Southington Board of Education Meeting

Thursday, February 24, 2022 6:30 PM
John Weichsel Municipal Center Public Assembly Room, 200 North Main Street, Southington, CT 06489
200 North Main Street
Southington, CT 06489

COMMITTEE OF THE WHOLE - OPERATIONS

1. CALL TO ORDER
2. Executive Session - 6:30 p.m.
    a. Student Matters
    b. UPSEU Contract Negotiations
    c. Review & Discussion of Special Education Audit Proposal
    d. Superintendent's Mid-year Evaluation
3. Reconvene Meeting - Regular Session - 7:00 p.m.
4. Pledge of Allegiance
5. Celebration of Excellence - Neo Sebastian Reyes - Senator Murphy's Annual Martin Luther King, Jr. Essay Contest Winner
6. Approval of Minutes
    a. January 27, 2022 Meeting
    b. February 8, 2022 Special Meeting
7. Public Communications
    a. Communications from Student Board Representatives
    b. Communications from Board of Education
    c. Communications from Administration
    d. Communications from Public
8. Committee Reports
    a. Policy & Personnel Committee Meeting - February 2, 2022
    b. Curriculum & Instruction Committee Meeting - February 11, 2022
    c. Finance Committee Meeting - February 15, 2022
9. Superintendent's Report
    a. Personnel Report
10. Old Business
    a. Town Government Communications
    b. Science - Kindergarten Units - Second Reading
11. New Business
    a. Air Quality Discussion
    b. Approval of Out of State/Overnight Field Trip
    c. Policy 3542.1 Purposes and Facilities - Food Service - *Policy Revision* - First Reading
    d. Policy 5145.3 Sexual Harassment of Students - *Policy Revision* - First Reading

e. Science - Grade 1 Units - First Reading
f. Library Media Proposal for Grades 3-5 - First Reading
g. Leonard & Gladys Joll Scholarship Committee Appointment
h. Southington High School Graduation Date

12. Adjournment

The minutes presented within this document provide a summary of the discussion that took place at the Board of Education meeting. For the complete discussion of the agenda items, please view the video of the Board meeting on our website at www.southingtonschools.org. These minutes are considered a draft until approved at the following regular Board of Education meeting.

SOUTHINGTON BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT
REGULAR MEETING

JANUARY 27, 2022

The regular meeting of the Southington Board of Education (Committee of the Whole - Instruction) was held on Thursday, January 27, 2022, at 7:00 p.m. as a public meeting in the John Weichsel Municipal Center Public Assembly Room, 200 North Main Street, Southington, Connecticut with an Executive Session preceding at 6:30 p.m.

1. CALL TO ORDER

Mrs. Colleen Clark, Chairperson, called the meeting to order at 6:34 p.m.

Board members present were Mrs. Dawn Anastasio, Mr. Joseph Baczewski, Mrs. Terri Carmody, Mr. Sean Carson *(arrived at 6:48 p.m.),* Mr. James Chrzanowski *(arrived at 6:48 p.m.),* Mrs. Colleen Clark, Mr. David Derynoski, Mr. Zaya Oshana, and Mr. Jasper Williams.

Cabinet administrators present were Mr. Steven Madancy, Superintendent of Schools, and Mr. Frank Pepe, Assistant Superintendent. Also present: Mrs. Sherri DiNello, Consultant.

2. EXECUTIVE SESSION – NIPSEU & UPSEU NEGOTIATION UPDATES AND STUDENT MATTERS

MOTION: by Mr. Derynoski, second by Mr. Oshana:

"Move to go into Executive Session, excluding the public and the press, for the purpose of discussing UPSEU and NIPSEU Negotiation Updates and Student Matters, and upon conclusion reconvene to public session."
Motion carried unanimously by voice vote.

Mrs. Clark ended Executive Session at 7:10 p.m.
The Regular Board Meeting was reconvened at 7:15 p.m.

3. RECONVENE MEETING – REGULAR SESSION

Board members present were Mrs. Dawn Anastasio, Mr. Joseph Baczewski, Mrs. Terri Carmody, Mr. Sean Carson, Mr. James Chrzanowski, Mrs. Colleen Clark, Mr. David Derynoski, Mr. Zaya Oshana, and Mr. Jasper Williams.

Cabinet administrators present were Mr. Steven Madancy, Superintendent of Schools; Mr. Frank Pepe, Assistant Superintendent; Mrs. Jennifer Mellitt, Director of Business & Finance; and Ms. Rebecca Cavallaro, Director of Pupil Personnel Services.

Student Representatives present were Jhalissa Vincent, Ethan Solury, and Angelina Micacci.

4. PLEDGE OF ALLEGIANCE

The student representatives led in reciting of the Pledge of Allegiance.

MOTION: by Mr. Carson, seconded by Mr. Oshana:

"Move to add Agenda Item 9.e 'Retired Teacher Compensation Daily Rate for Substituting' to the agenda."
Motion carried unanimously by voice vote.

MOTION: by Mr. Oshana, seconded by Mr. Williams:

"Move to move Agenda Item 9.a 'Approval of Out of State/Overnight Field Trips' to Agenda Item 5.a."
Motion carried unanimously by voice vote.

MOTION: by Mr. Oshana, seconded by Mr. Derynoski:

"Move to add Agenda Item 9.f 'Student Expulsion 2021-2022-08' to the agenda."
Motion carried unanimously by voice vote.

MOTION: by Mr. Oshana, seconded by Mrs. Carmody:

"Move to add Agenda Item 9.g 'Student Expulsion 2021-2022-10' to the agenda."
Motion carried unanimously by voice vote.

5. APPROVAL OF MINUTES – JANUARY 13, 2022

MOTION: by Mr. Baczewski, seconded by Mr. Williams:

"Move to approve the Regular Board of Education minutes of January 13, 2022, as submitted."
Motion carried unanimously by voice vote.

5.a. Approval of Out of State/Overnight Field Trips *(Moved from Agenda Item 9.a)*

Mr. Edward Barry, Robotics Advisor, came to the podium and explained the FIRST Robotics World Championship Competition to be held at the George Brown Convention Center in Houston, Texas from April 19-24, 2022. There were 43 SHS students planning to attend through individual fundraising to offset travel expenses. Mrs. Clark questioned if there was trip cancellation insurance. Mr. Barry explained that FIRST Robotics headquarters located in New Hampshire was looking into cancellation insurance in case the whole event needed to be cancelled. The SHS FIRST Robotics Team advisors were working with the hotel and airlines for vouchers in the event they were not able to be used in April and could be used for a future event.

MOTION: by Mrs. Carmody, seconded by Mr. Derynoski:

"Move to approve the SHS Robotics Team Out of State/Overnight Field Trip."
Motion carried unanimously by voice vote.

Mrs. Joy Cooney, FBLA Advisor, came to the podium with the officers of the Future Business Leaders of America (FBLA) and FBLA President, Ryan Ogren, explained that the National Leadership Conference Competition would be held at the McCormick Place Center in Chicago, Illinois from June 28-July 2, 2022. He stated that 12 FBLA members expressed interest in attending if they qualify at the state level and that there would be ongoing fundraising.

MOTION: by Mr. Oshana, seconded by Mr. Derynoski:

"Move to approve the Out of State/Overnight Field Trip for FBLA to attend the National Convention."
Motion carried unanimously by voice vote.

6. PUBLIC COMMUNICATIONS

a. Communications from Student Board Representatives

Jhalissa Vincent reported on the following:

- On Monday, January 24, the annual American Legion Oratorical Contest was held with five Southington High School contestants talking about the Constitution for eight minutes as well as a specific amendment for possible scholarships. Student Representative, Ethan Solury, placed third.
- WISE (Women in Science Club) met on January 27 to discuss "Leaving a Legacy". They invited alumni to talk about their experiences at Cornell, MIT, UConn, and other universities in the field of science.
- January 26 was the end of semester one (1) and January 27 was the beginning of new classes. Grades for the first semester will be finalized by Friday, February 4.
- All Juniors will be taking the NGSS (Next Generation Science Standards) Science Assessment on February 9-11, 2022.

Ethan Solury reported on the following:

- Kennedy and DePaolo Middle Schools Drama Club started their rehearsals for the live spring production of the musical "School of Rock" to be held March 31-April 1, 2, 7, 8, 2022 at 7:00 p.m. at Southington High School.
- An SHS student started an initiative named, "Valentines for Veterans" to provide Valentines to 189 veterans living at the Veterans Administration Hospital, as well as skilled-nursing facilities in Southington, Wolcott, and Bristol. The SHS student is working with students from Kennedy and DePaolo Middle Schools to reach his goal.
- Hat Day was held at Derynoski (DES) School to raise money for their Polar Plunge Team. A new initiative at DES is that they are announcing strategies for student awareness such as Mindful Monday, Tranquility Tuesday, Wellness Wednesday, Fun Fact Thursday, and Funny Friday with tips given by the School Psychologist, Social Worker, Physical Education teacher and Mrs. Verderame, Principal.
- South End kicked off 2022 celebrating their new December Charter Champions at a virtual school assembly and held a food drive donating over 200 pounds of food

to the Southington Community Center. South End voted on a new school mascot "South End Sharks".

Angelina Micacci reported on the following:

- The Southington Boys Ice Hockey Co-op Team was collecting Teddy Bears to donate to hospitals in memory of the St. Luke Prep High School ice hockey player, Teddy Balkind from New Canaan, who was killed in an ice hockey incident in early January. Teddy Bear donations will be collected at home ice hockey games.
- She reported on the SHS Girls Basketball, SHS Boys Basketball, Girls Gymnastic SHS Wrestling, Cheerleading, Boys and Girls Indoor Track, Boys Swimming and Diving Teams seasons to date.

Mrs. Carmody commented on the American Legion Oratorical Contest and how the students prepare and speak on the Bill of Rights and that their communication skills and knowledge make her so proud. She noted that Mrs. Clark and Mr. Madancy were judges and thanked the American Legion for sponsoring it.

b. Communications from Public

There were a number of residents *(Attachment #1)* who came to the podium to voice their comments, recommendations, requests, and concerns regarding the following: Use of federal funds by Southington, budgeting priorities, lowest per pupil spending in the state, HVAC (Heating, Ventilation, and Air Conditioning) in schools including short-term and long-term replacement schedules for obsolete systems, ventilation and indoor air quality in classrooms, parent donating homemade air filtration unit to Flanders and did not receive any follow-up from the Board to do the same for other classrooms, safety of homemade air filtration units, budget line for investment of indoor air quality and monitoring, upgrade of HVAC in oldest schools, Board taking action on Critical Race Theory (CRT) and six tenets to not be taught in Southington, mask mandates no longer justifiable, Center for Disease Control (CDC) statement that cloth masks are face decorations, N95 masks not sized for children, ESSER (Elementary & Secondary School Emergency Relief) Funds attached to mask mandates, campaign promises, sending formal letter to Governor Lamont requesting that his Executive Powers lapse and to restore the authority to local municipalities and school boards, testimonies from teachers on negative impact of COVID and mask mandates on students in the classroom, denial of mask exemptions, proclamations to state against mandates and end the Governor's Executive Powers, silent parents who are happy with the mask mandates for safety of children and happy how the Board of Education has handled the mandates.

Please see the YouTube video link of the meeting and public communication below that also can be found on both the Town of Southington and Southington Board of Education websites: https://www.youtube.com/channel/UC59RScd50ReAqz-PnbXUSSQ/playlists

Mr. Carson commented on all the work that goes into putting the budget together. He asked Mr. Madancy to address again the budget process for the public. He asked that Mr. Madancy or Mr. Romano, Director of Operations, address the parent's concern regarding an air quality management program especially pertaining to Kelley and Flanders Schools as well as the district's Capital Project strategies over the next two years while the Board waits to hear from the state on what the new construction reimbursement rate would be. Mrs. Clark noted that it would be a lengthy conversation and stated that his concerns would be included as an agenda item for the next Board meeting.

c. Communications from Board Members

Mr. Baczewski stated that the 2022-2023 operational budget reflected what was best for educating the students of Southington to assist in their future success and provide great services to the taxpayers. He noted that it had been two years since the pandemic health crisis and witnessing the best and worst in humanity. He thought that the current state of affairs did not provide sufficient grounds to allow for continuation of Emergency Powers by Governor Lamont and that the state should be able to function now with the three branches of government. He noted how the Governor's Emergency Power mandates affected the education environment and that after two years of Emergency Powers it should now be in the hands of the elected legislators.

MOTION: by Mr. Baczewski, seconded by Mr. Carson:

"Move to add to the agenda a Board of Education Resolution that is apolitical stating that the Town of Southington could effectively manage the business of the town."

Mr. Baczewski requested that the Resolution state, "*On this day, the town of Southington thanks the service of Governor Lamont for the work that he has performed during the health emergency, but respectfully asks that he does not seek continuation of Emergency Powers and, therefore, allow Government to return to function as intended by our constitution. That localities be restored to their ability to manage health, education, and daily operations under the guidance of law set forth by the legislative branch, executive branch, and judicial branch. That discretion of health services be interpreted at the local level to best serve this community and its needs."*

Mr. Chrzanowski asked for clarification on what they were voting on because the Board members did not have the Resolution language in front of them. Mr. Carson noted that Mr. Baczewski wanted to add it as an agenda item and up for discussion to create a Resolution. Mr. Madancy pointed out that they needed a two-thirds vote to add it to the agenda.

ROLL CALL VOTE:
YES: Mrs. Anastasio, Mr. Baczewski, Mr. Carson, Mr. Chrzanowski, Mr. Williams, Mrs. Clark.
NO: Mrs. Carmody, Mr. Derynoski, Mr. Oshana.
Motion passed with six in favor and three opposed.

Mrs. Clark stated that the BOE Resolution would be added to the agenda as Agenda Item 9.h.

Mrs. Clark commented that, as a judge of the American Legion Oratorical Contest, she was amazed by the students' poise on stage and the knowledge the students possessed.

d. Communications from Administration

Administration reported on the following:

1. 2021 AP Computer Science Award: Mr. Madancy announced that administration was recently notified by the College Boards that Southington was recognized as one of the top 2021 AP (Advanced Placement) Computer Science Female Diversity Award recipients. It

recognizes 1,020 schools in the nation with 300 in Connecticut alone and is an honor not bestowed on many high schools.

2. Seal of Bi-Literacy: Mr. Madancy explained that Southington High School is one of only 58 districts in the state participating in the Seal of Bi-Literacy on high school transcripts. He credited the SHS World Language and English Language Departments for their efforts in bringing the students to a level of proficiency because those are not easy seals to earn.

3. Year One of Digital SAT: Mr. Madancy announced that the College Board is shifting the SAT's to be online and digital. Southington has a device for each student now. The College Board goal is to have all students taking the SAT online by 2024.

4. Narcan Donation: Mr. Madancy thanked Mrs. Cathy O'Hara, RN, District Nursing Supervisor, for her efforts in Southington obtaining a grant for Narcan to be available in the high school, middle schools, and Karen Smith Academy. Southington has always had Narcan in the secondary schools and this was a replenishment in case of an overdose crisis that recently happened to a 13-year-old student in Hartford who passed away.

5. SHS DECA Recognition: Mr. Madancy announced that the high school DECA chapter was recognized as a "DECA Campaign Program" for the 2022-2023 school year, which is an honor for the high school's DECA chapter model of excellence.

7. COMMITTEE REPORTS

a. Curriculum & Instruction Committee Meeting – January 14, 2022

Mr. Baczewski reported that the committee discussed the Senior Capstone Experience, which created another opportunity for STEPS and Southington High School to collaborate. He stated that Ms. Discenza, Director of Guidance, provided an overview of the five modules. STEPS will use a grant to purchase the program and upon approval Mrs. Megan Albanese, STEPS Director, will send a letter to senior class families. The committee received a presentation on the proposed three Kindergarten Science Curriculum Units, which is on the agenda as a first read. The committee was presented the implicit bias videos by Mr. Pepe that was referenced during the public comments at the November Board of Education meeting. The committee members requested further follow-up on this curriculum. The committee mapped out their next four meetings on Fridays in February-May.

8. OLD BUSINESS

a. Town Government Communications

Mrs. Clark reported that she attended a "Meeting of the Chairs" last week with the Chairs of Town Council, Board of Finance, Board of Education, Planning & Zoning, and Mr. Sciota, Town Manager, and Mr. Madancy. They discussed what was happening in the community. On January 31, they will be addressing the Grand List, on February 9 Governor Lamont's budget, and the Infrastructure Bill in June.

b. Capital Improvement Plan 2022-2023 to 2026-2027 – Revision

Mr. Madancy stated that he and Mr. Sciota provided an update on the Capital Improvement Plan at the last Board meeting about the shifting of projects and the years that they would be addressed at referendum. The revised Capital Improvement Plan addresses the shift from the project originally designated as 2023 for referendum to 2022 and the projects designated as 2022 projects over to 2023 for referendum. He thanked Ms. Hill, Accounting

Manager, for revising the Capital Plan, which allows the Town Manager to include in the Town's Budget presentation for approval.

MOTION: by Mr. Derynoski, seconded by Mr. Williams:

"Move to approve the revised Capital Improvement Plan, as submitted."
Motion carried unanimously by voice vote.

c. SHS – GPA and Weighting Proposal – Second Reading

MOTION: by Mr. Williams, seconded by Mr. Derynoski:

"Move to approve the SHS GPA and Weighting Proposal, as presented."
Motion carried unanimously by voice vote.

d. SHS World Language New Course Proposal – Classical Mythology ECE – Second Reading

MOTION: by Mr. Baczewski, seconded by Mr. Derynoski:

"Move to approve the SHS World Language New Course Proposal – Classical Mythology ECE (Early College Experience), as recommended by the Curriculum & Instruction Committee."
Motion carried unanimously by voice vote.

e. SHS English Course Proposal – English IV – Second Reading

MOTION: by Mr. Baczewski, seconded by Mr. Williams:

"Move to approve the SHS English Course Proposal – English IV, as recommended by the Curriculum & Instruction Committee."
Motion carried with eight in favor and Mrs. Carmody opposed.

f. Science Grade 3 Unit - Migrating Monarchs – Second Reading

MOTION: by Mr. Baczewski, seconded by Mr. Carson:

"Move to approve the Science Grade 3 Unit - Migrating Monarchs, as recommended by the Curriculum & Instruction Committee."
Motion carried unanimously by voice vote.

g. Science Grade 4 Unit – Mimicking the Natural World – Second Reading

MOTION: by Mr. Baczewski, seconded by Mr. Carson:

"Move to approve the Science Grade 4 Unit - Mimicking the Natural World, as recommended by the Curriculum & Instruction Committee."
Motion carried unanimously by voice vote.

h. SHS Textbook Proposal – AP Biology – Second Reading

MOTION: by Mr. Baczewski, seconded by Mr. Williams:

"Move to approve the SHS Textbook Proposal – AP Biology, as recommended by the Curriculum & Instruction Committee."
Motion carried unanimously by voice vote.

i. Policy 4118.8 Alcohol and Drug Use – Policy Revision – Second Reading

MOTION: by Mr. Williams, seconded by Mr. Baczewski:

"Move to approve the Alcohol and Drug Use policy revision, as proposed by the Policy & Personnel Committee."
Motion carried unanimously by voice vote.

j. Policy 5131.6 Drugs, Alcohol, Tobacco – Policy Revision – Second Reading

MOTION: by Mr. Williams, seconded by Mr. Baczewski:

"Move to approve the Drugs, Alcohol, Tobacco policy revision, as proposed by the Policy & Personnel Committee."
Motion carried unanimously by voice vote.

k. Policy 6146.1 Grade Reporting – Policy Revision – Second Reading

MOTION: by Mr. Williams, seconded by Mrs. Carmody:

"Move to approve the Grade Reporting policy revision, as proposed by the Policy & Personnel Committee."
Motion carried unanimously by voice vote.

l. Policy 9321 Time, Place Notification of Meetings – Policy Revision – Second Reading

MOTION: by Mr. Williams, seconded by Mr. Derynoski:

"Move to approve the Time, Place Notification of Meetings policy revision, as proposed by the Policy & Personnel Committee."

Mr. Derynoski pointed out that there was discussion on a Board meeting sign-in book and asked if it would be implemented at some point. Mr. Williams noted that it was part of the discussion and not part of the policy. Mr. Pepe added that it was not written into the policy, but it could be a practice adopted by the Board. Mr. Derynoski noted that in the past, it was at the discretion of the Board Chairperson and if someone from the public was to come in late and not able to sign-in they would still be allowed to speak. Mrs. Clark pointed out that there was currently a sign-in sheet. Mr. Williams explained that the committee discussed that the Chair now has the option to adjust the public comment time, as needed. Part of the change in the language was that the Chair had the discretion to adjust the time for public comment and that the book gives the chair the ability to see the number of people who signed up for public communication and the chair, knowing the length of the agenda, would be able to adjust the public speaking time accordingly. Mr. Madancy stated that it would be an administrative procedure and once the practice was established it would become the expectation. When there's lengthy public comments, it could detract from the Board's ability to do business based on what is on the agenda. Mrs. Clark responded that the policy was just revised to allow the public five (5) minutes to talk regardless of the number of people who show up to speak. Mr. Williams explained that there was another line in the policy stating that the Chair had the ability to adjust the time.

Motion carried unanimously by voice vote.

9. NEW BUSINESS

a. Approval of Out of State/Overnight Field Trips *(Moved to Agenda Item 5.a)*

b. Science – Kindergarten Units – First Reading

This was a first read and will come before the Board at their next regular meeting for action. Mrs. Clark stated that if the Board members had any questions to contact Mr. Baczewski.

c. Ratification of Nutmeg Independent Public Safety Employees Union (NIPSEU) Southington Secretarial & Food Service Workers Contract

MOTION: by Mr. Oshana, seconded by Mr. Williams:

"Move to approve the Nutmeg Independent Public Safety Employees Union (NIPSEU) Southington Secretarial & Food Service Workers Three-year Contract July 1, 2021-June 30, 2024."

Motion carried unanimously by voice vote.

d. Review / Adoption of 2022-2023 Board of Education Operating Budget

Mr. Madancy stated that an additional reduction was made to the Superintendent's initial proposed 2022-2023 Operating Budget after the settling of the Secretarial & Food Service Workers (NIPSEU) Contract. The reduction was for $116,529 and comes after adding in the rental of facilities and the student activities increase for Robotics. The final budget number was $104,618,146 for an increase of four percent (4.00%).

MOTION: by Mr. Baczewski, seconded by Mrs. Carmody:

"Move that the Board of Education approve the 2022-2023 Operating Budget in the amount of $104,618,146."

Mrs. Clark thanked the administrators for their efforts and work on the budget. Mr. Madancy stated that the administrative team made some nice changes to the budget from the way that it was done in the past and that they deserved the credit.

Motion carried unanimously by voice vote.

e. Retired Teacher Compensation Daily Rate for Substituting

MOTION: by Mr. Carson, seconded by Mr. Derynoski:

"Move to approve the unaffiliated compensation for retired teachers who substitute to $135.00 per day."
Motion carried unanimously by voice vote.

f. Student Expulsion – 2021-2022-08

MOTION: by Mr. Oshana, seconded by Mr. Williams:

"Move to expel Student 2021-2022-08, as stipulated by the administration."
Motion carried unanimously by voice vote.

g. Student Expulsion – 2021-2022-10

MOTION: by Mr. Oshana, seconded by Mr. Derynoski:

"Move to expel Student 2021-2022-10, as stipulated by the administration."
Motion carried unanimously by voice vote.

h. Resolution to the State *(Added to the agenda)*

Mr. Madancy clarified that the motion was to add this as an agenda item and that there currently was no motion on the floor. As an agenda item it could be discussed, or a motion could be introduced.

Mr. Baczewski stated that he would like the Board to discuss and come up with an apolitical resolution that they all could support. This would be a resolution to send to Governor Lamont. Mrs. Carmody questioned what the resolution to the Governor would include because she had a problem with a resolution. Mrs. Carmody thought that the Board of Education did not have jurisdiction to not follow what the Governor was mandating. She acknowledged that the Board of Education does not agree with what the Governor was telling them to do; however, she thought that the resolution was something that the Board of Education should not be doing. Mr. Baczewski clarified that he was not looking to be specific about mask mandates or any other mandate on the resolution. His concern was that the Governor should not be asking for continued Emergency Powers, which would force all the current mandates that are in place to be discussed by the legislators. Mrs. Carmody remarked that it was up to the General Assembly to determine whether the Governor receives continuation of his Emergency Powers and not something that the Board of Education would have anything to do with. Mr. Baczewski stated that the Resolution would show that the Board of Education did not support emergency mandates. The Board had a lengthy discussion on whether to send a resolution/letter and the wording of it.

Mrs. Clark stated that to form a resolution and consensus during the meeting was impossible and suggested that the Board meet with administration on an exit plan to get local control back and send the resolution/letter to the Governor. Mr. Baczewski's concern was the timeline because the Governor's Emergency Powers were up for reevaluation in February. Mr. Baczewski remarked that the Board could make the best decisions for the students along with the guidance from the Regional Health Director. Mr. Derynoski stated that the Board would be addressing the resolution/letter to the wrong person and that the letter should be sent to the legislature because they are the ones who control the Governor and would grant him the authority to continue with Executive Power. Mr. Derynoski recommended that a Board member write the resolution/letter and bring it to the next Board meeting on February 24. Mr. Baczewski stated that it was unacceptable because the legislature would be voting on the Executive Powers before that date.

Mr. Carson recommended that the chair call for a Special Meeting to discuss and vote on a resolution/letter. Mrs. Clark appointed a subcommittee of Mr. Baczewski, Mr. Williams, and Mr. Oshana charged to write a bipartisan resolution/letter to send to the legislature. Meet the first week of February to do it and then present it at the Special Meeting. Mr. Madancy added that the FOI Commission still allows for meetings to be held virtually online until April 20, 2022. If needed, the Board Special Meeting could be done virtually and would be the only item on the agenda that would be posted.

10. ADJOURNMENT

MOTION: by Mr. Derynoski, seconded by Mr. Oshana:

"Move to adjourn."

Motion carried unanimously by voice vote.

The meeting adjourned at 8:49 p.m.

Respectfully submitted,
Linda Blanchard
Recording Secretary

ATTACHMENT #1 – PUBLIC COMMUNICATIONS

Southington Board of Education
PUBLIC COMMUNICATION
January 27, 2022

	NAME	ADDRESS	TOPIC
1	Katie Wade	39 Madelyn Ln	
2	Todd Kitcher	270 Chesterwood Terr	Ventilation
3	Steven Baleshiski	191 Queen Street	CRT
4	Tyler Young	48 Berkley Ave	mask mandates
5	Susan Zatchonski		
6	Michael Kryzanski	27 Hitchcock Post Drive	government mandate
7	Kathy Reilly	58 Doral Lane	masks
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Southington Board of Education Special Meeting

Tuesday, February 8, 2022 – 7:00 p.m.
This meeting will convene virtually
Join Zoom Meeting
Call - 1 646 558 8656
Meeting ID: 880 5766 5294
Passcode: 257798

Board Members Present: Mrs. Colleen Clark, Board Chairperson, Mr. Joseph Baczewski, Board Vice-Chairperson, Mrs. Dawn Anastasio, Board Secretary. Mrs. Terri Carmody, Mr. Sean Carson, Mr. James Chrzanowski, Mr. David Derynoski, Mr. Zaya Oshana, Mr. Jasper Williams.
Administration Present: Mr. Steven Madancy, Superintendent of Schools and Mr. Frank Pepe, Assistant Superintendent of Schools

Mrs. Clark called the meeting to order at 7:01 p.m.

Mrs. Clark read a statement explaining the background behind comprising a letter to the State Legislature, and read the letter. Mrs. Clark thanked BOE members who contributed to the letter, and then turned the meeting over to Mr. Madancy for clarification on Governor Lamont's recent announcement.

Mr. Madancy explained Governors Lamont's statement made on Monday February 7,2022 and clarified some language. Logistics regarding the bill are still being worked out at the legislative level, and the legislature is not in session until Thursday. There has been no action by the legislature at this time concerning next steps. If they choose to use the same language as in the past, it will provide authority to the State Commissioner of Education to provide guidance on mask-wearing, etc. If the Commissioner issues guidance that masks are no longer required, that ends the mask mandate. That can only be changed if the local BOE adopts a mandatory mask policy, or the Commissioner of Education revises her guidance in the future. Mr. Madancy also confirmed that we will be working with our local health director and develop correspondence for families in Southington.

After discussion, there was a consensus and all BOE members agreed that the letter read should be sent to Governor Lamont's office as well as the CSDE and DPH.

Motion to adjourn the meeting made by Mr. Derynoski, seconded by Mr. Chrzanowski.

Meeting adjourned at 7:41 p.m.

Respectfully Submitted,
Dawn Anastasio, Secretary
Southington Board of Education

Board of Education

Administrative Report

February 24, 2022

1. STEPS/SPD Partnership
2. STEPS Parent University
3. Masks in schools
4. SEF Gala location, date and time
5. DECA Gold Certification
6. Cable Advisory and PEGPETIA Grant
7. Athletic Facilities and Roof Update

Steven G. Madancy
Superintendent of Schools

Frank M. Pepe
Assistant Superintendent of Schools

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Southington Public Schools

Board of Education
Southington, Connecticut

Policy & Personnel Committee
Wednesday, February 2, 2022 - 5:30pm
Superintendent's Conference Room

Members in attendance: Chairman Jasper Williams, Dawn Anastasio, David Derynoski, Zaya Oshana

Meeting was called to order at 5:47 PM

1. Policy 3542.1 Purposes and Facilities – Food Service - *Policy Revision* to comply with recent legislative changes. District Food Manager Nya Welinsky was consulted during the policy revision process. No student will ever be deprived of a reimbursable meal due to forgotten or lost money. Procedures to charge a meal and subsequent collection of owed money was reviewed. After 30 meals are charged, the family is referred to the District's Homeless Education Liaison. Regulations to address a family effectively and respectfully for unpaid meals are in place through the associated regulations. This policy shall be available to all households at all times via student/parent handbooks, on online portals that households use to access student accounts, placed on the District's website, on the website of each school, and published at the beginning of each school year at the time information is distributed regarding free and reduced price meals and again to the household the first time the policy is applied to a specific child.

2. Policy 5145.3 Sexual Harassment of Students – *Policy Revision* to comply with recent legislative changes. Discussion ensued around Title IX, sex discrimination and sexual harassment and the district's responsibility to investigate any such allegation based on the adopted policy and associated regulations.

   All members were in favor of bringing the aforementioned policies forward to the full Board for a first read at the February 24, 2022 BOE meeting.

The meeting was adjourned at 6:20 PM

Respectfully Submitted,

Frank Pepe

Frank Pepe

Steven G. Madancy
Superintendent of Schools

Frank M. Pepe
Assistant Superintendent of Schools

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Southington Public Schools

Board of Education
Southington, Connecticut
Curriculum & Instruction Committee Meeting Minutes
Friday, February 11, 2022 - 9:00 a.m.
Technology Training Lab, Municipal Center

Members Present: Dawn Anastasio, Jasper Williams, Terri Carmody; **Absent**: Committee Chair Joseph Baczewski

Administration Present: Assistant Superintendent Frank Pepe, Assistant Principal Richard Aroian, Director of Teaching and Learning for Secondary Education Dianne Holst-Grubbe, Coordinator PreK-8 English Language Arts / PreK-5 Social Studies Stephanie Lawlor, Digital Learning Coordinator Rebecca Savelkoul, District Math and Science Coordinator Amy Zappone

School Staff Present: Teacher Heather Allenback, Teacher Kerri Laferriere, K-5 Science Leader Melissa O'Neil

Meeting called to order at 9:08 a.m. by Mrs. Carmody

First Grade Science Units - Melissa O'Neil and Amy Zappone presented four new first grade units titled, Playground Shadows, Film Animation, Senses in Nature and Seasonal Changes.

Playground shadows (Unit 1) involves shadow length and position change in respect to the sun's position in the sky. Students actively explore the moon lit by the sun, shadow puppets, a disco ball, prisms, flashlights, mirrors, and the creation of sundials.

Film animation (Unit 2) involves the science of film and how light and sound are used to communicate information. Students explore light and sound with tuning forks, elastics bands, word vibrations, the creation of sound maker.

Senses in nature (Unit 3) transforms students into plant and animal scientists who determine how their external parts help each to meet the needs to grow and survive. The tulip, the Venus flytrap and the star nosed mole are used to develop the concept of biomimicry.

Seasonal changes (Unit 4) examine how living things respond to seasonal changes. Unlike humans, plants and animals have strong biological seasonal cycles that are linked to the amount of sunlight each day. Students will learn what it is like to be a field biologist.

Library Media Grades 3-5 - Rebecca Savelkoul presented three new elementary library media units.

Tech and Digital Citizenship (Unit 1) – demonstrates how to be good digital citizen.

- Grade 3 – Who am I online? What am I doing? AM I believing what I'm seeing online?
- Grade 4 – What to share? How to keep things private? Editing media online.
- Grade 5 – Cyberbullying and behavior online.

Research and Info Literacy (Unit 2) allows the library media specialist to make connections with classroom teachers. The lessons focus on the following: research skills, 21st century tools, presentation skills, identify valid digital resources, attribute correctly.

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Innovative Design (Unit 3) focuses on computer coding and directly connects to existing emotional intelligence work. For example, students will reach a level of frustration when coding and it is critical for each to emotionally regulate to persevere.

Information to address questions posed from the January 14th C/I meeting – Language Arts Coordinator Stephanie Lawlor and Teacher Kerri Laferriere shared the context for one of the five implicit bias videos utilized in grade eight ELA classes. The lesson described is not focused on implicit bias but rather the video is used to instill the importance of rereading through a turn and talk that identifies; what was complicated? and what did you not understand?

Frank Pepe offered answers to questions raised during the March C/I meeting.

- Citizenship in Action Course Description – Students focus on both skill development and content understanding as they explore topics such as the structure and function of government, a citizen's rights and responsibilities, the media's role in informing the public, elections and the democratic process, political ideologies that shape American government, and the potential for reform and change. Part of the course centers on a required action inquiry project that students explore through the year. Students investigate an issue or problem at levels that range from the school community to the global society, create solutions and present their findings. The result of the course is to prepare students to be active participants in civic life in both their communities and our democracy.
- Enrollment – This is a required course for all Juniors. Currently, four classes run with a total of 83 students. This course offering was intentionally moved to Junior year so students could engage in age-appropriate discussions since most are a year away from voting.
- Talking Points – Assistant Principal Rich Aroian and Department Leader Heather Allenback described the larger context regarding when and if the implicit bias videos are used. The purpose is student centered focused with a graphic organizer consisting of two columns, *1. Notable quote or Detail and 2. Your Observation/Comment*. The exercise is used as a steppingstone to define and introduce media bias. Nothing in the lesson focuses on students releasing their own bias. Instead, it is directed to empower students as consumers of information via metacognitive reflection.

Discussion ensued around Board Policy 6144 which deals with teaching controversial issues. Essentially, instructors have a responsibility to provide the opportunity for responsible discussion of controversial issues. These discussions are objective and representative of all major points of view. Instructors approach these issues in an impartial manner and cannot promote a partisan view. It is critically important for students with differing views to express selves to others civilly. This is real world application.

Meeting was adjourned at 10:25 a.m.

Respectfully Submitted,

Frank Pepe

Frank Pepe

SOUTHINGTON BOARD OF EDUCATION
Southington, Connecticut

FINANCE COMMITTEE MEETING
Tuesday, February 15, 2022, 6:30 p.m.
Video Conference

Board Members Present:	James Chrzanowski; Sean Carson; David Derynoski; Zaya Oshana
Present from Administration:	Jennifer Mellitt, Director of Business & Finance; Kaiya Hill, Accounting Manager; Nya Welinsky, Food Services Director

The Finance Committee meeting was called to order at 6:31 p.m.

1. **FOOD SERVICE FINANCIAL UPDATE:**

Ms. Hill presented the Comparative Income statements for 6/30/2021 and 6/30/2020. She noted how Food Services had incurred losses over the last two fiscal years due to COVID beginning in March 2020. Overall, the losses totaled $560,222; however, through ESSER II funding, the Board of Education was able to contribute $500k to the Food Service program. This ultimately resulted in a $277,129 adjusted net income.

Ms. Hill explained that Southington continues to participate in the Seamless Summer Option which provides breakfast and lunch to students at no cost. Ms. Hill reviewed the balance sheet and noted that cash had significantly decreased due to meals being free to students; however, government reimbursements had increased. Ms. Hill reminded the committee that the Board loaned Food Services $300k from the FY20 non-lapsing account with no immediate intention on receiving the funds back. Mr. Carson stated that the Food Service program should be self-sustaining and therefore, loaning money should not be a practice. Ms. Mellitt mentioned that when the original loan was made, the Finance Committee developed guidelines for a future repayment when/if Food Services had a net profit over $30,000. We will revisit the repayment plan after the conclusion of FYE 06/30/2022 if a net profit exists.

Mr. Derynoski and Mr. Oshana shared the history that the Food Services Program has consistently been a self-sustaining, in-house program and the loan became necessary due to COVID. Mr. Derynoski and Mr. Oshana praised the Food Service Director and her staff for their past work and their hard work during these two pandemic years.

Ms. Hill reviewed the Comparative Income statements for the six months ending 12/31/2021, 12/31/2020, and 12/31/2019. She noted how it was important to compare the three years to show how the program's income and expenses were impacted pre-COVID, during the height of COVID and the hybrid learning model at the high school, and this year during COVID with the full enrollment of students. Despite these challenges, Food Services has a net income of $149,218. Cash sales are only generated from à la carte items and payments from teachers for meals. With Southington Schools going back to full in-person learning and meals being free, the number of meals served has increased by over 100,000.

Ms. Welinsky noted that her staff is tired but they continue to excel and proudly serve the students of Southington Schools. Ms. Welinsky thanked the committee for their support and left the meeting.

2. BOARD OF EDUCATION FINANCIAL UPDATE:

Mrs. Mellitt reviewed the financial update for the Board of Education through January 2022. She explained that the financial update highlights accounts with anticipated surpluses and deficits. A discussion was had about COVID contact tracing salaries (A/C 11400) mainly consisting of nurses and secretaries. At this point, we do not anticipate a large surplus at year end.

3. MISCELLANEOUS:

None.

The meeting adjourned at 7:30 p.m.

Respectfully submitted,

Jennifer Mellitt

Jennifer Mellitt
Director of Business & Finance

ITEM 1

FOOD SERVICE

FINANCIAL UPDATE

Southington Public Schools

Kaiya N. Hill
Accounting Manager

MEMO

TO: BOE Finance Committee
DATE: February 14, 2022
RE Southington Food Services Financial Update

Attached are the following financial statements and meal count information for the Southington Food Services Program:

- Comparative Income Statement for FYE 06/30/2021 and 06/30/20
- Balance sheet as of 06/30/2021 and 12/31/2021
- Comparative Income Statement for the six months ending 12/31/2021, 12/31/2020 and 12/31/2019 (pre-COVID)
- Summary of meal counts for the 2019-20, 2020-21 and 2021-22 (YTD).

<u>Comparative Income Statement for FYE 06/30/2021 and 06/30/20</u>

The Food Service program incurred losses from operations over the past two fiscal years due to the COVID closure beginning in March 2020 and extending through the reduced enrollment in schools during the entire FY 2020-21 (remote schooling option and a hybrid model at the high school). A few key items to note:

- Losses for the two fiscal years totaled $560,222.
- The use of ESSER II grant funds as allowed by the guidelines contributed $500,000 to offset operating losses in the Food Service program resulting in an adjusted net income of $277,129 for FYE 06/30/2021.
- The Food Service program continues to participate in the Seamless Summer Option. This option provides breakfast and lunch to all students without cost to the student. The income statement shows the shift in the source of income from cash sales to the focus on reimbursement from the government. The only remaining cash sales are sales to teachers and the A La Carte items purchased by students (snacks, ice cream, etc).

<u>Balance sheet as of 06/30/2021 and 12/31/2021</u>

- Although cash has decreased in the six months through December by $368,359, the government receivable for meal reimbursement has increased by $524,430 thereby increasing assets by approximately $156,071.
- The student prepaid meal balances are $107,005

- A loan of $300,000 was made in November 2020 using the Non-Lapsing FY20 funds. No repayment of the loan is recommended at this time.

<u>Comparative Income Statement for the six months ending 12/31/2021, 12/31/2020 and 12/31/2019 (pre-COVID)</u>

- For the six months ending December 31, 2021, the Food Service operations has generated a net income of $149,218.
- The six months ending 12/31/2019 are included for comparison to a Pre-COVID period.
- The revenues for the six months ending 12/31/2021 are mainly from government meal reimbursements. The only cash sales remain sale of meals to teachers and the A La Carte items available for purchase.
- As a result of having all students back in schools full time and the meals being provided at no cost to the students, the number of meals being served has increased by well over 100,00 meals as compared to each of the previous two years as shown on the meal count attachment.
- The Food Service program continues to struggle with food supply chain issues which results in last minute menu changes and large increases in the cost of food and packaging for COVID protocols.
- Consistent with the economy, staffing for part time positions continues to be a problem.

Southington Schools Food Services
Income Statement
FYE 06/30/2021 & 06/30/2020

Account/ Description	06/30/2021	06/30/2020
98100 - SALES FULL PRICE LUNCH	6,537	487,516
98110 - SALES REDUCED LUNCH	110	7,256
98120 - SALES FULL PRICE BREAKFAST	148	30,787
98130 - SALES REDUCED BREAKFAST	7	1,199
98150 - MISC & A LA CARTE	155,459	332,122
98500 - SALES SEVERE NEED BREAKFAST	103	9,679
05 - SUBTOTAL - CASH SALES	**162,364**	**868,559**
98200 - REIMBURSEABLE FED LUNCH	1,281,767	495,844
98210 - REIMBURSEABLE FED BREAKFAST	92,472	122,834
98220 - REIMBURSEABLE KINDERGARTEN MILK	-	64
98300 - SEVERE NEED GOVERNMENT REIMBURSEABLE	172,089	7,648
98400 - GOV'T $0.07 REIMBURSEABLE LUNCHES	25,695	20,078
10 - SUBTOTAL - REIMBURSEABLE MEALS	**1,572,023**	**646,468**
98510 - CHILD NUTRITION & STATE BKFST GRANTS	48,538	45,034
98520 - HEALTHY FOOD INITIATIVE	36,622	36,634
98550 - DONATION INCOME	4,967	5,523
98600 - COVID REIMBURSEMENTS	68,235	-
20 - SUBTOTAL - GRANT REVENUE	**158,362**	**87,191**
98140 - CATERING SALES/MISC	98	497
98160 - SALES DAY CARE	-	24,199
98530 - REBATES & MISC	252	244
40 - SUBTOTAL - OTHER REVENUE	**350**	**24,940**
Total Revenue	**1,893,098**	**1,627,158**
11111 - SALARIES - DIRECTOR	(81,994)	(73,796)
11112 - SALARIES - BOOKKEEPER	(50,177)	(48,956)
11114 - SALARIES - SCHOOL PERSONNEL	(755,875)	(708,716)
20110 - CT MUNICIPAL RETIREMENT	(78,533)	(76,227)
20210 - FICA	(28,855)	(27,353)
20230 - MEDICARE	(12,140)	(11,189)
20310 - ACCIDENT AND HEALTH	(188,948)	(188,948)
50 - SUBTOTAL - SALARIES & BENEFITS	**(1,196,522)**	**(1,135,185)**
40000 - PURCHASES - LUNCH FOOD	(658,411)	(591,033)
40010 - PURCHASES - BREAKFAST FOOD	-	(24)
40050 - PURCHASES - PIZZA	-	(39,837)
40100 - PURCHASES - LUNCH SNACKS	(1,697)	(8,029)
40150 - PURCHASES - LUNCH MILK	(106,540)	(72,014)
40200 - PURCHASES - ICE CREAM	(13,212)	(15,274)
60 - SUBTOTAL - FOOD EXPENSES	**(779,860)**	**(726,212)**
40020 - SUPPLIES - KITCHEN	(81,282)	(36,671)
40030 - SUPPLIES - OFFICE	(873)	(2,399)
40400 - PURCHASES - SMALL WARES/KITCHEN	(2,087)	(3,209)
70 - SUBTOTAL - KITCHEN SUPPLIES	**(84,243)**	**(42,278)**
30000 - REPAIRS & MAINTENANCE	(25,979)	(21,354)
30100 - RENTALS & EQUIPMENT SYSTEM	(9,952)	(10,363)
50000 - EQUIPMENT	-	(6,082)
50100 - EQUIPMENT SYSTEM WIDE	-	(152)
80 - SUBTOTAL - EQUIPMENT & REPAIRS	**(35,931)**	**(37,951)**
33930 - MILEAGE REIMBURSEMENT	(934)	(2,744)
54300 - TECHNOLOGY / SOFTWARE	(9,009)	(13,530)
64000 - UNEMPLOYMENT & OTHER FEES	(9,050)	(4,798)
64100 - OTHER MISC EXPENSES	(421)	(1,810)
90 - SUBTOTAL - OTHER EXPENSES	**(19,413)**	**(22,883)**
Total Expenses	**(2,115,970)**	**(1,964,509)**
Net Income (Loss)	**(222,871)**	**(337,351)**
98700 - TRANSFERS IN FROM ESSER II GRANT	500,000	-
100 - TRANSFERS IN FROM GRANTS	500,000	-
Adjusted Net Income (Loss)	**277,129**	**(337,351)**

Southington Schools Food Services
Balance Sheet Comparison
6/30/2021 & 12/31/2021

Account/ Description	06/30/2021	12/31/2021
Assets		
10100-0000 Cash In Bank- Payroll	85	85
10120-3600 Cash Checking- Accounts Payable	689,474	321,114
10400-1100 Government Receivables	350,568	874,998
10450-1120 Inventory- Food	38,818	38,818
Total Assets	**1,078,945**	**1,235,016**
Liabilities		
10605-2100 Student Prepaid Balances	100,153	107,005
10608-2200 SPS Food Service Subsidy	300,000	300,000
Total Liabilities	**400,153**	**407,005**
Equity		
10900-0000 Fund Balance	401,663	401,663
10940- 0000 Revenue Control	2,393,098	3,707,461
10950-0000 Expend Control	(2,115,970)	(3,281,113)
Total Equity	**678,792**	**828,011**
Total Liabilities & Equity	**1,078,945**	**1,235,016**

Southington Schools Food Services
Income Statement
Six Months Ending 12/31/21,12/31/20,12/31/19

Account/ Description	6 Mo. Ending 12/31/2021	6 Mo. Ending 12/31/2020	6 Mo. Ending 12/31/2019
98100 - SALES FULL PRICE LUNCH	-	6,537	290,093
98110 - SALES REDUCED LUNCH	-	110	4,600
98120 - SALES FULL PRICE BREAKFAST	-	148	17,705
98130 - SALES REDUCED BREAKFAST	-	7	762
98150 - MISC & A LA CARTE	126,383	45,606	197,193
98500 - SALES SEVERE NEED BREAKFAST	-	103	1,209
05 - SUBTOTAL - CASH SALES	**126,383**	**52,511**	**511,562**
98200 - REIMBURSEABLE FED LUNCH	1,030,786	427,833	225,360
98210 - REIMBURSEABLE FED BREAKFAST	64,675	32,600	38,097
98220 - REIMBURSEABLE KINDERGARTEN MILK			37
98300 - SEVERE NEED GOVERNMENT REIMBURSEABLE	68,423	62,104	4,758
98400 - GOV'T $0.07 REIMBURSEABLE LUNCHES	-	8,665	10,511
10 - SUBTOTAL - REIMBURSEABLE MEALS	**1,163,884**	**531,202**	**278,764**
98510 - CHILD NUTRITION & STATE BKFST GRANTS	24,545	-	25,804
98550 - DONATION INCOME			3,825
20 - SUBTOTAL - GRANT REVENUE	**24,545**	**-**	**29,629**
98140 - CATERING SALES/MISC		112	272
98160 - SALES DAY CARE			8,944
98530 - REBATES & MISC		2	215
40 - SUBTOTAL - OTHER REVENUE	**(449)**	**114**	**9,431**
TOTAL REVENUE	**1,314,362**	**583,827**	**829,385**

11111 - SALARIES - DIRECTOR	(40,166)	(39,288)	(31,199)
11112 - SALARIES - BOOKKEEPER	(23,165)	(22,031)	(19,823)
11114 - SALARIES - SCHOOL PERSONNEL	(354,271)	(305,022)	(284,474)
20110 - CT MUNICIPAL RETIREMENT	(37,437)	(31,515)	(31,656)
20210 - FICA	(13,269)	(12,389)	(10,975)
20230 - MEDICARE	(5,788)	(5,015)	(4,493)
20310 - ACCIDENT AND HEALTH	(67,268)	(75,579)	(75,579)
50 - SUBTOTAL - SALARIES & BENEFITS	**(541,363)**	**(490,839)**	**(458,199)**
40000 - PURCHASES - LUNCH FOOD	(446,727)	(244,883)	(331,764)
40009 - PURCHASES - BREAKFAST FOOD	491		(24)
40050 - PURCHASES - PIZZA			(23,588)
40100 - PURCHASES - LUNCH SNACKS	(1,556)	(535)	(5,316)
40150 - PURCHASES - LUNCH MILK	(57,818)	(40,201)	(41,833)
40200 - PURCHASES - ICE CREAM	(11,676)	(4,818)	(10,141)
60 - SUBTOTAL - FOOD EXPENSES	**(517,286)**	**(290,436)**	**(412,667)**
40020 - SUPPLIES - KITCHEN	(67,883)	(57,488)	(32,052)
40030 - SUPPLIES - OFFICE	(423)	(272)	(925)
40400 - PURCHASES - SMALL WARES/KITCHEN	(5,154)	(2,087)	(3,101)
70 - SUBTOTAL - KITCHEN SUPPLIES	**(73,461)**	**(59,847)**	**(36,078)**
30000 - REPAIRS & MAINTENANCE	(25,714)	(14,341)	(6,881)
30100 - RENTALS & EQUIPMENT SYSTEM	(2,389)	(9,952)	-
50000 - EQUIPMENT			(678)
80 - SUBTOTAL - EQUIPMENT & REPAIRS	**(28,103)**	**(24,292)**	**(7,559)**
54300 - TECHNOLOGY / SOFTWARE	(2,337)	(1,980)	(9,588)
64000 - UNEMPLOYMENT & OTHER FEES	(2,051)	(3,083)	(2,207)
64100 - OTHER MISC EXPENSES	(52)	135	1,565
90 - SUBTOTAL - OTHER EXPENSES	**(4,440)**	**(4,928)**	**(10,230)**
Total Expenses	**(1,164,652)**	**(870,343)**	**(924,732)**

Net Income (Loss)	**149,710**	**(286,516)**	**(95,347)**

Southington School Lunch
Reimburseable Meal Counts 2019-2020

Month	September	October	November	December	January	February	March	April	May	June
Lunch	42,682	46,358	34,788	26,329	43,183	38,264	24,656	11,924	12,276	6,370
Breakfast	7,687	9,411	6,644	4,549	8,445	7,467	8,521	10,462	10,922	5,770
Breakfast *(Severe Need)*	799	908	584	392	732	588	410	1,462	1,354	600
Monthly Total	**51,168**	**56,677**	**42,016**	**31,270**	**52,360**	**46,319**	**33,587**	**23,848**	**24,552**	**12,740**
Grand Total Meal Count	**51,168**	**107,845**	**149,861**	**181,131**	**233,491**	**279,810**	**313,397**	**337,245**	**361,797**	**374,537**

Southington School Lunch
Reimburseable Meal Counts 2020-2021

Month	September	October	November	December	January	February	March	April	May	June
Lunch	22,125	39,258	30,985	31,421	42,172	31,394	47,254	39,842	49,351	33,273
Breakfast	5,737	4,555	3,429	3,593	4,572	3,697	6,352	5,234	7,078	4,745
Breakfast *(Severe Need)*	427	9,372	10,147	7,578	9,244	6,900	9,955	8,218	8,512	5,837
Monthly Total	**28,289**	**53,185**	**44,561**	**42,592**	**55,988**	**41,991**	**63,561**	**53,294**	**64,941**	**43,855**
Grand Total Meal Count	**28,289**	**81,474**	**126,035**	**168,627**	**224,615**	**266,606**	**330,167**	**383,461**	**448,402**	**492,257**

Southington School Lunch
Reimburseable Meal Counts 2021-2022

Month	September	October	November	December	January	February	March	April	May	June
Lunch	60,413	66,261	57,633	54,439						
Breakfast	6,076	7,610	6,541	6,037						
Breakfast *(Severe Need)*	5,316	7,819	7,611	7,040						
Monthly Total	**71,805**	**81,690**	**71,785**	**67,516**						
Grand Total Meal Count	**71,805**	**153,495**	**225,280**	**292,796**						

Increase in Meal Counts from 2020-21 to 2021-22:	**43,516**	**72,021**	**99,245**	**124,169**

Increase in Meal Counts from 2019-20 to 2021-22:	**20,637**	**45,650**	**75,419**	**111,665**

ITEM 2

BOARD OF EDUCATION FINANCIAL UPDATE

Southington Public Schools

Jennifer S. Mellitt
Director of Business & Finance

MEMO

TO: Finance Committee Members
DATE: February 15, 2022
RE: Financial Update

Attached is the BOE's Financial Update through January 31, 2022. The update highlights accounts with known surpluses or deficits at this time. As shown on page 6, we do not anticipate having a large surplus at the end of June.

Some items to note:

- Part time salaries are not encumbered
- Nexus tuitions have been billed but not yet been received. When received, the Nexus tuitions will offset Special Education line items such as paraprofessionals, purchased services, support salaries and A/C number 83127 Nexus Salaries. Since part time salaries are not encumbered, the Nexus tuition revenue will not offset dollar for dollar as of the January financial update.
- The State Excess Cost grant is estimated to be $2.4MM to offset A/C number 83370 and 83371. We have not received our first installment as of this writing.

The Administration will continue to update the financial projection as new information is available.

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

10 - REGULAR EDUCATION

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
11110 - ADMINISTRATIVE SALARIES	882,294	0	882,294	337,080	532,650	12,563	$ -
11120 - CLERICAL SALARIES	378,300	0	378,300	124,945	208,554	44,802	$ -
11135 - TECHNOLOGY DEPT PERSONNEL SALARIES	647,770	0	647,770	216,777	422,528	8,465	$ (10,000)
11140 - FISCAL SALARIES	409,627	0	409,627	189,473	291,962	(71,808)	$ -
11210 - PRINCIPALS & COORDINATORS SALARIES	3,764,851	0	3,764,851	1,454,688	2,310,010	153	$ -
11300 - TEACHER SALARIES	31,993,121	0	31,993,121	16,290,649	15,105,873	596,599	$ 300,000
11400 - GRANT SALARIES/ COVID Salaries	0	0	0	1,348,686	1,433,046	(2,781,732)	*$ (100,000)*
11500 - LIBRARY/MEDIA SALARIES	550,180	0	550,180	247,819	223,065	79,296	$ 69,000
11600 - SCHOOL SECRETARY SALARIES	1,590,801	0	1,590,801	601,223	830,546	159,033	$ 20,000
11710 - SCHOOL PHYSICIAN SALARY	16,000	0	16,000	13,840	0	2,160	$ 2,160
11715 - STUDENT PHYSICAL FEES	1,200	0	1,200	0	1,162	38	
11720 - REGISTERED NURSES SALARIES	727,821	0	727,821	401,803	350,163	(24,145)	$ -
11740 - LICENSED PRAC. NURSES SALARIES	190,975	0	190,975	110,730	105,053	(24,808)	$ (35,000)
11810 - CUSTODIAL SALARIES	1,865,234	0	1,865,234	649,043	1,155,533	60,658	$ -
11820 - MAINTENANCE SALARIES	1,007,401	0	1,007,401	385,672	616,476	5,253	
11900 - GUIDANCE SALARIES	1,351,388	0	1,351,388	678,543	660,327	12,518	$ 45,000
11910 - COACHING SALARIES	438,599	0	438,599	0	168,722	269,877	$ -
11915 - ATHL. ATTENDENTS SALARIES	9,826	0	9,826	0	2,484	7,342	$ -
11916 - EVENT SUPERVISOR & CHAPERONES	45,000	0	45,000	0	21,868	23,132	$ -
11920 - STIPEND SALARIES	80,268	0	80,268	0	31,343	48,925	$ -
11922 - DETENTION SALARIES	9,000	0	9,000	0	3,459	5,541	$ -
12100 - PARAPROFESSIONAL SALARIES	609,203	0	609,203	233,674	332,407	43,122	$ -
12110 - CUSTODIAL OVERTIME	0	0	0	0	(15,153)	15,153	$ -
12150 - RETIREMENT COMPENSATION	223,019	0	223,019	0	46,466	176,553	
12200 - TEACHER SUBSTITUTES	515,000	0	515,000	71,000	508,064	(64,064)	$ (100,000)
12220 - SECRETARY SUBSTITUTES	2,500	0	2,500	0	579	1,921	
12230 - CUSTODIAL SUBSTITUTES	20,000	0	20,000	0	34,550	(14,550)	$ (20,000)
12400 - PARAPROFESSIONAL SUBSTITUTES	1,000	0	1,000	0	2,124	(1,124)	
12500 - STEPS SALARIES	39,000	0	39,000	9,509	53,719	(24,228)	$ (20,000)
12700 - NURSE SUBSTITUTES	48,000	0	48,000	0	11,924	36,076	
12820 - SUMMER MAINT. SALARIES	25,656	0	25,656	0	18,961	6,695	
12830 - CROSSING GUARD SALARIES	108,170	0	108,170	0	54,118	54,052	
12840 - SECUR. ATTENDANTS SALARIES	181,511	0	181,511	113,458	97,956	(29,903)	$ -
14100 - WORK STUDY SALARIES	3,000	0	3,000	0	1,711	1,289	
20110 - MUNCIPAL RETIREMENT ADMIN. FEE	1,346,058	0	1,346,058	0	769,446	576,612	$ -
20210 - SOCIAL SECURITY FEES	468,712	0	468,712	192,199	275,485	1,028	
20230 - MEDICARE FEES	657,383	0	657,383	315,903	357,220	(15,740)	
20310 - HEALTH INSURANCE	9,652,844	0	9,652,844	1,807,553	7,779,503	65,788	$ -
20320 - LIFE & DISABILITY INSURANCE	85,000	0	85,000	43,687	44,696	(3,382)	
20410 - UNEMPLOYMENT INSURANCE	30,000	0	30,000	29,725	6,697	(6,422)	
20510 - WORKERS' COMPENSATION	632,583	0	632,583	152,714	458,143	21,726	
31200 - PROFESSIONAL DEVELOPMENT	80,000	0	80,000	971	62,773	16,255	$ -
31300 - TUITION REIMBURSMENT-SEA	20,000	0	20,000	0	0	20,000	
31800 - LEGAL FEES	97,850	0	97,850	0	81,475	16,375	$ (40,000)
31850 - MEDICAL & ATHLETIC TRAINING SERVICES	34,850	0	34,850	9,000	21,120	4,730	
31900 - PROFESSIONAL & TECHNICAL SERVICES	50,000	0	50,000	600	30,988	18,412	$ -

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
32110 - WATER AND SEWER	91,000	0	91,000	36,552	37,144	17,304	
32120 - ELECTRICITY	1,448,000	0	1,448,000	722,850	782,921	(57,771)	$ -
32125 - ENERGY MGMT SYST MAINTENANCE	33,000	0	33,000	13,000	13,000	7,000	
32135 - ENERGY PERFORMANCE CONTRACT	770,920	0	770,920	382,665	386,755	1,500	
32140 - CONTRACTED REFUSE	79,000	0	79,000	31,668	46,435	897	
32200 - CONTRACTED CUSTODIAL SERVICES	226,316	0	226,316	78,768	147,908	(360)	
32201 - HVAC REPAIRS & MAINTENANCE	56,000	0	56,000	14,082	8,930	32,988	
32301 - UPKEEP OF GROUNDS	9,500	0	9,500	0	2,512	6,988	
32302 - MAINTENANCE OF ATHLETIC FIELDS	72,300	0	72,300	25,562	38,826	7,912	
32303 - REPL. OF WINDOW COVERINGS	3,000	0	3,000	0	1,062	1,939	
32304 - REPAIR OF GLASS	4,000	0	4,000	0	0	4,000	
32305 - BURNER/BOILER REPAIR SERVICES	17,000	0	17,000	0	1,520	15,480	$ -
32306 - HEAT REPAIR SERVICES	55,000	0	55,000	995	39,744	14,260	
32307 - CLOCK & BELL REPAIR SERVICES	2,000	0	2,000	0	0	2,000	
32308 - PUBLIC ADDRESS SYSTEM SERVICES	9,000	0	9,000	1,475	0	7,526	
32309 - CONTRACT SERVICE ELEVATORS	31,405	0	31,405	8,875	20,234	2,295	
32310 - OTHER EXPENSES FOR REPAIR	15,000	0	15,000	0	16,212	(1,212)	
32313 - COPIER REPAIR	53,500	0	53,500	19,963	32,885	652	
32317 - MUSICAL INSTRUMENT REPAIR	14,200	0	14,200	4,985	6,510	2,705	$ 1,500
32318 - INSTRUCTIONAL EQUIPMENT REPAIRS	10,500	0	10,500	240	8,883	1,377	$ 1,000
32319 - OTHER EQUIPMENT REPAIR	52,000	0	52,000	16,147	41,382	(5,529)	
32320 - SPECIAL EQUIPMENT REPAIR	28,000	0	28,000	0	9,923	18,077	$ 8,000
32322 - ROOF REPAIR	32,000	0	32,000	2,100	4,607	25,293	$ -
32323 - DISTRICTWIDE COMPUTER MAINTENANCE	178,000	0	178,000	40,725	177,091	(39,816)	$ (40,000)
32324 - DISTRICTWIDE COMPUTER HARDWARE	32,000	0	32,000	5,084	6,888	20,028	$ -
32325 - DISTRICTWIDE SOFTWARE	321,288	0	321,288	0	325,803	(4,515)	$ (5,000)
32405 - PROPERTY/LIABILITY/ AUTO INSURANCE	238,745	0	238,745	60,137	180,553	(1,946)	$ (15,000)
32415 - STUDENT INSURANCE	85,920	0	85,920	0	84,421	1,499	
32510 - RENTAL & LEASING OF EQUIPMENT	600,121	0	600,121	97,472	335,946	166,703	$ (15,000)
32520 - RENTAL OF FACILITIES	30,050	0	30,050	0	3,500	26,550	$ -
32900 - CARE OF GROUNDS	56,927	0	56,927	2,197	23,468	31,261	$ 10,000
32910 - CARE OF DRIVES & WALKS	286,546	0	286,546	168,254	154,754	(36,462)	$ (36,462)
33100 - SYSTEMWIDE TRANSPORTATION	2,297,843	0	2,297,843	1,196,167	1,090,368	11,308	$ 11,300
33300 - VOCATIONAL EDUCATION TRANPORTATION	200,350	0	200,350	98,481	99,959	1,909	
33700 - NON-PUBLIC SCHOOL TRANSPORTATION	190,590	0	190,590	100,543	92,646	(2,599)	
33800 - MAGNET SCHOOL TUITIONS	582,393	0	582,393	0	430,497	151,896	$ 151,896
33810 - PRINCIPALS / TEACHERS PROF. CONFERENCES	12,000	0	12,000	0	0	12,000	
33900 - BOARD OF EDUCATION EXPENSES	8,200	0	8,200	12	1,575	6,613	
33905 - ADMINISTRATIVE EXPENSES	1,000	0	1,000	0	0	1,000	
33910 - CENTRAL OFFICE CONFERENCES AND TRAVEL	16,500	0	16,500	0	3,040	13,460	
33920 - BUSINESS OFFICE TRAVEL EXPENSES	150	0	150	55	70	25	
33925 - OTHER ADMINISTRATIVE TRAVEL EXPENSES	14,000	0	14,000	5,250	6,750	2,000	$ 2,000
33930 - TEACHERS' TRAVEL EXPENSES	6,000	0	6,000	2,035	529	3,437	
33950 - NURSES' TRAVEL EXPENSES	150	0	150	0	0	150	
34100 - POSTAGE	32,000	0	32,000	0	13,408	18,592	$ 4,000
34200 - TELEPHONE	245,000	0	245,000	92,364	139,829	12,806	
35100 - RECRUITING	1,750	0	1,750	0	519	1,231	
35200 - ADVERTISING	2,000	0	2,000	0	1,319	681	

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
36100 - PRINTING EXPENSES	10,000	0	10,000	325	4,305	5,370	
36200 - RECYCLING SERVICES	14,750	0	14,750	1,092	1,251	12,408	$ 8,000
39200 - MIDDLE SCHOOL ATHLETIC TRANSPORTATION	16,400	0	16,400	0	6,057	10,343	
39300 - HIGH SCHOOL ATHLETIC TRANSPORTATION	135,478	0	135,478	0	47,870	87,608	$ -
39440 - BAND & ORCHESTRA FIELD TRIPS	36,000	0	36,000	0	12,128	23,872	$ -
39450 - SYSTEMWIDE FIELD TRIPS	22,000	0	22,000	465	6,084	15,451	$ -
39470 - STUDENT ACTIVITIES	24,000	0	24,000	0	5,728	18,272	
40110 - CENTRAL OFFICE CLERICAL SUPPLIES	17,000	0	17,000	1,625	5,633	9,742	
40210 - AUDIO VISUAL SUPPLIES	12,705	0	12,705	456	4,438	7,811	
40300 - GENERAL TEACHING SUPPLIES	205,448	0	205,448	16,621	82,861	105,965	
40305 - CONTENT AREA LITERACY SUPPORT	72,770	0	72,770	2,157	35,270	35,343	
40310 - KINDERGARTEN CLASSROOM SUPPLIES	13,000	0	13,000	0	4,096	8,904	
40320 - COORDINATORS PROGRAM SUPPLIES	14,500	0	14,500	0	3,700	10,800	
40400 - ART SUPPLIES	45,885	0	45,885	3,479	25,816	16,590	
40600 - TECHNOLOGY EDUCATION SUPPLIES	49,737	0	49,737	4,015	22,618	23,105	
40700 - FAMILY & CONSUMER SCIENCE SUPPLIES	24,845	0	24,845	3,052	11,235	10,558	
40900 - MUSIC SUPPLIES	25,120	0	25,120	3,090	11,065	10,964	$ 150,000
40910 - INSTRUMENTAL MUSIC SUPPLIES	11,780	0	11,780	0	6,234	5,546	
40920 - PHYSICAL EDUCATION SUPPLIES	15,172	0	15,172	100	7,496	7,576	
41100 - TESTING SUPPLIES	25,562	0	25,562	0	0	25,562	
41150 - MATH SUPPLIES	18,842	0	18,842	746	6,123	11,973	
41200 - SCIENCE SUPPLIES	72,359	0	72,359	4,304	31,125	36,930	
41300 - HEALTH SUPPLIES	19,193	0	19,193	631	8,076	10,486	
41310 - OTHER HEALTH SUPPLIES	1,545	0	1,545	0	0	1,545	
41410 - CUSTODIAL SUPPLIES	181,200	0	181,200	15,882	110,436	54,882	$ -
41420 - OPERATION OF VEHICLES	40,000	0	40,000	11,550	21,164	7,286	
41430 - REPAIR OF BUILDINGS	200,000	0	200,000	9,829	129,677	60,495	$ -
41440 - ENVIRONMENTAL & SAFETY	24,000	0	24,000	0	9,767	14,234	
41500 - OIL HEAT	84,137	0	84,137	0	84,137	(0)	
41650 - GAS HEAT	404,450	0	404,450	199,150	147,701	57,599	
41800 - MISCELLANEOUS EXPENSES	13,000	0	13,000	367	3,602	9,031	
41850 - GRADUATION EXPENSES	13,000	0	13,000	3,004	2,490	7,506	$ -
41950 - COPIER SUPPLIES	32,500	0	32,500	10,519	17,422	4,559	
42100 - TEXTBOOK REPLACEMENT	34,007	0	34,007	170	18,549	15,289	
42205 - EBOOK LICENSE/SUBSCRIPTIONS	900	0	900	0	0	900	
42250 - MATH CONSUMABLE WORKBOOKS	78,449	0	78,449	821	1,535	76,093	$ -
42300 - CONSUMABLE ACTIVITY BOOKS	45,450	0	45,450	0	20,780	24,670	$ -
42500 - SCHOOL BASED SOFTWARE	250,610	0	250,610	800	261,358	(11,548)	$ -
42600 - SCHOOL BASED COMPUTER SUPPLIES	29,850	0	29,850	87	4,372	25,391	
42800 - HEALTH EDUCATION SUPPLIES	3,524	0	3,524	0	1,294	2,230	
43100 - LIBRARY BOOKS	34,080	0	34,080	6,777	4,641	22,662	$ 21,000
43200 - OTHER LIBRARY EXPENSES	6,091	0	6,091	79	3,021	2,991	
44100 - SUBSCRIPTIONS	10,480	0	10,480	51	4,609	5,820	
44200 - NEW MUSIC EQUIPMENT	11,000	0	11,000	0	0	11,000	
46200 - ALTHLETIC EQUIPMENT HIGH SCHOOL	24,350	0	24,350	12,304	4,416	7,630	
46470 - HIGH SCHOOL FIRST AID SUPPLIES	5,773	0	5,773	0	892	4,881	
46472 - AWARDS AND PROGRAMS	10,500	0	10,500	20	5,342	5,138	
46473 - OFFICIATING EXPENSES	47,000	0	47,000	0	33,000	14,000	$ -

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
46600 - ATHLETIC SUPPLIES HIGH SCHOOL	35,700	0	35,700	1,451	6,741	27,508	
46700 - ATHLETIC UNIFORMS	26,265	0	26,265	14,423	7,947	3,894	
48100 - PETTY CASH	1,600	0	1,600	0	1,600	0	
49310 - BUSINESS EDUCATION SUPPLIES	5,144	0	5,144	0	2,442	2,702	
49600 - ALTERNATIVE EDUCATION PROGRAM	15,000	0	15,000	374	4,733	9,893	
49700 - GUIDANCE SUPPLIES	9,613	0	9,613	180	2,870	6,563	
54100 - EQUIPMENT ADMINISTRATION	10,000	0	10,000	0	13,888	(3,888)	$ -
54200 - SCHOOL BASED EQUIPMENT	0	0	0	0	9,750	(9,750)	$ (9,750)
54300 - TECHNOLOGY EQUIPMENT CONTING.	18,000	0	18,000	58,474	98,772	(139,246)	$ -
64000 - DUES & MEMBERSHIP FEES	48,000	0	48,000	0	44,403	3,597	
70218 - COVID RELATED EXPENSES	0	0	0	25,088	227,057	(252,144)	$ (53,000)
80200 - JUMPSTART	24,950	0	24,950	0	5,041	19,909	$ 15,000
81112 - SALARIES- DIRECTOR	35,000	0	35,000	21,749	14,692	(1,441)	$ (1,441)
82113 - ASTE - TEACHER SALARIES	377,013	0	377,013	196,390	314,225	(133,602)	$ -
82116 - ASTE - CLERICAL SALARIES	43,044	0	43,044	17,869	22,474	2,701	$ -
82117 - ASTE - TECHNOLOGY ASSISTANT	30,741	0	30,741	0	22,792	7,949	
82118 - ASTE - CUSTODIAL SALARIES	115,430	0	115,430	21,709	36,004	57,716	
82119 - ASTE - SECURITY SALARIES	30,170	0	30,170	0	0	30,170	$ -
82203 - ASTE - HEALTH INSURANCE	184,711	0	184,711	34,588	134,588	15,534	$ -
82319 - ASTE - WATER & SEWER	2,300	0	2,300	1,110	901	289	
82320 - ASTE - GAS	20,800	0	20,800	11,700	6,482	2,618	
82321 - ASTE - ELECTRICITY	30,000	0	30,000	17,450	22,348	(9,798)	$ (9,800)
82323 - ASTE - PROPERTY SERVICES	10,200	0	10,200	2,275	1,286	6,639	
82324 - ASTE - PROPERTY INSURANCE	6,290	0	6,290	1,625	4,875	(210)	
82338 - ASTE - PROFESSIONAL TRAVEL	3,200	0	3,200	595	707	1,898	
82342 - ASTE - TELEPHONE	1,400	0	1,400	756	605	39	
82394 - ASTE - FIELD TRIPS	4,500	0	4,500	0	6,014	(1,514)	
82401 - ASTE - OFFICE SUPPLIES	800	0	800	348	891	(439)	
82402 - ASTE - AUDIO VISUAL SUPPLIES	1,000	0	1,000	47	1,326	(373)	
82403 - ASTE - TEACHING SUPPLIES	21,600	0	21,600	2,220	17,659	1,721	
82414 - ASTE - CUSTODIAL SUPPLIES	4,000	0	4,000	0	2,167	1,833	
82423 - ASTE - WORKBOOKS	500	0	500	0	0	500	
82425 - ASTE - COMPUTER SOFTWARE	2,150	0	2,150	840	0	1,310	
82426 - ASTE - COMPUTER SUPPLIES	500	0	500	0	0	500	
82431 - ASTE - LIBRARY BOOKS	300	0	300	0	0	300	
82440 - ASTE - PERIODICALS	200	0	200	0	0	200	
82445 - ASTE EQUIPMENT	5,000	0	5,000	242	1,302	3,456	
90100 - APPROPRIATED REVENUES	0	32,000	32,000	0	1,349	30,651	$ 130,000
10 - REGULAR EDUCATION	**73,056,721**	**32,000**	**73,088,721**	**30,004,739**	**42,607,470**	**476,513**	**$ 439,403**

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

15 - SPECIAL EDUCATION

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
20110 - MUNCIPAL RETIREMENT ADMIN. FEE	1,146,641	0	1,146,641	0	607,942	538,699	$ -
20210 - SOCIAL SECURITY FEES	374,308	0	374,308	173,875	209,554	(9,120)	$ -
20230 - MEDICARE FEES	219,127	0	219,127	107,653	116,282	(4,808)	$ -
83110 - CLERICAL SALARIES	260,728	0	260,728	84,717	152,764	23,247	
83111 - PRINCIPAL SALARY	57,897	0	57,897	15,432	24,630	17,836	
83112 - ADMINISTRATIVE SALARIES	581,490	0	581,490	278,157	451,774	(148,441)	$ (7,000)
83113 - TEACHER SALARIES	4,737,578	0	4,737,578	2,527,845	2,361,651	(151,917)	
83114 - OT & PT SALARIES	671,240	0	671,240	315,810	298,631	56,799	
83115 - SPEECH PATHOLOGISTS SALARIES	713,268	0	713,268	424,208	337,770	(48,710)	
83116 - PSYCHOLOGISTS SALARIES	819,240	0	819,240	408,814	374,258	36,168	
83117 - SOCIAL WORKERS SALARIES	595,675	0	595,675	341,878	322,900	(69,103)	
83118 - GUIDANCE SALARIES	238,479	0	238,479	119,743	116,528	2,208	$ 10,000
83119 - IDEA PART B SALARIES	0	0	0	552,228	510,035	(1,062,263)	$ -
83120 - PRESCHOOL TEACHER SALARIES	323,472	0	323,472	190,405	178,481	(45,414)	$ -
83121 - PARAPROFESSIONAL SALARIES	5,439,641	0	5,439,641	2,291,037	2,737,987	410,617	$ -
83122 - SUBSTITUTES SALARIES	163,200	0	163,200	0	0	163,200	$ -
83123 - HOMEBOUND INSTRUCTOR SALARIES	85,000	0	85,000	0	23,254	61,746	$ -
83124 - PARAPROFESSIONAL SUBSTITUTES	38,000	0	38,000	0	7,472	30,528	$ -
83125 - EXTENDED SCHOOL YEAR SALARIES	150,000	0	150,000	0	216,525	(66,525)	
83126 - FAMILY RESOURCE SALARIES	0	0	0	17,367	4,217	(21,584)	$ -
83127 - NEXXUS SALARIES	0	0	0	153,063	125,573	(278,637)	$ -
83129 - BCBA & ABA THERAPISTS SALARIES	890,449	0	890,449	429,101	442,049	19,299	
83203 - HEALTH INSURANCE	3,651,945	0	3,651,945	683,849	3,079,399	(111,302)	$ -
83205 - WORKERS' COMPENSATION	168,326	0	168,326	40,595	121,785	5,946	
83206 - LIFE & DISABILITY INSURANCE	29,500	0	29,500	12,328	19,523	(2,351)	
83313 - OCCUPATIONAL / PHYSICAL THERAPY	2,000	0	2,000	250	4,866	(3,116)	
83314 - EVALUATION & DIAGNOSTIC	60,000	0	60,000	16,000	23,747	20,253	$ -
83315 - VOCATIONAL SERVICES	6,000	0	6,000	0	0	6,000	
83318 - LEGAL SERVICES	65,000	0	65,000	22,750	19,649	22,602	
83319 - PURCHASED SERVICES	44,425	0	44,425	369,477	117,082	(442,134)	$ (375,000)
83320 - DIAGNOSTIC CENTER	159,900	0	159,900	0	166,381	(6,481)	$ (6,600)
83332 - IN-TOWN TRANSPORTATION	687,469	0	687,469	319,150	439,193	(70,874)	$ (70,000)
83335 - OUT OF TOWN TRANSPORTATION	1,753,798	0	1,753,798	1,151,377	882,347	(279,926)	$ (280,000)
83336 - TRAVEL FOR INSTRUCTION	21,606	0	21,606	18,322	3,480	(196)	
83337 - PROFESSIONAL DEVELOPMENT	18,000	0	18,000	1,240	16,032	728	
83338 - PROFESSIONAL MEETINGS	1,200	0	1,200	8,666	1,705	(9,171)	$ -
83339 - ADMINISTRATIVE TRAVEL	8,000	0	8,000	3,992	4,308	(300)	
83340 - TRAVEL FOR INSTRUCTION	3,500	0	3,500	108	42	3,350	
83350 - AUDIOLOGICAL SERVICES	80,000	0	80,000	4,880	23,241	51,879	
83369 - APPLIED BEHAVIOR ANALYSIS PROGRAM	40,000	0	40,000	23,234	5,019	11,747	
83370 - OUT OF TOWN TUITION	2,864,767	0	2,864,767	2,304,692	2,174,091	(1,614,017)	$ -
83371 - AGENCY PLACEMENT TUITION	162,182	0	162,182	237,736	237,171	(312,724)	
83372 - SPEC ED-RENTAL OF FACILITIES	48,803	0	48,803	26,036	49,432	(26,665)	$ -
83400 - CLERICAL SUPPLIES	2,000	0	2,000	0	283	1,717	
83401 - OFFICE SUPPLIES	2,000	0	2,000	0	371	1,629	
83403 - GENERAL TEACHING SUPPLIES	6,180	0	6,180	788	2,795	2,597	

Southington Schools
Expenditure Report and Projected Surplus (Deficit)
Seven Months Ending January 31, 2022

ACCTNUM	Adopted Budget	Ytd Adjustments	Adjusted Budget	Encumbrance YTD	Expenditures YTD	Available YTD	Projected Surplus/ (Deficit)
83411 - TESTING SUPPLIES	35,000	0	35,000	67	52,053	(17,120)	$ -
83412 - ACHIEVE SUPPLIES	2,500	0	2,500	0	0	2,500	
83417 - PROFESSIONAL MATERIALS	450	0	450	0	0	450	
83425 - COMPUTER SOFTWARE	33,000	0	33,000	1,046	30,642	1,312	
83427 - ASSISTIVE TECHNOLOGY	0	0	0	0	3,000	(3,000)	
83431 - CLP SUPPLIES	1,500	0	1,500	63	777	660	
83494 - SYSTEMWIDE SPEECH SUPPLIES	3,000	0	3,000	3,118	3,714	(3,832)	
83495 - INSTRUCTIONAL SUPPLIES	22,000	0	22,000	3,402	5,383	13,215	
83496 - SPECIALIZED MATERIALS	20,000	0	20,000	53	305	19,642	
83497 - VOCATIONAL SUPPLIES	2,500	0	2,500	0	1,093	1,407	
83498 - PRESCHOOL SPEECH SUPPLIES	1,000	0	1,000	0	1,006	(6)	
83499 - PRESCHOOL PROGRAM SUPPLIES	8,000	0	8,000	302	6,521	1,177	
83542 - EQUIPMENT FOR INSTRUCTION	14,921	0	14,921	200	13,883	838	
15 - SPECIAL EDUCATION	**27,535,905**	**0**	**27,535,905**	**13,685,051**	**17,130,595**	**(3,279,741)**	**$ (728,600)**
SOUTHINGTON PUBLIC SCHOOLS	**100,592,626**	**32,000**	**100,624,626**	**43,689,789**	**59,738,065**	**(2,803,228)**	**$ (289,197)**

Net of Certified Salaries - $300,000 surplus at 1/31/22
Net of Secretrial Salaries - need to process retro pay in February
Health Insurance line items - no surplus/deficit expected
Excess Cost Payment from State of CT has not been received
NOTE: No Part time employees are encumbered

Adjustments for Nexus Billings not received, State Excess cost and other	$ 300,000
Preliminary Projected Surplus/Deficit at 1/31/2022	$ 10,803

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only__________ Board Meeting Date February 24, 2022

Decision Requested X Agenda Code 9 a

AGENDA REPORTING FORM

Agenda Topic: Personnel Report

Summary of Issue: This Personnel Report includes appointments, resignations, retirements, and transfers for certified and classified personnel for the 2021-2022 school year. This report includes activity for the month of January 2022.

Background: The human resource department provides the Board of Education with a monthly update of personnel additions/reductions/changes.

Alternative Strategies:

Cost (if applicable): N/A **Funding Source:** Board of Education

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Recommend that the Board of Education approve the Personnel Report as submitted by the human resource department.

Michelle Passamano
Signature of Staff Member Submitting Report

Steven Madancy
Signature of Superintendent

Included:
Personnel Report

Personnel Report
January 2022

APPOINTMENTS

	NAME	POSITION	SCHOOL	FTE	EFFECTIVE	DEGREE	SALARY
CLASS	Bakal, Nicholas	Custodian	SHS	.50	1-3-2022	N/A	$15.63
CLASS	Cannatelli, Anthony	Custodian, PT	MC	.50	1-24-2022	N/A	$15.63
CERT	Condon-Santore, Zoe	SLP	SHS	1.0	1-3-2022	6th +30	$70,780
CLASS	Dagata, Kathleen	Paraeducator, EASE	JFK	1.0	1-3-2022	N/A	$17.67
CLASS	Fuoco, Ashlee	Paraeducator	SHS	1.0	1-3-2022	N/A	$17.67
CERT	Gendreau, Robert	Special Education	JFK	1.0	1-3-2022	6th	$71,017
CLASS	Hall, Saige	Paraeducator	DES	.88	1-18-2022	N/A	$17.67
CERT	Nielsen, Heidi	Grade 4, 1-yr	FES	1.0	11-15-2021	MA	$52,262
CLASS	Pocock, Erika	Secretary, Operations	CO	1.0	1-4-2022	N/A	$24.84
CERT	Roach, Erin	Grade 2, co-teacher, 1-yr	TES	1.0	12-20-2021	N/A	$52,262
CLASS	Worrell, Kimberly	Math & ELA Tutor	HES	1.0	1-24-2022	N/A	$21.35

RESIGNATIONS/RETIREMENTS

	NAME	POSITION	SCHOOL	EFFECTIVE	YRS	RET/RES
CLASS	Bray, Sammi	Youth prevention advocate	STEPS	1-21-2022	6 mo.	RESIGN
CERT	D'Amato, Catherine	Language Arts	JFK	1-10-2022	11	RESIGN
CERT	DiNello, Gina	Grade 5	HES	6-30-2022	37	RETIRE
CLASS	Dziob, Lisa	Paraeducator, F/T	SHS	1-29-2022	8	RESIGN
CERT	Hart, Daniel	Social Studies	SHS	6-30-2022	28	RETIRE
CERT	Russman, Sheryl	School Counselor	SHS	6-30-2022	16	RETIRE
CERT	Spinello, Sandra	Business & Marketing	SHS	6-30-2022	13	RETIRE
CLASS	Tramontanis, Brittany	Tutor, Math & ELA	DES	1-6-2022	1 mo.	RESIGN
CLASS	Vargas, Crystal	Secretary, Special Ed & Transportation	CO	1-17-2022	14 mo.	RESIGN
CLASS	Yorski, Susan	Paraeducator, F/T	JAD	1-3-2022	19	RETIRE

ASSIGNMENT CHANGE

	FROM (PREVIOUS ASSIGN)		TO (NEW ASSIGN)		
NAME	POSITION/SCHOOL	FTE	POSITION/SCHOOL	FTE	EFFECTIVE
Downey, Karen	Paraeducator, ACHIEVE, SHS	.88	Paraeducator, ACHIEVE, SHS	1.0	1-18-2022
Paolino, Tanya	Paraeducator, PT, SEES	.88	Paraeducator, SEES	1.0	1-18-2022
Pare, Natalie	Paraeducator, ACHIEVE, SHS	.88	Paraeducator, SHS	1.0	1-31-2022
Spirtt, Christine	Paraeducator, EASE, JFK	.88	Paraeducator, SES	.88	1-3-2022
Spyros, Gia	Food Serv Tech, SES	.88	Asst. Manager Food Serv-SHS	1.0	1-24-2022

Personnel Report
January 2022

TRANSFERS

	FROM (PREVIOUS ASSIGN)		TO (NEW ASSIGN)		
CERT NAME	POSITION/SCHOOL	FTE	POSITION/SCHOOL	FTE	EFFECTIVE
None to report					

COACHING / STIPENDS

Coaching Stipends

Brown, Allison	Asst. indoor track coach	SHS	STIPEND
Slade, Dylan	Asst. boys' lacrosse coach	SHS	RESIGN
Westendorp, Mark	Freshman girls' basketball coach	SHS	STIPEND

Other Stipends

Bass-Lamberto, Heidi	Team leader grade 7/8 c	JFK	STIPEND
Madden, Allison	Team leader grade 8B	JFK	STIPEND

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only ____________________ **Board Meeting Date** **February 24, 2022**

Decision Requested X **Agenda Code** **10 b.**

AGENDA REPORTING FORM

Agenda Topic: Science Kindergarten Units – Second Reading

Summary of Issue: The Curriculum & Instruction Committee has reviewed Science Kindergarten Units

Background: ____________________

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the Science Kindergarten Units to the full Board for a Second Reading.

Titles of Attachments:

1. Science Kindergarten Units

Frank Pepe
Signature of Staff Member Submitting Report

Steven Madancy
Signature of Superintendent of Schools

Table of Contents

Unit 1 - Mystery Class Pet
Students plan for a "mystery" class pet (pet choice is up to the teacher). As students prepare for their mystery class pet, they need to understand what both plants and animals need to live and grow. Students learn that plants need sunlight, water, and air; while animals need water, food, and shelter. Students investigate and observe how animal/plant needs change with the seasons. The new pet may require specific changes to their environment in order to survive the season. A class plant may also change with the seasons. Students will investigate how living things change and impact the environment and animal habitats (pets and wild). Taking care of a pet means not disrupting its natural balance or habitat. This unit looks at some of the ways humans have impacted living things by changing the environment. At the conclusion of the unit, students find out which class pet they will have to plan and care for the remainder of the year. Students will generate a care guide for their new pet. You can view the flowchart for this unit here. **Teacher Note**: *While marked as Unit 1 per the NGSS thematic bundle format, this could also be swapped with the second unit in science for kindergarten.*
Suggested Pacing: 11-13 hrs
Anchoring Phenomenon/Design Problem: Planning for a mystery class pet
Unit Driving Question: How do plant and animal needs help us pick an appropriate class pet?
Culminating Performance Task: Students will create a Care Guide for their new class pet.
NGSS Performance Expectations: (Hyperlinks will bring reader to NGSS Evidence Statements) ● K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. ○ [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.] ● K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time. ○ [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days vs cloudy days in different months.] ○ [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.] ● K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. ○ [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.] ● K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. ○ [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

Back to Top of Page

- K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*
  - [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Three Dimensions that form the Foundation for these NGSS Performance Expectations:		
Science & Engineering Practices: **Analyzing and Interpreting Data** • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) (K-ESS2-1) **Engaging in Argument from Evidence** • Construct an argument with evidence to support a claim. (K-ESS2-2) **Developing and Using Models** • Use a model to represent relationships in the natural world. (K-ESS3-1) **Asking Questions and Defining Problems** • Ask questions based on observations to find more information about the designed world. (K-ESS3-2) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) **Obtaining, Evaluating, and Communicating Information** • Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)	**Disciplinary Core Ideas:** **LS1.C: Organization for Matter and Energy Flow in Organisms** • All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) **ESS3.A: Natural Resources** • Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1) **ESS3.C: Human Impacts on Earth Systems** • Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary) (K-ESS2-2) **ESS2.D: Weather and Climate** • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe	**Crosscutting Concepts:** **Patterns** • Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) (K-ESS2-1) **Systems and System Models** • Systems in the natural and designed world have parts that work together. (K-ESS2-2) (K-ESS3-1) **Cause and Effect** • Events have causes that generate observable patterns. (K-ESS3-2)

Back to Top of Page

	and record the weather and to notice patterns over time. (K-ESS2-1) **ESS2.E: Biogeology** ● Plants and animals can change their environment. (K-ESS2-2) **ETS1.A: Defining and Delimiting an Engineering Problem** ● Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary) (K-ESS3-2) ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Before beginning to design a solution, it is important to clearly understand the *problem. (K-2-ETS1-1)* **ETS1.B: Developing Possible Solutions** ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.(secondary)	

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3)(K-ESS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)(K-ESS2-1)
- R.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)

Back to Top of Page

- SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Mathematics -

- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)
- MP.2 Reason abstractly and quantitatively. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- MP.4 Model with mathematics. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1)
- K.CC Counting and Cardinality (K-ESS3-1)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR:

Students collect weather data throughout the school year in their *Student Journal for Weather Pattern Data* packets.

- Teacher completes the first page with the students as an example of how to do this throughout the year.
- Visit a chosen section of the school grounds with plants and animals.
- Throughout the year, visit this location and have students make some observations about the living things and weather conditions (seasonal).
- Plan *at least* 4 visits to the same location. If you don't have an appropriate outdoor space - you may use the Edpuzzle Video of a backyard over 15 months.

Resources:

- Student Journal for Weather Pattern Data packets
- Edpuzzle Video of a backyard over 15 months

Learning Sequence 1

- **Learning Sequence Driving Question:**
  - What are living and nonliving things?
- **Learning Sequence 1**
- **Relationship to Anchoring Phenomena/Design Problem:**
  - This is the introduction to the anchoring phenomenon of planning for a mystery pet.
- **Student Expected Outcomes:**
  - Students will observe patterns in a variety of things to categorize/sort them as either living or nonliving.

Back to Top of Page

Learning Sequence 2
• **Learning Sequence Driving Question:**
  ○ What do living things need to survive?
• Learning Sequence 2A
  ○ Plants
• Learning Sequence 2B
  ○ Animals
  ○ Complete BOTH lesson plans.
• **Relationship to Anchoring Phenomena/Design Problem:**
  ○ Students learn that plants need sunlight, water and air and animals need water, food and shelter to prepare for their mystery class pet.
• **Student Expected Outcomes:**
  ○ Students will ask scientific questions based on observations to understand the needs of living things deepening their understanding of patterns in the natural world.
  ○ Students will draw a model showing the needs of a pet plant.
  ○ Students will ask scientific questions based on observations to understand the needs of living things deepening their understanding of patterns in the natural world.
  ○ Students will draw a model showing the needs of an animal.

Learning Sequence 3
• **Learning Sequence Driving Question:**
  ○ How do plants and animals get what they need from their habitat?
• Learning Sequence 3
• **Relationship to Anchoring Phenomena/Design Problem:**
  ○ Animal and plant needs change with the seasons. These needs must be understood to prepare adequately for a class pet.
• **Student Expected Outcomes:**
  ○ Students will obtain scientific information to describe patterns in the natural world to understand why living things live where they do.
  ○ Students will obtain scientific information to describe patterns in the natural world to relate changes in the environment to the survival of living things.
  ○ Students will use a model to represent the relationship between the needs of plants and the needs of animals and the places they live.

Learning Sequence 4
• **Learning Sequence Driving Question:**
  ○ How do plants, animals, and humans impact their environment?
• Learning Sequence 4
• **Relationship to Anchoring Phenomena/Design Problem:**
  ○ Students investigate how living things change and impact the environment and animal habitats (pets and wild). Taking care of a pet means not disrupting its natural balance or habitat. This learning sequence looks at some of the ways humans have impacted living things by changing environments.
• **Student Expected Outcomes:**
  ○ Students will investigate the impacts humans have on the environment.
  ○ Students will propose a plan for reducing one of the impacts humans have on the environment.

Learning Sequence 5 • **Learning Sequence Driving Question:**   ○ What does our class pet need to survive and thrive?

Back to Top of Page

- **Learning Sequence 5**
- **Relationship to Anchoring Phenomena/Design Problem:**
  - Students find out which class pet they will have to plan and care for the remainder of the year. (Class pets can be small animals, plants or a digital animal through observed through www.explore.org)
- **Student Expected Outcomes:**
  - Students will develop a care guide for the new class pet.

Assessments:

- **Culminating Performance Task**
  - Students will create a Care Guide for their new class pet in Learning Sequence #5.

- **Kindergarten Performance Expectations Rubrics and Prompts**
- **Elementary Assessment Resources**

Additional Resources:

- G0K Unit Materials List
  - Click on specific tab for unit-specific materials
- EPIC! Digital Library - GK U1 List
  - Includes ebooks and videos
  - Must have an educator user account for free access

Learning Sequence 1
Brief Description: Present the students with the idea that they will be getting a class pet, and that pets are living things. Students explore a set of objects (6) that allow the students to "discover" why things are considered alive. This set of objects ranges from whole organisms to parts of an organism.
Suggested Pacing: 0.5 - 1 hr
Lesson-Level Phenomenon/Design Problem: Sorting living and nonliving things.
Relationship to Anchoring Phenomena/Design Problem: This is the introduction to the anchoring phenomenon of planning for a mystery pet.
Learning Sequence Driving Question: What are living and nonliving things?
Student Expected Outcomes: ● Students will observe patterns in a variety of things to categorize/sort them as either living or nonliving.
CONNECTIONS TO STANDARDS
Three Dimensions Related to the Specific Learning Performance(s):

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Analyzing and Interpreting Data ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) (K-ESS2-1)	**LS1.C Organization for Matter and Energy Flow in Organisms** ● All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)	**Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) (K-ESS2-1)

Related Performance Expectation(s) in this Unit:

- K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.
    - [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

Possible Common Core State Standards Connections:

K-LS1-1:
ELA/Literacy -

- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)

Mathematics -

- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)

Back to Top of Page

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may believe that:
- plants, eggs, and seeds are not living.
- trees are not alive but seedlings are alive.
- only large land mammals are animals.
- insects are not animals.
- humans are not animals.
- birds, fish, insects, worms are not animals.
- any object that moves is living. (Machines, smoke, clouds, fire, moving water...)
- non-living is dead.
- plants are not living.
- grass, trees, and other plants die in the winter and are born in the spring.
- a seed is dead.
- they cannot link the same properties that are associated with animals being alive to plants.
- trees, grass, vegetables, weeds are not plants.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:
- Teacher shares the *Mystery Pet Slideshow* (Slides 1 and 2) with the students, and gets the students feeling excited about the prospect of getting a mystery class pet.
- Students share their ideas about pets and discuss the question: What can be a pet?
  - Get students to the idea that pets are living things, but not necessarily an animal.

Teacher Note:
- Students plan for a "mystery" class pet (pet choice is up to the teacher and can be a plant, animal or virtual pet from explore.org depending on your classroom).

Resources:
- Mystery Pet Slideshow

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

Back to Top of Page

- Students expand their discussion from the Engage activity to also include living and nonliving characteristics of things and how those differences would impact their class pet choice, using slides 3 + 4 of the Mystery Pet Slideshow.
    - The last slide can be done as a class using an interactive whiteboard or projector.
- Students work in small groups with an assortment of things (living, nonliving, or once living).
    - Provide students with the opportunity to explore each item and discuss with their group their ideas about whether or not the object is living or was once living and then have the groups sort the objects.
        - The list of objects can be found in the materials list in the unit overview.
        - These are suggested items, you may modify the list based on the objects you have available to you.
        - Optional Setup - Students can rotate through a station set-up with sample item(s) at each station to limit the total supplies needed.
- After the students have explored the objects, allow them to share their ideas in a whole class discussion.
    - You can slide and sort the objects on the smartboard around as the students share their ideas.

Resources:

- Mystery Pet Slideshow

Optional Instructional Strategy

- Summary Table
    - recommended to complete as a class

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

Additional Resources:

- G0K Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2A		
Brief Description: Students observe and learn how to care for plants and be able understand how to meet the needs of a plant. This is important if a plant ends up to be the class pet.		
Suggested Pacing: 2.5 - 3 hrs		
Lesson-Level Phenomenon/Design Problem: What do plants need to survive?		
Relationship to Anchoring Phenomena/Design Problem: Students learn that plants need sunlight, water and air to prepare for their mystery class pet.		
Learning Sequence Driving Question: What do plants need to survive?		
Students Expected Outcomes: ● Students will ask scientific questions based on observations to understand the needs of living things deepening their understanding of patterns in the natural world. ● Students will draw a model showing the needs of a pet plant.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Analyzing and Interpreting Data ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) (K-ESS2-1) **Developing and Using Models** ● Use a model to represent relationships in the natural world. (K-ESS3-1)	**LS1.C: Organization for Matter and Energy Flow in Organisms** ● All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) **ESS3.A: Natural Resources** ● Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)	**Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) (K-ESS2-1) **Systems and System Models** ● Systems in the natural and designed world have parts that work together. (K-ESS2-2) (K-ESS3-1)
Related Performance Expectation(s) in this Bundle: ● K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. ○ [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]		
Possible Common Core State Standards Connections:		

Back to Top of Page

ELA/Literacy
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)

Mathematics
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more or "/"less of" the attribute, and describe the difference. (K-LS1-1)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may believe that:
- living things they are not familiar with, do not grow or reproduce.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:
- Teacher shows Slides #1 and #2 of the *Plant Slideshow* and/or show a live plant.
- Students discuss how the seedling progresses to a mature plant.
- Teacher asks the following questions:
  - What do these plants have in common (slide 1)?
  - What is a plant?
  - Where do plants come from?
  - How might it have changed over time?
  - What did this plant need to get to this point?

Resources:
- Plant Slideshow

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:
- Students work in small groups to explore a variety of seeds, bulbs, live plants, and dead plants.
  - This can be done in stations or have samples for each group.
  - This can also be done using Slides #3-5 in *Plant Slideshow* if actual items are not available.
- Students experiment with plants to visualize the importance of a healthy system that includes water and sunlight to promote a plant's survival.
  - Set up two investigations with partner plants:
    - (1) water, no water (both plants should receive equal amounts of sunlight),
    - (2) sunlight, no sunlight (both plants should receive equal amounts of water).

Back to Top of Page

- Select bean plants that have already begun to sprout as the common plant for all of the experiments.
- Over a week or two, students should record their observations in a *My Plant Growth Journal*.
- You may want to alternate observation days, but both investigations should have a minimum of three journal entries each.

- Students should discuss the patterns they notice in the data.

Resources:
- Plant Slideshow
- My Plant Growth Journal

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Students discuss their observations from their *My Plant Growth Journals*.
- Teacher shares information about what plants need to live and grow (light and water) using books from epic! Books. Some options are listed in Resources.

Resources:
- My Plant Growth Journal
- *Seed to Plant by National Geographic* on epic! Books
- Plants Are Alive by Molly Aloian on epic! Books
- Research other resource options about plants on epic! Books

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities

Back to Top of Page

- Uses recorded observations in explanations

Vocabulary: flower, food, life, light, plant, grow, seed, survive, sun, soil, sunlight, requirements for life

ELABORATE (Applications / Extensions)
Activity Description:
- Students draw a model on Page 8 of their *My Plant Growth Journal* that indicates what a "pet plant" would need to live and grow in the classroom.
    - Help students to make the connection that plants need both water and sunlight for a healthy system.
    - Encourage students to draw where they would place their pet plant in the classroom and explain why that would help the plant get what it needs for survival and growth.
- Student explanations will have to be verbal and should call upon the patterns they identified in the plant investigation.
    - Encourage students to begin labeling their models using arrows and letters representing the object.

Resources:
- My Plant Growth Journal

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s) (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.
- ❏ **SEP:** *Analyzing and Interpreting Data; Developing and Using Models*
- ❏ **DCI:** *LS1.C: Organization for Matter and Energy Flow in Organisms; ESS3.A: Natural Resources*
- ❏ **CCC:** *Patterns; Systems and System Models*

Summative Assessment Description(s)
- The pet plant model defining what plants need to live and grow from the *My Plant Growth Journal*.

Resources:
- My Plant Growth Journal

Optional Instructional Strategy
- Summary Table
    - recommended to complete as a class

Back to Top of Page

Additional Resources:

- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2B		
Brief Description: Students observe and learn how to care for different animals, and apply that information to understanding how to meet the needs of a potential class pet.		
Suggested Pacing: 1.75 - 2.5 hrs		
Lesson-Level Phenomenon/Design Problem: What Pet Should I Get - Dr. Seuss		
Relationship to Anchoring Phenomena/Design Problem: Students learn that animals need water, food and shelter to prepare for their mystery class pet.		
Learning Sequence Driving Question: What do animals need to survive?		
Students Expected Outcomes: ● Students will ask scientific questions based on observations to understand the needs of living things deepening their understanding of patterns in the natural world. ● Students will draw a model showing the needs of an animal.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Developing and Using Models** ● Use a model to represent relationships in the natural world. (K-ESS3-1)	**Disciplinary Core Ideas:** **LS1.C: Organization for Matter and Energy Flow in Organisms** ● All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) **ESS3.A: Natural Resources** ● Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) **Systems and System Models** ● Systems in the natural and designed world have parts that work together. (K-ESS3-1)
Related Performance Expectation(s) in this Bundle: ● K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. ○ [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]		

Back to Top of Page

- [K-ESS3-1](#) Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
    - [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

Possible Common Core State Standards Connections:

ELA/Literacy
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)
- SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)

Mathematics
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)
- MP.2 Reason abstractly and quantitatively. (K-ESS3-1)
- MP.4 Model with mathematics. (K-ESS3-1)
- K.CC Counting and Cardinality (K-ESS3-1)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may believe that
- living things they are not familiar with, do not grow or reproduce.

LESSON PLAN – [5-E Model](#)

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:
- Class reads *What Pet Should I Get?*-Dr. Seuss.
- Based on the book, students discuss with their table which pet they would take home from the pet store and why.
- Students share their ideas with the class.

Resources:
- *What Pet Should I Get?* by Dr. Seuss (may be available as a YouTube read)

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:
- Show the *Animal Slideshow.*
    - Help the students understand that some of these animals would not make a good class pet.

[Back to Top of Page](#)

- Have students discuss the animals shown and make suggestions about which ones could be a class pet and which ones could not, and why they think that.
- *The Salamander Room* by Anne Mazer can help to make the point that not all animals make good pets. Make sure students explain their reasoning.

- Teacher asks:
  - Do all animals have the same needs?
  - What do animals need to live and grow?
- Students work in small groups to complete a *What's Needed handout* for at least one of the animals.
- Groups share their predictions with the class.
- Record student ideas to help identify patterns within the needs of all animals.
  - Help students identify patterns in their predictions (all animals need water, food, shelter).

Resources:
- Animal Slideshow
- *The Salamander Room* by Anne Mazer (may be available as a youtube read)
- What's Needed handout

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:
- Students work in small groups with one set of small "sorting" cards (Slides #1 & 2 from the *Sort Activity Slideshow*).
  - Project one of the large animal cards from the *Sort Activity Slideshow* (Slides #3-6).
  - Students sort through the small cards and find the ones that relate to the projected animal card.
- Students talk about their selections.
  - Help students to understand the pattern that all animals need water, food and shelter in order to live and grow.
  - Potential prompts for student discussion:
    - What foods did you pair with this animal?
    - Where is this animal likely to live?
    - How does this animal get water?
    - What patterns do you notice about what all animals need to live and grow?
    - What do all of these animals need?
    - Do all animals have the same food? What are the different types (plant, other animals, both plants and animals) of food?
- Optional: This may be a great time to bring in resources specific to each of the animals.

Back to Top of Page

Resources:

- Sort Activity Slideshow
- Optional: Books about pets on epic! Books

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: food, grow, survive, plant, sunlight, body, environment, living thing

ELABORATE (Applications / Extensions)

Activity Description:

- Read *Mingo the Flamingo*, as students listen they should think about what they think Mingo needs in his "just right" environment.
  - Before you read the last page of the book, have students share ideas of Mingo's "just right" environment. DO NOT show the students the last page of the book.
- After reading the last page (DO NOT show the students the pictures from the last page), have students make a model drawing of *Mingo's Just Right Environment.*
- Students share their completed models with their peers.
  - Be sure to ask students to explain their scientific reasoning for the "just-right environment" they have predicted for MIngo; look for food, water, and shelter in each of their models.
- Share the pictures from the last page of the book and discuss their models compared to the book's pictures. Point out that their models should include food, water and shelter.
- Students revise/add to their models to include what Mingo needs to survive.

Resources:

- *Mingo the Flamingo* by Pete Oswald and Justin K. Thompson (may be available as a youtube read)
- Mingo's Just Right Environment

Teacher Action(s):

- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?"

Student Action(s):

- Applies new labels, definitions, and explanations to Mingo's unique situation.
- Uses previous information to ask questions, propose solutions and make decisions about what Mingo would need in his just-right environment.

Back to Top of Page

- Draw reasonable conclusions from evidence posed from the reading and previous learning experience in the sequence.
- Through discussion students should check for understanding among peers.

EVALUATE
Formative Monitoring Description(s) (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP:** *Developing and Using Models*
- ❏ **DCI:** LS1.C: Organization for Matter and Energy Flow in Organisms; ESS3.A: Natural Resources
- ❏ **CCC:** *Patterns; Systems and System Models*

Summative Assessment Description(s)

- Teacher shares the *Kindergarten Patterns CCC Discussion Card Slide* to discuss as a class the patterns living things need that they explored in both 2A Plants and 2B Animals.
- Their *Mingo's Just Right Environment* models will provide a deep understanding of what students learned about what animals need to live and grow. *Look for food source, water source, and shelter in their final model.*

Resources:

- Kindergarten Patterns CCC Discussion Card Slide
- Mingo's Just Right Environment

Optional Instructional Strategy

- Summary Table
  - recommended to complete as a class

Optional Elaborate Further / Reflect / Enrichment:

- Students complete the *Plant and Animal Similarities and Differences handout.*

Resources:

- Plant and Animal Similarities and Differences

Additional Resources:

- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 3
Brief Description: Students make observations and gather evidence to demonstrate that as the environment changes with the seasons, local plants and animals can continue to get what they need to survive from their habitat.
Suggested Pacing: 2 - 2.5 hrs
Lesson-Level Phenomenon/Design Problem: Bears' seasonal needs
Relationship to Anchoring Phenomena/Design Problem: Animal and plant needs change with the seasons. These needs must be understood to prepare adequately for a class pet.
Learning Sequence Driving Question: How do plants and animals get what they need from their habitat?
Student Expected Outcomes: ● Students will obtain scientific information to describe patterns in the natural world to understand why living things live where they do. ● Students will obtain scientific information to describe patterns in the natural world to relate changes in the environment to the survival of living things. ● Students will use a model to represent the relationship between the needs of plants and needs of animals and the places they live.

CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Analyzing and Interpreting Data ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) (K-ESS2-1) **Engaging in Argument from Evidence** ● Construct an argument with evidence to support a claim. (K-ESS2-2) **Developing and Using Models** ● Use a model to represent relationships in the natural world. (K-ESS3-1)	**ESS2.D: Weather and Climate** ● Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) **ESS3.A: Natural Resources** ● Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)	**Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) (K-ESS2-1) **Systems and System Models** ● Systems in the natural and designed world have parts that work together. (K-ESS2-2) (K-ESS3-1) **Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2)

Back to Top of Page

Obtaining, Evaluating, and Communicating Information ● Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)		

Related Performance Expectation(s) in this Bundle:

- K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.
  - [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]
- K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time.
  - [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days vs cloudy days in different months.]
  - [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]
- K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
  - [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)(K-ESS2-1)
- SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)

Mathematics -

- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)
- MP.2 Reason abstractly and quantitatively. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- MP.4 Model with mathematics. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- K.CC Counting and Cardinality (K-ESS3-1)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

Prior Student Knowledge:
None can be assumed.

LESSON PLAN – 5-E Model

Engage (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Show students the *Engage Slideshow*.
- Teacher asks students to notice how the living thing changes in response to changes in their environment.

Resources:

- Engage Slideshow

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- Divide the class into four groups and assign each group a different season.
- Groups identify how a bear acts and what it needs during their given season. Students identify some cause and effect relationships that happen as the seasons change.
- Students may use the *Seasons According To Bears* handout to draw a model that includes the bear's needs:
  - environment
  - food
  - water source
  - shelter
- Provide students with a variety of nonfiction picture books about bears.
  - Each group can refer to the pictures in the books and make their models based on what they notice in the books (making observations and obtaining information).
- Students make seasonal observations of bears with the *BearCam* from the National Park Service and discuss any patterns in local weather conditions they notice. Ask students how those patterns impact the animal they are observing.
  - If bears are not of interest to your student population, you can choose different live animals to observe at www.explore.org.
- Add these models to a class bulletin board about Bears Through The Seasons.

Teacher Note:

- Ongoing throughout the school year reminder - Students collect weather data in their *Student Journal for Weather Pattern Data packets*.

Resources:

- Seasons According To Bears
- Research Bears on epic! Books - there are several collections available, as well as individual texts.
- BearCam from the National Park Service
- www.explore.org

Back to Top of Page

- Student Journal for Weather Pattern Data packets

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Students present their models from Explore and explain what they added to their picture and the reasons they included each item.
- As a class, discuss the cause and effects related to the similarities and differences among all four season models.
- Read texts such as *Bear Wants More* and *Bear Snores On* both by Karma Wilson to get students noticing the differences in bear behavior during different seasons.
- Teacher asks students to make predictions about what they will see on the National Park Service's *BearCam*, based on the season, and then students can visit the site and make verbal observations.
  - Students should be prompted to make observations of the plants in the environment as well as the animals.

Resources:
- *Bear Wants More* and *Bear Snores On* both by Karma Wilson
- BearCam from the National Park Service

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: food, survive, hibernate, needs, same, different

ELABORATE (Applications / Extensions)

Activity Description:

- Students revisit Mingo the Flamingo and his "just right" environment and discuss:
    - Could a bear live in Mingo's environment?
    - Could Mingo live in the bear's environment?
    - Explain why or why not for each.
        - Discussion should include similarities and differences among the two environments and the animals' needs.
        - Help students get to the understanding that animals and plants live in environments that meet their specific needs.
- Read *Flamingoes* on epic! Books.
- Prompt students to share their ideas about how plants and animals get what they need from their environment.
    - What about the farm do students think caused Mingo to feel not quite right?
    - If the environment changes with the seasons, how do plants and animals respond?
    - Do all animals respond the same way?
    - Do plants or animals change their environment to meet their changing needs?
- Students complete a *Comparison of Mingo and Bear Environmental Needs* handout. They may talk with their tablemates to help with ideas
- Students discuss potential class pet needs, and if they think the pet's needs will change with the seasons.

Resources:

- Flamingos on epic! Books
- Comparison of Mingo and Bear Environmental Needs handout

Teacher Action(s):

- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP:** *Analyzing and Interpreting Data; Engaging in Argument from Evidence; Developing and Using Models; Obtaining, Evaluating, and Communicating Information*
- ❏ **DCI:** *ESS2.D: Weather and Climate; ESS3.A: Natural Resources*
- ❏ **CCC:** *Patterns; Systems and System Models; Cause and Effect*

Summative Assessment Description(s)

Back to Top of Page

- Students' completion of the *Comparison of Mingo and Bear Environmental Needs* handout as well as their participation in the Elaborate discussion.

Resources:
- Comparison of Mingo and Bear Environmental Needs handout

Optional Instructional Strategy
- Summary Table
  - recommended to complete as a class

Additional Resources:
- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Learning Sequence 4
Brief Description: Students will investigate how living things change and impact the environment and animal habitats (pets and wild). Students will brainstorm ideas for reducing human impact on the school grounds.
Suggested Pacing: 1.75 - 2.25 hrs
Lesson-Level Phenomenon/Design Problem: Living things change their environment - such as an ant farm, beaver dam, earthworms, or tree roots on a sidewalk.
Relationship to Anchoring Phenomena/Design Problem: Students investigate how living things change and impact the environment and animal habitats (pets and wild). Taking care of a pet means not disrupting its natural balance or habitat. This learning sequence looks at some of the ways humans have impacted living things by changing the environments.
Learning Sequence Driving Question: How do plants, animals, and humans impact their environment?
Student Expected Outcomes: ● Students will investigate the impacts humans have on the environment. ● Students will propose a plan for reducing one of the impacts humans have on the environment.

CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Analyzing and Interpreting Data ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1) (K-ESS2-1) **Engaging in Argument from Evidence** ● Construct an argument with evidence to support a claim. (K-ESS2-2) **Asking Questions and Defining Problems** ● Ask questions based on observations to find more information about the designed world. (K-ESS3-2)	**ETS1.A: Defining and Delimiting an Engineering Problem** ● Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary) (K-ESS3-2) ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) **ESS2.E: Biogeology** ● Plants and animals can change their environment. (K-ESS2-2) **ETS1.B: Developing Possible Solutions** ● Designs can be conveyed through sketches, drawings, or physical	**Patterns** ● Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) (K-ESS2-1) **Systems and System Models** ● Systems in the natural and designed world have parts that work together.(K-ESS2-2) (K-ESS3-1) **Cause and Effect** ● Events have causes that generate observable patterns. (K-ESS3-2)

Back to Top of Page

Obtaining, Evaluating, and Communicating Information ● Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)	models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary)	

Related Performance Expectation(s) in this Bundle:

- K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
  - [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]
- K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.*
  - [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- R.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2)

Prior Student Knowledge:
None can be assumed.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Teacher reads *Roots* by Grace Hansen and shows the *Tree Root images* to show how plants can change their environments.
- Teacher also reads one or more of the animal books listed in Resources (or other books about beavers, moles, ants and/or earthworms that the teacher selects).
- Guide students to ask questions about how these living things change their environment.
  - This can be scaffolded as an *I Notice, I Wonder* discussion.

Resources:

- *Roots* by Grace Hansen (on Epic)
- Tree Root Images
- Animal Book Options:
  - *Beavers* by Gail Gibbons (on Epic)
  - *Mole's Hill* by Lois Ehlert
  - *Ant Cities* by Arthur Dorros
  - *Wonderful Worms* by Linda Glaser
- I notice, I wonder Handout

Back to Top of Page

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Show students Slide #1 of the Explore Slideshow and briefly discuss their ideas.
- Students vote for the claim they believe by circling the Beaver or Tree on the card (Slide #2) provided by the teacher:
  - Plants change their environment the most to survive.
  - Animals change their environment the most to survive.
- Teacher collects votes and creates a bar graph for students to view.
- Students work with a classmate who voted the same way to construct a verbal argument supported by the evidence (from what they learned in Engage and data from the bar graph) for how plants and animals can change the environment to meet their needs.
- Students share their arguments, observations and questions about the different living things and how they change the environment during whole class discussion.

Resources:
- Explore Slideshow

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students’ investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Teacher prompts children to think about how humans are animals, and they too impact the environment.
- Read the *Lorax by Dr. Seuss* to the kids understand that all living things change the environment to meet the needs for survival, but sometimes those changes can negatively impact other living things.

Back to Top of Page

- In planning for a class pet we need to think about what an animal/plant needs to live and grow, as well as the ways we might negatively impact the pet's environment (too much water, dirty cage, not enough food, shade block the sun, etc.).
- Students review *Human Impact Pictures* and discuss how humans have impacted the environment and affect other living things.
    - Help students to make observations of the natural systems and discuss (argue) how humans have caused changes in that environment
    - Students must use evidence from the images to backup their claims.
    - This could be done as a station activity, or students can select the image they would like to make a human impact claim about using evidence from the images.
    - Teacher Note: Additional pictures can be found on the *How animals and plants can change their environment to meet their needs* link.

Resources:
- *The Lorax* by Dr. Seuss (may be available as a YouTube read)
- Human Impact Pictures
- How animals and plants can change their environment to meet their needs

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: food, land, life, plant, environment, human, living thing, survive, recycle

ELABORATE (Applications / Extensions)

Activity Description:
- Students can share their findings and arguments with the whole class.
- Read the text: *How to Help the Earth-by the Lorax* (Dr. Seuss), by Tish Rabe.
- Students can think about the ways the school community impacts the environment and brainstorm a way to reduce their impact (ex: litter) on the school grounds and possibly carry out one of their ideas.
- Students work individually or in groups to create a model (sketches, drawings or physical models) of their ideas.

Resources:
- *How to Help the Earth-by the Lorax* (Dr. Seuss) by Tish Rabe

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations

Back to Top of Page

- Refers the students to existing data and evidence and asks “What do you already know?”, Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s) (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.
- ❏ **SEP:** *Analyzing and Interpreting Data; Engaging in Argument from Evidence; Asking Questions and Defining Problems; Obtaining, Evaluating and Communicating Information*
- ❏ **DCI:** *ETS1.A: Defining and Delimiting an Engineering Problem; ESS2.E: Biogeology; ETS1.B: Developing Possible Solutions*
- ❏ **CCC:** *Patterns; Systems and System Models; Cause and Effect*

Summative Assessment Description(s)
- Student identification of human impacts on the school community and their proposed plan for addressing one of those impacts.

Optional Instructional Strategy
- Summary Table
  - recommended to complete as a class

Additional Resources:
- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 5		
Brief Description: The students will finally find out what class pet they will get. Class pets can be plants, small animals, digital animals via www.explore.org. It is not necessary to have a "living" class pet.		
Suggested Pacing: 1.25 - 1.5 hrs		
Lesson-Level Phenomenon/Design Problem: The BIG REVEAL-What class pet will we get?		
Relationship to Anchoring Phenomena/Design Problem: Students find out which class pet they will have to plan and care for the remainder of the year. (Class pets can be small animals, plants or a digital animal observed through www.explore.org)		
Learning Sequence Driving Question: What does our class pet need to survive and thrive?		
Student Expected Outcomes: • Students will develop a care guide for the new class pet.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Developing and Using Models • Use a model to represent relationships in the natural world. (K-ESS3-1)	**LS1.C: Organization for Matter and Energy Flow in Organisms** • All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) **ESS3.A: Natural Resources** • Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1) **ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering.	**Systems and System Models** • Systems in the natural and designed world have parts that work together. (K-ESS2-2) (K-ESS3-1)

	• Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem.	

Related Performance Expectation(s) in this Bundle:

- K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.
    - [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]
- K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
    - [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]
- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3)(K-ESS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)(K-ESS2-1)
- R.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Mathematics -

- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)
- MP.2 Reason abstractly and quantitatively. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- MP.4 Model with mathematics. (K-ESS3-1)(K-ESS2-1)(K-2-ETS1-1)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1)
- K.CC Counting and Cardinality (K-ESS3-1)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)

Back to Top of Page

- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

Prior Student Knowledge:
What students learned throughout this unit.

LESSON PLAN – 5-E Model This sequence will not following the full 5-E model as it is the Culminating Performance Task.

ENGAGE/EXPLORE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Build excitement and reveal the selected class pet.
- Show students that there are a variety of texts that can help students prepare for and care for a pet. Help students to identify that each text provides information about (1) food, (2) water, (3) habitat-weather conditions and enclosure.
- Allow students to review and explore a variety of texts and videos related to the selected class pet.

Resources:

- epic! Books

Culminating Performance Task:

- Students will construct a *Care Guide* for their new class pet. Students complete the Care Guide template.
- If time, students can construct a prototype of the class pet's enclosure that meets the basic needs of their new class pet.

Resources:

- Care Guide template

Optional Instructional Strategy

- Summary Table
    - recommended to complete as a class

Additional Resources:

- G0K Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Unit 2 - Waiting for Weather
Kindergarteners will discover that weather impacts what we wear, how we feel, and what we do daily by observing daily weather conditions through collecting data with student made weather instruments and notice that weather influences us every day. People and scientists measure wind, precipitation (snow, rain, etc) and daily temperatures to describe and record the observed weather conditions to notice patterns over time. Students will understand that some weather can be considered severe such as blizzards, heavy rain, heat waves, etc. Weather scientists follow the patterns to help communities prepare and deal with these types of weather conditions. The goal is for the students to think about and identify what they notice, how they feel and is this behavior normal given what they understand about weather conditions. The overall focus of this unit is how weather affects what we wear and what we do. Students will be introduced to five toys who are patiently waiting as they look out the window for various events to happen, three of which are weather related. While the toys waited they observed "many wonderful, interesting things", such as interesting cloud shapes, rainbows, lighting, snow, and fireworks. As adults we understand that we don't have to "wait" for the weather to make our choices but in the story *Waiting* by Kevin Henkes the characters just wait and miss out on all the fun of enjoying the great outdoors. **Teacher Notes**: ● **While marked as Unit 2 per NGSS thematic bundle format, this unit carries throughout the year. This may also be a better entry point for science for kindergarten. The other units will need to be completed around this unit. ** ● This unit is NOT about how weather works, but identifying patterns in weather and how weather impacts the child's daily activity. ● The concept of weather runs throughout the entire school year -The lenses of how weather impacts "Me" (unit 2), "Plants and Animals" (unit 1) and "Play" (unit 3). ● It is important for the coherence of the unit that this section is seasonally repeated in order to support the students' understanding of how weather impacts their daily lives. The Explore section in Learning Sequence 2 will be repeated seasonally: Focus on: ○ Bear in Fall has a kite: waiting for wind ○ Puppy in Winter sits on a sled: waiting for snow ○ Pig in Spring has an umbrella: waiting for rain You can view the flowchart for this unit here.
Suggested Pacing: 11-14 hrs **Teacher Notes**: ● September to November - Bear in Fall has a kite: waiting for wind ● December to February - Puppy in Winter sits on a sled - waiting for snow ● March to May - Pig in Spring has an umbrella: waiting for rain
Anchoring Phenomenon/Design Problem: *Waiting* by Kevin Henkes and how weather affects us every day
Unit Driving Question: How does weather affect our everyday choices?
Culminating Performance Task: ● Weather Preparedness Handout
NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements) ● K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. ○ [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

Back to Top of Page

- K-PS3-2. Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface.*
  - [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]
- K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
  - [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.]
  - [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]
- K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*
  - [Clarification Statement: Emphasis is on local forms of severe weather.]
- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Three Dimensions that form the Foundation for these NGSS Performance Expectations:		
Science & Engineering Practices: **Developing and Using Models** • Develop a simple model based on evidence to represent a proposed object or tool. (K-ETS1-2) **Planning and Carrying Out Investigations** • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1) **Constructing Explanations and Designing Solutions** • Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2) **Analyzing and Interpreting Data** • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)	**Disciplinary Core Ideas:** **P S3.B: Conservation of Energy and Energy Transfer** • Sunlight warms Earth's surface. (K-PS3-1) **ESS2.D: Weather and Climate** • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) **ESS3.B: Natural Hazards** • Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2) **ETS1.A: Defining and Delimiting an Engineering Problem** • Asking questions, making observations, and gathering	**Crosscutting Concepts:** **Cause and Effect** • Events have causes that generate observable patterns. (K-PS3-1) (K-PS3-2) (K-ESS3-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1) **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Back to Top of Page

Asking Questions and Defining Problems • Ask questions based on observations to find more information about the designed world. (K-ESS3-2) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1) **Obtaining, Evaluating, and Communicating Information** • Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)	information are helpful in thinking about problems. *(secondary) (K-ESS3-2)* • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. [(K-2-ETS1-1)] **ETS1.B: Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. [(K-ETS1-2)]	

Possible Common Core State Standards Connections:

Common Core State Standards Connections:
ELA/Literacy -

- R.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which name what they are writing about and supply some information about the topic. (K-ESS2-2)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)(K-PS3-1),(K-PS3-2)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-ESS2-1(K-2-ETS1-1),(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-ESS2-1), (K-2-ETS1-1),(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS3-1),(K-PS3-2)

Back to Top of Page

- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR:

Students collect weather data throughout the school year in their *Student Journal for Weather Pattern Data* packets.

- Teacher completes the first page with the students as an example of how to do this throughout the year.
- Visit a chosen section of the school grounds with plants and animals.
- Throughout the year, visit this location and have students make some observations about the living things and weather conditions (seasonal).
- Plan *at least* 4 visits to the same location. If you don't have an appropriate outdoor space - you may use the Edpuzzle Video of a backyard over 15 months.

Resources:

- Student Journal for Weather Pattern Data packets
- Edpuzzle Video of a backyard over 15 months

Learning Sequence 1

- Learning Sequence Driving Question:
  - How does weather help me know what to wear each day?
- Learning Sequence 1
- Relationship to Anchoring Phenomena/Design Problem:
  - This is an introduction to the anchoring phenomenon of how weather affects us every day.
- Student Expected Outcomes:
  - Students will make observations about weather and the effect it has on the choices we make about our clothing and activities.

Learning Sequence 2

- Learning Sequence Driving Question:
  - How do we know what the weather will be each day?
- Learning Sequence 2
- Relationship to Anchoring Phenomena/Design Problem:
  - Students collect and record data on the type of weather happening each day and develop an understanding of weather patterns by season.
- **Student Expected Outcomes:**
  - Students will make and record observations of different types of weather in order to identify patterns in the natural world.
  - Students will be able to use and analyze their observations of different types of weather in order to identify seasonal patterns based in the natural world over time.
  - Students will ask questions in order to understand what is classified as severe weather in our local area.
  - Students will collect information from texts/media about local severe weather warnings to understand that these events can be predicted and forecasted based on regional and local weather patterns.

Learning Sequence 3

- Learning Sequence Driving Question:
  - How does the Sun affect our lives?
- Learning Sequence 3
- Relationship to Anchoring Phenomena/Design Problem:

Back to Top of Page

- The heat from the sun impacts our choices every day.
- Student Expected Outcomes:
    - Students will make observations and conduct investigations exploring the role of the Sun in warming the Earth's surface.
    - Students will make material comparisons for designing a shelter to protect a living organism.

Assessments:

- **Culminating Performance Task**
    - Weather Preparedness Handout after Evaluate in *Learning Sequence 3*

- **Kindergarten Performance Expectations Rubrics and Prompts**
- **Elementary Assessment Resources**

Additional Resources:

- G0K Unit Materials List
    - Click on specific tab for unit-specific materials
- EPIC! Digital Library - GK U2 List
    - Includes ebooks and videos
    - Must have an educator user account for free access

Back to Top of Page

Learning Sequence 1		
Brief Description: In the book *Waiting*, students are introduced to five toys who are patiently waiting as they look out the window for various events to happen, three of which are weather related. While the toys wait, they observe "many wonderful, interesting things", such as interesting cloud shapes, rainbows, lightning, and snow. As adults we understand that we don't "wait" for the weather to make our choices but in the story *"Waiting"* the characters just wait and miss out on all the fun of enjoying the great outdoors. The children will start this unit by developing an understanding of what weather is and how we observe it. The overall focus of this unit is how weather affects what we wear and what we do, not how weather works.		
Suggested Pacing: 1.25 - 1.75 hrs		
Lesson-Level Phenomenon/Design Problem: *Waiting by Kevin Henkes* and how weather affects us every day.		
Relationship to Anchoring Phenomena/Design Problem: This is an introduction to the anchoring phenomenon of how weather affects us every day.		
Learning Sequence Driving Question: How does weather help me know what to wear each day?		
Student Expected Outcomes: ● Students will make observations about weather and the effect it has on the choices we make about our clothing and activities.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Analyzing and Interpreting Data** ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) **Developing and Using Models** ● Develop a simple model based on evidence to represent a proposed object or tool.	**Disciplinary Core Ideas:** **ESS2.D: Weather and Climate** ● Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)	**Crosscutting Concepts:** **Cause and Effect** ● Events have causes that generate observable patterns. (K-PS3-1) (K-PS3-2) (K-ESS3-2) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)
Related Performance Expectation(s) in this Unit: ● K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. ○ [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.]		

Back to Top of Page

- [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- R.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2)
- W.K.1 Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2)
- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which name what they are writing about and supply some information about the topic. (K-ESS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-ESS2-1)
- MP.4 Model with mathematics. (K-ESS2-1)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may think:

- it rains when there are enough clouds.
- rain occurs when clouds are shaken.
- clouds move because we move.
- clouds are made of cotton, wool, or smoke.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Introduce the story *Waiting* by Kevin Henkes. As you read the story, ask the students to notice what the toys are waiting for.
- Ask: When will the characters know it is their turn to go out and play? When will they STOP waiting? List the student responses on chart paper.
- Present *Waiting Slideshow* and ask the students to turn and talk with the prompts from Slide #2:
  - What type of weather do you notice outside the window?
  - Which toy looks prepared for this type of weather?
  - Which toys are not prepared for this type of weather?
  - How do you know? The type of weather that will let them use their prop:
    - rain - Pig has an umbrella
    - wind - Bear has a kite
    - snow - Puppy sits on a sled
- Teacher completes the Explanatory Model from the *Waiting Slideshow* (Slide #3) with class ideas.
- Share that unlike the toys that are waiting, the students are going to figure out how to know what the weather is like by being kindergarten weather scientists, or classroom meteorologists throughout their school year, so they can be prepared for any type of weather situation.

Back to Top of Page

- Pose the question(s):
    - What is weather?
    - How do we observe the weather?
    - Does weather change?
    - How does the weather help me to know what to wear and what I can do each day?

Resources:
- *Waiting* by Kevin Henkes (may be available as a youtube read)
- Waiting Slideshow

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:
- Ask the students how they decided what to wear today. Teachers can model a response by showing what they are wearing.
- Students work in small groups with a packet of *Sky Condition Cards* to match with weather regalia.
- Teacher shares "weather regalia" (see materials for a list of suggested items or use *Smartboard Regalia Images*). Select a variety of items to spark student discussion that would support further investigation of temperature, sky conditions (sunny, cloudy, partly sunny/cloudy, windy), and precipitation (rain, snow) and asks students to hold up appropriate *Sky Condition Card.*
- Another alternative would be to have students do a small group picture sort and have the groups share their sorting (item and weather condition/season) .
- Save the student sorts to refer to in the Explore/Explain Lessons.

Resources:
- Sky Condition Cards
- Smartboard Regalia Images

Optional Instructional Strategy
- Summary Table
    - recommended to complete as a class

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

Back to Top of Page

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

Additional Resources:
- G0K Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2

Brief Description:
This learning sequence consists of three parts and will be repeated based on seasons: Fall, Winter and Spring. Students learn to observe and track daily weather which will be ongoing as well as looking at local weather from the lens of "severe" weather. It is very important to reinforce the reasons students are exploring the weather and seasons is because they are investigating the patterns of weather throughout the year and those observations help us make choices in our daily lives.

Suggested Pacing:
- Fall: 2 - 2.5 hrs
- Winter: 2 - 2.5 hrs
- Spring: 2 - 2.5 hrs
- Evaluate: 0.5 hours

Lesson-Level Phenomenon/Design Problem:
Apply seasonal weather to the *Waiting* characters:
- Bear in Fall has a kite: waiting for wind
- Puppy in Winter sits on a sled: waiting for snow
- Pig in Spring has an umbrella: waiting for rain

Relationship to Anchoring Phenomenon/Design Problem:
Students collect and record data on the type of weather happening each day and develop an understanding of weather patterns by season.

Learning Sequence Driving Question:
How do we know what the weather will be each day?

Student Expected Outcomes:
- Students will make and record observations of different types of weather in order to identify patterns in the natural world.
- Students will be able to use and analyze their observations of different types of weather in order to identify seasonal patterns based in the natural world over time.
- Students will ask questions in order to understand what is classified as severe weather in our local area.
- Students will collect information from texts/media about local severe weather warnings to understand that these events can be predicted and forecasted based on regional and local weather patterns.

CONNECTIONS TO STANDARDS

Three Dimensions Related to the Specific Learning Performance(s):

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Planning and Carrying Out Investigations • Make observations (firsthand or from media) to collect data that can be used to make comparisons. **Obtaining, Evaluating, and Communicating Information** • Read grade-appropriate texts and/or use media to	**ESS2.D: Weather and Climate** • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) **ESS3.B: Natural Hazards**	**Cause and Effect** • Events have causes that generate observable patterns. **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Back to Top of Page

obtain scientific information to describe patterns in the natural world. **Analyzing and Interpreting Data** ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) **Asking Questions and Defining Problems** ● Ask questions based on observations to find more information about the designed world. (K-ESS3-2) **Developing and Using Models** ● Develop a simple model based on evidence to represent a proposed object or tool. (K-ETS1-2)	● Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2) **ETS1.A: Defining and Delimiting an Engineering Problem** ● Asking questions, making observations, and gathering information are helpful in thinking about problems. *(secondary)* *(K-ESS3-2)*	

Related Performance Expectation(s) in this Unit:

- K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
  - [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.]
  - [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]
- K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.*
  - [Clarification Statement: Emphasis is on local forms of severe weather.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)
- RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2)
- SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2)

Mathematics -

- MP.2 Reason abstractly and quantitatively., (K-ESS2-1)
- MP.4 Model with mathematics. (K-ESS2-1)(K-ESS3-2)
- K.CC Counting and Cardinality (K-ESS3-2)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)

- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may think:
- it rains when there are enough clouds.
- rain occurs when clouds are shaken.
- clouds move because we move.
- clouds are made of cotton, wool, or smoke.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:
This will be repeated seasonally. Focus on:
  - Bear in Fall has a kite: waiting for wind
  - Puppy in Winter sits on a sled - waiting for snow
  - Pig in Spring has an umbrella: waiting for rain
- For the first round of seasonal observations (as described in the overview), be sure to identify a suitable space outside to take the class prior to actually going out, if possible, a spot that will change over time like a deciduous tree.
- Take the students outside for a walk on the school grounds ending at the spot where they will be making their seasonal observations throughout the school year.
- Ask the students to observe the weather.
- Record the students ideas and thoughts on a class list.
- Ask the students to make a picture frame with their hands to focus on a specific areas of the environment (the sky, the clouds, or anything that is moving with the wind). Make anecdotal notes for yourself to refer to when you return to the classroom.
  - Ask the students to describe what they see at each focal point which is the area of environment that was framed by their hands. (Consider using technology to perhaps photograph their focal point.)
  - Ask the students to think about how it feels outside.
  - How does their skin feel?
  - What do they hear?
- When you return to the classroom, have the students record their observations and ideas in their *Student Journal for Weather Pattern Data* packets.
- Have the students share their observations - Chart these ideas and any questions they may have.
- Have the students *Turn and Talk* to respond to this question:
  - What is weather?
- Chart their responses - be sure to not get into explanatory details - just accept their responses. As you move through the unit your students will figure out themselves, with your facilitation, more about the weather.
- *Optional:* If you don't have an outdoor space that contains plant life that will change over time, you may use the Edpuzzle Video of a backyard over 15 months.
  - Use the sections that are appropriate for the season you are in and follow the question protocol with your class.
  - You do not have to type in your answers. They are simply there as prompts for guiding student discussion.

Resources:
- Student Journal for Weather Pattern Data packets

Back to Top of Page

- Time Lapse Backyard Over 15 Months

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
EXPLAIN (Concepts Explained / Vocabulary Defined)

Part #1: Focus on Day to Day changes in the weather -Repeat the following steps in Fall, Winter and Spring.
- Students use the *Character Calendar template* to track the weather according to the different characters.
  - Teacher Notes:
    - The weather chart will be a pictograph. This will help students identify monthly and seasonal patterns related to rain, wind, sun and snow.
    - Keep data for Unit 3, Learning Sequence 4
    - This chart (or whatever calendar tracking you choose) needs to be kept after each month or a photo taken so comparisons can be made at a later time. This is an ongoing experience that should be carried out for the entire year. It is suggested that the months are grouped by seasonal changes.
- Students are asked:
  - How do scientists figure out the weather each day?
  - How do you figure out the weather each day?
  - How does knowing the weather help you figure out what to wear?
  - What should we wear today?
- Review collected data from the *Character Calendar template.*
- Use the *Thermometer Demonstration* to record temperature readings and help students to recognize relative temperature descriptors (hot, warm, cool, cold, very cold).
- Character Calendar: Which toy will get to play outside today? How do we know?
  - Teacher Note: As an add-on to calendar time and weather discussions, students can determine the characteristics of the day and decide which character will go out to play. Each character calendar acts as a data collection tool in the form of a pictograph. This will help students identify patterns in weather according to season.

Part #1 Resources:
- Character Calendar template
- Thermometer Demonstration

Part #2: Focus on Seasonal changes in the weather over time
- Help students to identify patterns by using the *Character Calendar template* from Part #1.
- Based on the time of year, students learn the different ways scientists observe each weather condition. Focus on reading and writing exercises around the timeline and weather concepts listed below.
  - Fall: The Bear (students investigate wind)
    - Student Prompts: How do we know if it is windy? Is the sun out? How can we measure the wind? Is it windy in every season?
    - Students investigate how scientists measure the wind using the *DIY Wind Instruments* activity. Provide time for students to collect data using their wind instruments throughout the season.

Back to Top of Page

        - Students should complete at least one Science journal entry per month (see sequence 1).
        - Texts associated with Wind
            - *Wind* by Erin Edison
            - *The Wind Blew* by Pat Hutchins
            - *Feel the Wind* by Arthur Dorros
    - Winter: The Puppy (students investigate snow)
        - Student prompts: How do we know it will snow? Is the sun out when it snows? Does it snow in every season?
        - Investigate how scientists measure snow.
        - Have students predict how much water there will be when the snow melts. Fill a variety of containers (all different heights i.e jar and bucket) with snow. Ask the students to make predictions about what will happen to the snow inside the warm building? Have students turn and talk to express their ideas. Once you have established that the snow will turn to water, have the students use the *Snow/Water Prediction Sheet* to show the amount of water they expect each container to hold once the snow melts. Students can draw their ideas. After the snow melts and students record their results, prompt students to ask questions about their results. Collect student questions on chart paper.
        - Students should complete at least one Science journal entry per month (see sequence 1).
    - Spring: The Pig (students investigate rain and clouds)
        - Student Prompts: How do we know it will rain? Does it rain in every season? Is the Sun out all the time?
        - Investigate how scientists measure and collect rain-DIY Rain Gauge. Provide time for students to collect data using their rain gauges throughout the season.
        - Investigate how clouds relate to rain.
- Students should complete at least one entry per month in their *Student Journal for Weather Pattern Data* packets (from Engage).
- Students can use optional text resources listed below for further information.

Part #2 Resources:
- DIY Wind Instruments
- Texts associated with Wind
    - *Wind* by Erin Edison
    - *The Wind Blew* by Pat Hutchins
    - *Feel the Wind* by Arthur Dorros
- Snow/Water Prediction Sheet
- Texts about snow:
    - *The Story of Snow* by Mark Cassino
    - *Snow Day* by Lester Laminack
    - *Snow* by Uri Shulevitz
    - *Sadie and the Snowman* by Allen Morgan
- DIY Rain Gauge
- Texts associated with rain:
    - *Rain!* by Linda Ashman
    - *Rain* by Sam Usher
    - *Down Comes the Rain* by Franklyn Branley
    - *Clouds* (weather basics) by Erin Edison
- Student Journal for Weather Pattern Data packets (from Engage)

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Back to Top of Page

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: weather, prediction, forecast, observation, pattern, season (fall, winter, spring, summer), thermometer, rain gauge, anemometer, precipitation, freeze, melt, rain, snow, cloudy, sun, earth, light, wind, heat, cold

ELABORATE (Applications / Extensions)

Activity Description: CT Severe Weather (seasonal)
- During each season, if a local "severe" weather event occurs, take this opportunity to investigate the event.
- Present the *Waiting Slideshow (Slide #2)* with the toys observing a window with stormy weather and a window with the rainbow. Just like the waiting toys, we sometimes have weather that we need to prepare for because it's going to be different than just a regular rainy day or snowy day.
- Consider showing the PBS video *Peep and the Big World: Stormy Weather.*
- Compare how Peep and his friends behaved versus how we (humans) behave in stormy weather. (The point is to be sure to get across is that we have ways of knowing about upcoming stormy weather so that we can prepare for it). The exploration will focus on a few region specific events and has the student generate a survival guide.
- Teacher Note: You want to be consistent as to when you observe the weather each day as that is the way scientists and meteorologists conduct their observations and help us understand if we need to take some special action for local weather events that are classified as severe.

Fall severe weather connection - Hurricanes: *Hurricanes! By Gail Gibbons on epic! Books*
- Students are asked: What is a hurricane? What happens during a hurricane? How can we prepare for a hurricane?
- Read texts pertaining to windy weather events.
- Students work together to make a class severe weather survival guide for hurricanes.
- Weather/Season Assessment-Help Bear predict and measure the wind

Winter severe weather connection - Blizzards: *Blizzard by Joyce Markovics on epic! Books*
- Students are asked: What is a blizzard? What happens during a blizzard? How can we prepare for a blizzard?
- Read texts pertaining to blizzards.
- Students work together to make a class severe weather survival guide for blizzards.
- Weather/Season Assessment-Help Puppy dress for and measure snow.

Back to Top of Page

Spring severe weather connection - Thunderstorms: *Flash, Crash, Rumble and Roll* by Franklyn Branley or *A Party for Clouds: Thunderstorms* by Belinda Jensen on epic! Books

- Students are asked: What is a thunderstorm? What happens during a thunderstorm? How do we prepare for a thunderstorm? What do the clouds look like before or during a storm? How can clouds help us predict rain?
- Read texts pertaining to thunderstorms.
- Students work together to make a class severe weather survival guide for thunderstorms.
- Weather/Season Assessment - Help Pig predict and measure the rain.

Resources:

- Waiting Slideshow (Slide #2)
- Talking to Young Children about Severe Weather (for teachers)
- Peep and the Big World: Stormy Weather
- Weather/Season Assessment
- Hurricanes! By Gail Gibbons on epic! Books
- Blizzard by Joyce Markovics on epic! Books
- *Flash, Crash, Rumble and Roll* by Franklyn Branley
- A Party for Clouds: Thunderstorms by Belinda Jensen on epic! Books

Teacher Action(s):

- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP:** *Designing and Carrying Out Investigations; Obtaining, Evaluating and Communicating Information; Analyzing and Interpreting Data; Asking Questions and Defining Problems; Developing and Using Models*
- ❏ **DCI:** *ESS2.D: Weather and Climate; ESS3.B: Natural Hazards; ETS1.A: Defining and Delimiting an Engineering Problem*
- ❏ **CCC:** *Cause and Effects; Patterns*

Summative Assessment Description(s):

- Revisit the story *Waiting For Weather;* specifically when the cat with patches joins the toys.
  - Introduce the Waiting Slideshow (Slide 6) and ask students to design the cat so it is prepared for a specific type of weather.
    - Model this task while referring to the variety of weather data collected by the class prior to allowing the kids to generate their designs.
  - Teacher can assign different cats to each student: sunny cat, cloudy cat, rainy cat, thundercat, snowy cat, hurricane cat, blizzard cat.

Back to Top of Page

- Assign cat themes according to student readiness.
- After students design their cats according to the weather conditions, students should verbally describe the scientific significance of their designs and how the design helps the cat in a specific type of weather.

- As the students become adept as weather reporters, they can compare and contrast the seasonal changes as they experience the seasons throughout the year. Refer to the character calendar. Scaffold questions to help students identify emerging patterns. Focus question: Why should we pay attention to the changes in the weather/seasons?

Resources:
- Waiting Slideshow (Slide #6 or #7)

Optional Instructional Strategy
- Summary Table
  - recommended to complete as a class

Additional Resources:
- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 3		
Brief Description: Students explore the role the Sun plays in heating Earth's surface and everything on it. Students do this through observation and investigations involving the sun. Students become engineers to complete the task of designing a shelter to protect a living organism from the heat of the sun.		
Suggested Pacing: ● 2.75 - 3.75 hrs for the 5-Es ● 0.25 - 0.5 hrs for the Culminating Performance Task		
Lesson-Level Phenomenon/Design Problem: Frying an egg on a sidewalk		
Relationship to Anchoring Phenomena/Design Problem: The heat from the sun impacts our choices every day.		
Learning Sequence Driving Question: How does the sun affect our lives?		
Student Expected Outcomes: ● Students will make observations and conduct investigations exploring the role of the Sun in warming the Earth's surface. ● Students will make material comparisons for designing a shelter to protect a living organism.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Planning and Carrying Out Investigations ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1) **Constructing Explanations and Designing Solutions** ● Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2) **Developing and Using Models** ● Develop a simple model based on evidence to represent a proposed object or tool. (K-ETS1-2)	**PS3.B: Conservation of Energy and Energy Transfer** ● Sunlight warms Earth's surface. (K-PS3-1) **ETS1.A: Defining and Delimiting an Engineering Problem** ● Asking questions, making observations, and gathering information are helpful in thinking about problems. *(secondary) (K-ESS3-2)* ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)	**Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1) **Structure and Function** ● The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Back to Top of Page

Asking Questions and Defining Problems	ETS1.B: Developing Possible Solutions	
• Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	• Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-ETS1-2)	

Related Performance Expectation(s) in this Unit:

- K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.
  - [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]
- K-PS3-2. Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth's surface.*
  - [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]
- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Possible Common Core State Standards Connections:

ELA/Literacy -

- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory text in which name what they are writing about and supply some information about the topic. (K-ESS2-2)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)(K-PS3-1),(K-PS3-2)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-ESS2-1(K-2-ETS1-1),(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-ESS2-1), (K-2-ETS1-1),(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS3-1),(K-PS3-2)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may think:

- it rains when there are enough clouds.

Back to Top of Page

- rain occurs when clouds are shaken.
- clouds move because we move.
- clouds are made of cotton, wool, or smoke.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Show this video of an egg frying on the sidewalk in Florence, Arizona in June.
  - Use this as a springboard for students to develop questions and theories on the idea of an egg frying in this most unlikely place.
  - To tie this back to the text *Waiting*, tell the students that Sunny cat will be travelling to Arizona and is very worried about how the weather may affect him/her, especially if it can fry an egg. Sunny cat is very sensitive!
- Teacher asks the question: How is it possible to fry an egg on the sidewalk in Arizona?
- Students generate questions and express their ideas about this phenomena.
- Teacher uses the *Driving Question Board Slideshow* to showcase the students' questions about the phenomena.
  - Sort the students' questions into categories - this can be done w/o the students in preparation for developing your Explore experience.
  - Categories could be but aren't limited to temperature, surface materials, location, time of year.
- Students pose questions about these phenomena.

Resources:

- Frying a egg on a sidewalk
- Driving Question Board Slideshow

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

Activity #1:

- Ask the students to elaborate on other surface materials to try to cook an egg. *(While discussing, consider the following: Could we cook an egg on the grass? What makes the pavement hot enough to cook an egg? Do all surfaces get hot enough to cook an egg in the summer sun? How do we know? How can we test how the sun impacts different types of surfaces?)*
- As a class devise a plan for testing how light changes temperatures on different surface materials.
  - Help students come to consensus about the different surface materials they could test to determine temperature differences (For example: sand, gravel, woodchips, black and white construction paper to represent asphalt and concrete).
- Teacher sets up four surfaces under a lamp
  - Tell the students the light source represents the Sun.
- Students select two surfaces to test relative temperature.

Back to Top of Page

- Students complete the *Surface Materials Worksheet*.
- Students are responsible for relative temperature, but if teacher wants to use a thermometer, the class can periodically record the temperature of the surfaces. Color in a thermometer for each reading.
- Once all of the data has been collected, ask students to look for patterns in the data.
    - (Consider the following: Did the sun/light affect the surfaces differently? How do you know? Which surface got hotter? Why do you think that surface got hotter? Have you ever experienced something that told you the sun heated surfaces differently (sand at the beach, black top compared to grass, etc)?)

Resources Activity #1:
- Surface Materials Worksheet

Activity #2:
- Allow students to engage with the UV beads. To prevent losing the beads put one or two beads on a pipe cleaner and loop the cleaner closed.
    - Tell the students that in the right conditions, the beads will change color.
    - Challenge the students to find the condition that changes the beads.
- Ask students to brainstorm what condition may change the beads. Using student input, develop stations for students to test their ideas. For example, set up a variety of stations: (1) Ice water, (2) Warm Water, (3) Dark Area (box), (4) UV light(or a space where the students are in DIRECT sunlight), etc.
- Students complete *Bead Color Changes* handout to record their observations as they explore the different stations.

Resources Activity #2:
- Bead Color Changes

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:
- Read texts about the Sun and heat - possible suggestions listed in Resources.
- Students share their experiences from the Explore activity. *(Ask the following: Did you get the beads to change color? What did you have to do to get the beads to change color? How can we use these special beads to help Sunny Cat when he/she travels to Arizona.)*
- Sunny Cat likes sunny days, but she does not want to get sunburned. Elicit student ideas about how the UV beads could be used to help Sunny Cat make sure she does not get too much sun.
- Students use the UV beads to construct a collar or other device to put on Sunny Cat, so she doesn't spend too long in the sun.

Back to Top of Page

Resources:

- *Sun* by Marion Dane Bauer
- *What the Sun can Do* by Sharon Coan
- *Heatwave* by Eileen Spinelli
- *Come on Rain* by Karen Hess
- What Does Sunlight Do? by Jennifer Boothroyd (book available on Epic)
- The Sun Song Video by Scratch Garden

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: sun, heat, weather, light, Earth, sunlight, cool, temperature, warm, energy, thermometer

ELABORATE (Applications / Extensions)

Activity Description:

- Tell the students that we are still worried that Sunny Cat will be exposed to too much sun on her trip to Arizona. Not only does she need the UV bead collar to help her know when she is in the sun, but maybe she needs a shelter to protect her as well.
- Students think like engineers to plan and build Sunny Cat a shelter to protect her from the hot Arizona sun.
    - Engineers always plan their designs first.
- Show the students the materials they can use to create their shelters.
- Ask the students to draw a model of their shelter idea and label the parts (first letter of the part name is a great start).
- Students share their drawings with the class.
- Students provide feedback, in a respectful way, to one another.
    - Help students to clarify the structures on their shelter and what their intended function may be.
    - You may need to scaffold the discussions.
- Students finalize their plans incorporating the feedback they received.
- Students construct and test their designs.
    - If Sunny Cat's collar changes color under the shelter, then the shelter need to be revised.
    - If the collar stays "white" the students did a good job protecting Sunny cat from the sunlight.

Teacher Action(s):

- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Back to Top of Page

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❑ **SEP**: *Planning and Carrying Out Investigations; Constructing Explanations and Designing Solutions; Developing and Using Models; Asking Questions and Defining Problems*
- ❑ **DCI**: *PS3.B: Conservation of Energy and Energy Transfer; ETS1.A: Defining and Delimiting an Engineering Problem; ETS1.B: Developing Possible Solutions*
- ❑ **CCC**: *Patterns; Structure and Function*

Summative Assessment Description(s):
- Students Elaborate final designs.

Culminating Performance Task:
Show students the *Playing in the Snow* Image.
Ask students to predict the weather conditions.
Students use the *Weather Preparedness Handout* to recreate the image as a scientific model to show weather preparedness (*students will either have to change the weather in the image or the children's clothing*).
Students explain the changes they make to the photograph using scientific reasoning and rationale, as well as their knowledge of weather and what's needed to be prepared for different weather scenarios.

Resources:
- Playing in the Snow Image
- Weather Preparedness Handout

Optional Instructional Strategy
- Summary Table
  - recommended to complete as a class

Additional Resources:
- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Unit 3 - Push, Pull, Play!
In play, children rely on the science of forces and their interactions. All forms of play require force and motion through the lens of pushes and pulls. These forces are very evident in gross motor play on the playground or in gym class, however these interactions are also necessary for fine motor play as well. As play engineers students will design and test flying play objects. Students will define the roles of pushes, pulls and force strength in their design and test process Students investigate that all of their play actions feature pushes and pulls. Over the course of the four sequences students learn about the direction of motion related to pushes and pulls, that these forces can have different strengths, and that we can change the motion of an object by adding or changing force. Students also come to realize that certain weather conditions exhibit force and can impact the way that we play. As play engineers students will design and test a flying play object. Students will define the roles of pushes, pulls and force strength in their design and test process. Differentiation: While the phenomenon of the unit is play, play experiences utilized throughout the unit can be differentiated according to the resources available to the students or to meet the interests of specific students. For example, if a student does not prefer gross motor activity, he/she can play with coloring and drawing. These fine motor actions will yield the same relative understanding of pushes and pulls. You can view the flowchart for this unit here.
Suggested Pacing: 8-10 hrs
Anchoring Phenomenon/Design Problem: Push, Pull, Play
Unit Driving Question: How do we use pushes and pulls during play?
Culminating Performance Task: Students will present their final wind propelled object (kite, pinwheel, sailboat, etc.) to the class.

NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements)
• K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
  ○ [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.]
  ○ [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]
 	
• K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
  ○ [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.]
  ○ [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]
 	
• K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
  ○ [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days vs cloudy days in different months.]

Back to Top of Page

- [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

- K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Three Dimensions that form the Foundation for these NGSS Performance Expectations:

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Planning and Carrying Out Investigations • With guidance, plan and conduct an investigation in collaboration with peers.(K-PS2-1) **Analyzing and Interpreting Data** • Analyze data from tests of an object or tool to determine if it works as intended.(K-PS2-2) (K-2ETS1-3) • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) **Asking Questions and Defining Problems** • Ask questions based on observations to find more information about the natural and/or designed world(s). • Define a simple problem that can be solved through the development of a new or improved object or tool.	**PS2.A: Forces and Motion** • Pushes and pulls can have different strengths and directions.(K-PS2-1) (K-PS2-2) • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.(K-PS2-1) (K-PS2-2) **PS2.B: Types of Interactions** • When objects touch or collide, they push on one another and can change motion.(K-PS2-1) **PS3.C: Relationship Between Energy and Forces** • A bigger push or pull makes things speed up or slow down more quickly. *(secondary)* (K-PS2-1) **ESS2.D: Weather and Climate** • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) **ETS1.A: Defining Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. *(secondary)* (K-PS2-2)	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes.(K-PS2-1) (K-PS2-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Back to Top of Page

	• Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem. **ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs.(K-2ETS1-3)	

Possible Common Core State Standards Connections:

ELA/Literacy -

- RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)
- SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)(K-ESS2-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-3)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-PS2-1) (K-ESS2-1)(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-ESS2-1)(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-3)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)(K-ESS2-1)
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-3)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR:

Students collect weather data throughout the school year in their *Student Journal for Weather Pattern Data* packets.

- Teacher completes the first page with the students as an example of how to do this throughout the year.
- Visit a chosen section of the school grounds with plants and animals.
- Throughout the year, visit this location and have students make some observations about the living things and weather conditions (seasonal).
- Plan *at least* 4 visits to the same location. If you don't have an appropriate outdoor space - you may use the Edpuzzle Video of a backyard over 15 months.

Back to Top of Page

Resources:
- Student Journal for Weather Pattern Data packets
- Edpuzzle Video of a backyard over 15 months

Learning Sequence 1:
- Learning Sequence Driving Question:
  - How do we use pushes and pulls during play?
- Learning Sequence 1
- Relationship to Anchoring Phenomena/Design Problem:
  - Students build awareness of pushes and pulls and their impact on play and an object's motion.
- Student Expected Outcomes:
  - Students will investigate pushes and pulls to identify patterns of similarities and differences in motion and direction.

Learning Sequence 2
- Learning Sequence Driving Question:
  - What happens when you change the force of a push or pull during play?
- Learning Sequence 2
- Relationship to Anchoring Phenomena/Design Problem:
  - Students investigate and explore big and little forces while playing.
- Student Expected Outcomes:
  - Students will make observations of patterns in the natural world to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down.
  - Students will collaborate with peers to plan and conduct an investigation to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down.
  - Students will analyze data from tests of an object to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down.

Learning Sequence 3
- Learning Sequence Driving Question:
  - What happens when play objects crash into one another?
- Learning Sequence 3
- Relationship to Anchoring Phenomena/Design Problem:
  - Students apply their understanding of pushes and pulls in play to predict the outcomes of collisions.
- Student Expected Outcomes:
  - Students will make observations and describe patterns in the natural world to understand how pushes and pulls can have different directions and can be affected by change of motion.
  - Students will collaborate with peers to plan and conduct an investigation to understand how pushes and pulls can have different directions and can be affected by change of motion.
  - Students will analyze data from tests of an object or tool to understand how pushes and pulls can have different directions and can be affected by change of motion.

Learning Sequence 4
- Learning Sequence Driving Question:
  - How can weather make things move? Why do some play objects fly in the wind better than others?
- Learning Sequence 4

Back to Top of Page

- Relationship to Anchoring Phenomena/Design Problem:
    - Play can be impacted by weather.
- Student Expected Outcomes:
    - Students will make observations and describe patterns in the weather to understand how wind pushes and can have different directions and can change the motion or speed of an object.
    - Students will collaborate with peers to plan and conduct an investigation to understand how wind pushes and can have different directions and can change the motion or speed of an object.
    - Students will engineer objects/playthings that will fly in the wind.

Assessments:

- **Culminating Performance Task**
    - Students will present their final wind propelled object to the class. Their presentation must include:
        - The final model of their design - a drawing showing a push and pull with arrows.
        - Highlight one modification they made based on their testing results.
- Engineering Design Task
- **Kindergarten Performance Expectations Rubrics and Prompts**
- **Elementary Assessment Resources**

Additional Resources:

- G0K Unit Materials List
    - Click on specific tab for unit-specific materials
- EPIC! Digital Library - GK U3 List
    - Includes ebooks and videos
    - Must have an educator user account for free access

Back to Top of Page

Learning Sequence 1		
Brief Description: Students will draw and investigate how they change the motion of objects during play. Students work toward understanding the patterns of similarities and differences in motion and direction as they play in the classroom or on the playground. Students develop simple scientific models to represent their understanding of the direction of motion relative to a push or a pull and categorize images using scientific rationale.		
Suggested Pacing: 2-3 hrs		
Lesson-Level Phenomenon/Design Problem: Push, Pull, Play		
Relationship to Anchoring Phenomenon/Design Problem: Students build awareness of pushes and pulls and their impact on play and an object's motion.		
Learning Sequence Driving Question: How do we use pushes and pulls during play?		
Student Expected Outcomes: ● Students will investigate pushes and pulls to identify patterns of similarities and differences in motion and direction.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Analyzing and Interpreting Data** ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)	**Disciplinary Core Ideas:** **PS2.A: Forces and Motion** ● Pushes and pulls can have different strengths and directions.(K-PS2-1) (K-PS2-2) ● Pushing or pulling on an object can change the speed or-direction of its motion and can start or stop it.(K-PS2-1) (K-PS2-2)	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.(K-ESS2-1)
Related Performance Expectation(s) in this Unit: ● K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. ○ [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] ○ [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]		
Possible Common Core State Standards Connections: ELA/Literacy - ● W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)		

Back to Top of Page

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-PS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2-1)

Prior Student Knowledge:
None can be assumed

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Place a ball in the center of the classroom floor and ask students to Turn-and-Talk to come up with ways they could get the ball to move.
    - Record students' thinking on smart notebook or chart paper. Students should come up with things like kick the ball, tap the ball, bump the ball with another object, etc.
- As students share their ideas, ask them to begin to classify their ideas.
    - Which ideas are similar? Different?
    - Use the push and pull images from the *Explore Slideshow* to scaffold discussion.
    - Which actions that moved the ball would be considered PUSHES? PULLS? This will help students begin to identify the opposing concepts of push and pull. If students incorrectly identify a push and a pull, let it go for now. We want the students to build their understanding and change their responses over time.
    - Push: to press upon or against (a thing) with force in order to move it away
    - Pull: to draw or haul toward oneself or itself, in a particular direction, or into a particular position

Resources:

- Explore Slideshow (Slide #1)

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

Activity #1:

- Ask students to think about their playtime (in the classroom or outside on the playground).
- Prompt the students to draw pictures (print Slide 2 from *Explore Slideshow* on 11x17 paper) of how they make things move when they play. You may need to hone student thinking to a few instances. Use actions or play that is common to your classroom routines. You can choose to do this after play time or recess so that students have play actions that are readily accessible.
    - *Some examples:*
        - *kicking a ball*
        - *opening a door*
        - *moving a crayon to color*
        - *sliding down a slide*

        - *swinging on the swing set*
        - *pushing cars along a track*
- Post the push and pull images from the *Explore Slideshow* (slide #1) at opposite ends of the classroom.
- Have the students put their drawing where they think it belongs according to the actions they drew and share their rationale for selecting PUSH or PULL as the action depicted in the image they drew.
    - What patterns do they notice as they place their drawings?
    - Where do all objects that are pushed go?
    - Where do all objects that are pulled go?
    - If students incorrectly place their drawing, DO NOT fix it or comment at this time. The goal of NGSS instruction is to help students figure science out! Over time we can ask the students to relocate any images that they think are incorrectly placed.

Resources for Activity #1:
- Explore Slideshow

Activity #2:
- Students complete the *Station Activity* to investigate and experience pushes and pulls in hands-on play.
    - Students identify their actions at each station as a push, pull, or both.
    - Students share their ideas and use evidence from their experiences to explain their thinking.
    - While this is written as a station activity, It may be that you investigate one or two of the play features per day. Students must wear safety goggles at the marshmallow shooter station.
        - PUSH investigations:
            - soda bottle bowling
            - matchbox cars and ramps
            - coloring (can also be a PULL)
        - PULL Investigations
            - magnetic fishing
            - clothes line message (can also be a PUSH)
            - marshmallow shooters (SAFETY: design includes latex balloons, please check student allergies prior to use in the classroom)
- *Optional Activity:*
    - *Bring the students out to the playground with the cutouts of the push/pull cards from slide 3.*
    - *Visit the different pieces of playground equipment and have students demonstrate the use of the equipment.*
    - *Discuss ideas about the play action and hold up the card that best describes the movement (did movement result from a push or a pull).*
        - *Keep track of incorrect student responses. and help students to change their thinking.*
        - *Make sure students provide a rationale for their responses. They may be thinking from a different perspective. It is important for us, as teachers, to understand where students are coming from as they make their push/pull determinations.*
            - *Making the swings move: Push*
            - *Moving across the monkey bars: Pull*
            - *Making yourself move down the slide: Push*
            - *Making a ball/merry-go-round move: Push*
            - *Climbing the rock wall: Hands Pull, feet push*
            - *Making the zipline move (no kids riding): Pull*

Resources for Activity #2:
- Station Activity

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary

Back to Top of Page

- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
- Read an informational text about pushes and pulls. Some options are listed in resources.
- Facilitate class discussion, using and formally defining scientific vocabulary (see below).
- Students work together (Turn and Talk) without direct instruction to respond to each of the prompts below.
  - As students respond to the prompt, generate a smart notebook page or anchor chart to track students' understanding of pushes and pulls.
  - Students should minimally understand that a push moves an object away from the person, and a pull draws an object toward a person.
    - Include arrows in the anchor chart depictions.
  - Students may start to bring in the concepts of force as they discuss their interactions with the stations. Force will be the focus of future lessons, but allow the students to share their ideas about how the strength of the push or pull influenced the action of the object.
  - Students should share the patterns they have identified for both pushes and pulls.
    - What does a push look like?
    - What does it mean to push something?
    - What does it mean to pull something?
    - What does it look like to pull something?
    - What does the word direction mean?
    - What direction is a push? Pull?

Resources:
- *Pushing and Pulling* by Natalie Hyde available on epic! Books
- *Give it a Push, Give it a Pull: A Look at Forces* by Jennifer Boothroyd available on epic! Books
  - More options available on epic! Books
- *Motion: Push and Pull, Fast and Slow* by Darlene R. Stille
- *Pushes and Pulls:* TIme for Kids by Sharon Coan
- *Force Makes Things Move* by Kimberly Brubaker Bradley & Paul Meisel
- *Push and Pull* by Patricia J. Murphy

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities

Back to Top of Page

- Uses recorded observations in explanations

Vocabulary: push, pull, force, position, motion

ELABORATE (Applications / Extensions)

Activity Description:

- Provide student groups with the *Card Sort Activity*. Ask the students to identify the actions in the pictures as pushes or pulls.
- Have students revisit their initial drawing of making objects move during play (engage/explore).
- Ask them if they think their drawing was in the correct place (under push sign or pull sign).
    - Find out if any of the students would want to move their drawings to a different area and have them explain their rationale for the change.
    - If no student wants to move their pictures, have them explain why their picture is placed correctly.
- You could also add a BOTH sign where students can move their images if BOTH PUSHES and PULLS are evident in their play action drawings.
- Have the students collect their drawings and ask them to add some science features to their pictures. Scientists use labels and zoom out boxes to help others understand the events that occur.
- Have the students add PUSH or PULL arrows and labels to their drawing.
    - Labels should be simply "PUSH" or "PULL". Students can practice writing the words push and pull using slide 1 prior to this activity. Sample drawing/science model.

Resources:

- Card Sort Activity
- Sample drawing/science model

Teacher Action(s):

- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP:** *Analyzing and Interpreting Data*
- ❏ **DCI:** *PS2.A: Forces and Motion*
- ❏ **CCC:** *Patterns*

Summative Assessment Description(s)

- Student models and card sort results.

Optional Instructional Strategy

- Summary Table

Back to Top of Page

○ recommended to complete as a class
Additional Resources: ● G0K Unit Materials List ○ Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2		
Brief Description: Students investigate and explore big and little forces. They begin to understand that different objects require different amounts of force to start or stop motion. Students engage in an interactive read-aloud that introduces the concepts of bigger/smaller pushes and pulls, faster/slower start and stop. Students play with toy cars to feel the differences in pushes and pulls necessary to start and stop different sized cars. Students also begin to understand that adding a push of the same direction to an object already in motion will increase the speed of the object. Students apply their new learning to their initial play actions (depicted in their drawings).		
Suggested Pacing: 1.5 - 2 hrs		
Lesson-Level Phenomenon/Design Problem: Photo of parent and child on the swings. Do we need the same push to get each person moving?		
Relationship to Anchoring Phenomena/Design Problem: Students investigate and explore big and little forces while playing.		
Learning Sequence Driving Question: What happens when you change the force of a push or pull during play?		
Student Expected Outcomes: • Students will make observations of patterns in the natural world to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down. • Students will collaborate with peers to plan and conduct an investigation to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down. • Students will analyze data from tests of an object to understand how pushes and pulls can have different strengths, which causes objects to start, stop, speed up or slow down.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Planning and Carrying Out Investigations • With guidance, plan and conduct an investigation in collaboration with peers.(K-PS2-1) **Analyzing and Interpreting Data** • Analyze data from tests of an object or tool to determine if it works as intended.(K-PS2-2) (K-2ETS1-3) • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)	**PS2.A: Forces and Motion** • Pushes and pulls can have different strengths and directions.(K-PS2-1) (K-PS2-2) • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.(K-PS2-1) (K-PS2-2) **PS2.B: Types of Interactions** • When objects touch or collide, they push on one another and can change motion.(K-PS2-1) **PS3.C: Relationship Between Energy and Forces** • A bigger push or pull makes things speed up or slow	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes.(K-PS2-1) (K-PS2-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.(K-ESS2-1)

Back to Top of Page

	down more quickly. *(secondary)* (K-PS2-1)	

Related Performance Expectation(s) in this Unit:

- K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
  - [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.]
  - [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]
- K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
  - [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.]
  - [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

Possible Common Core State Standards Connections:

ELA/Literacy

- RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)
- SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)

Mathematics

- MP.2 Reason abstractly and quantitatively. (K-PS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)
- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS2-1)

Prior Student Knowledge:
None can be assumed

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Share Slide #1 of the *Learning Sequence #2 Slideshow* to prompt student thinking and discussion.
- Ask the students to share their ideas about the pushes necessary to get the two different people moving on the swings. Below are some possible prompts to get the kids thinking. Students may not have appropriate vocabulary to express their ideas. For now, students can describe the force of a push/pull as BIG or LITTLE.
  - How are the pushes the same and how are they different?
  - If I pushed the two people with the same amount (force), would their motion be the same?
  - Ask the students to predict the motion of the two people if they have pushes of the same strength? Different strengths?
  - How would the strength of the pushes differ to achieve the same height on the swing?
  - Why would we have to change the strength of the push on the different people?
  - Are all pushes the same?
  - Why do pushes have to be different?

Back to Top of Page

- Show the students Slide #2 of *Learning Sequence #2 Slideshow* the image of the three cars. Ask the students to share their ideas about how the pushes would be different to make all of the cars travel the same distance. Students should provide a rationale for their ideas. Would all of the cars get the same push, would one car get a BIG push and another car get a little push? Make sure students provide an explanation of their thinking as they share their ideas.

Resources:
- [Learning Sequence #2 Slideshow]

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description: Race Day!

Activity #1 Two Identical Cars (or same size)
- Show Slides #3 and #4 of the *Learning Sequence #2 Slideshow*
- Provide each group with three toy cars (two identical cars and one car of a different size).
- Students explore how the strength of a push changes the motion of the two identical cars. Use the slides to prompt student investigation.
- Students play with the cars. Make sure students frame their investigations through the lens of cause and effect (a big push caused…).
- Optional experiment set up ideas:
    - Experiment 1-
        - Partner A: Put an object in motion (start)
        - Partner B: Put an object in motion (start)
    - Experiment 2-
        - Partner A: Put an object in motion with a smaller push
        - Partner B: Put an object in motion with a bigger push
- Students share their findings with the class and record their observations on an I Notice format.
    - How did the size of the push impact the motion of the object?
        - If students are inaccurate in their findings, do not fix at this point. Record the misconception and check the student's understanding AFTER the explain phase.

Activity #2 - Two Different Sized Cars
- Show Slide #5 of the *Learning Sequence #2 Slideshow*
- Students explore how the size of the object affects the distance/speed it travels.
- Students apply the same amount of force to both the large (needs to be heavier) and small car.
    - Make sure students frame their investigations through the lens of cause and effect the same push on the big car caused…).
- Students share their findings with the class and record their observations on an I Notice format.
    - How did the size of the car impact the motion of the object when the push force remained the same?
        - If students are inaccurate in their findings, do not fix at this point. Record the misconception and check the student's understanding AFTER the explain phase.
- Ask probing questions to redirect students' investigations
    - How can you make the object go faster or slower?
    - What happens when you push or pull harder? Or Softer?

Back to Top of Page

    - What do you notice and/or wonder?
    - Does this remind you of anything?
    - What personal connections can you make?
- At the end of investigating, conduct a race with a few students using the same object.
- Identify the object that went the farthest-ask students to consider what made the object go that far.

Optional Activity:
- *Bring the students out to the playground .*
- *Visit the different pieces of playground equipment and have students change the strength of a push or a pull as they play with the equipment.*
- *You can choose to have all of the students make observations at one piece of equipment at a time or you can have the kids investigate on their own during a recess. Remind students of safe behaviors on the playground. While they are investigating the strength of pushes and pull they should not put one another in danger by adding excessive force.*
    - *Making the swings move: Big Push vs Little push*
    - *Making yourself move down the slide: Big Push vs Little push*
    - *Making a ball/merry-go-round move: Big Push vs Little push*

Resources:
- Learning Sequence #2 Slideshow

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:
- Class discussion about Race Day observations and playground exploration (optional).
    - Ask students to recall Race Day activity
    - Facilitate class discussion, using Race Day Observations to guide discussions.
        - What happened when you pushed hard on your object?
        - What caused the object to move faster?
        - What happened when you pushed softly on your object?
        - What caused the object to move slower?
        - Is that what happened to everyone's object?
- Ask for student volunteers to model what happens when you push hard on an object.
- Ask for student volunteers to model what happens when you push softly on an object.
- We saw that heavier things needed a bigger push or pull to get moving
    - What other things can affect how strong a push or a pull needs to be to move an object?
- Interactive Read Aloud-*And Everyone Shouted, ¨Pull!¨* by Claire Llewellyn or *Newton and Me* by Lynne Mayer
    - As you read the text, call attention to science vocabulary (push, pull, force, etc.).
    - Help students to connect the happenings in the text to their play actions.

Back to Top of Page

- In the text the start motion and stop motion of the cart required extra force.
- Help students to understand that BOTH starting and stopping motion requires a force.
- Challenge the student groups to put an object in motion (start) and cause the object in motion to go faster without stopping the object first.

- Continuation from Race Day Activity - Experiment 3-
    - Partner A: Put an object in motion (start)
    - Partner B: Speed up the object that was put in motion by Partner A
    - Ask students "What do you think caused the object to move faster?"
- Continuation from Race Day Activity - Experiment 4-
    - Partner A: Stop the object that was put in motion by Partner B
    - Partner B: Put an object in motion (start)
    - Facilitate by asking a student to put an object in motion (start) and asking another student to cause the object in motion to stop.
    - Ask students "What do you think caused the object to stop?"

Resources:

- *And Everyone Shouted, ¨Pull!¨* by Claire Llewellyn
- *Newton and Me* by Lynne Mayer available on epic! Books

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: Push, Pull, Force, Hard, Soft, Fast, Slow, Farther, Shorter

ELABORATE (Applications / Extensions)

Activity Description:

- Share the Elaborate Slideshow and ask students to place the arrows on the pages that best match their relative pushes and pulls. (Car-BIG Push, Cart-Little Push, Horse Wagon-Big Pull, Child's Wagon-Little Pull)
    - All 4 images have to be shown together, without having two images at a time the students cannot compare the relative force needed!
- Students redraw a play action model (Slide #8 from Elaborate Slideshow) representing a push or a pull to START or STOP motion (it can be the same action the drew initially or it can be a new action if the child chooses so).
- Students write about the force they add to make the object START or STOP the motion on the line (because students have practiced BIG, LITTLE and PUSH, PULL) they will represent their force this way when they write.
    - You will need to hear verbal responses from students as they write and draw.
    - There is no relative action to compare the BIG and LITTLE too, you will have to draw out the relative nature through discussion.
- Ask students if they would redesignate their initial models as a push or a pull. You can also ask them to add more detail about the force (BIG, LITTLE), the action (START, STOP), direction of the motion (PUSH, PULL) necessary to make their play action occur.
- Students share their ideas in a Turn and Talk activity.
    - As the students debrief prompt deeper thinking by asking questions about patterns they

Back to Top of Page

noticed, cause and effect, etc.
    - Hold students accountable to using science words as they describe their play actions.

Resources:
- Elaborate Slideshow

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring (Questioning / Discussion):
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence:
- ❏ **SEP**: *Planning and Carrying Out Investigation; Analyzing and Interpreting Data*
- ❏ **DCI:** *PS2.A: Forces and Motion; PS2.B: Types of Interactions; PS3.C: relationship Between Energy and Forces*
- ❏ **CCC:** *Cause and Effect; Patterns*

Summative Assessment Description(s):
- Check for student understanding during classroom discussions and investigations. Hold students accountable to the use of appropriate academic vocabulary after the explain phase.
- Use the students' results from the Elaborate activity as a summative assessment of their understanding.

Optional Instructional Strategy
- Summary Table - recommended to complete as a class

Additional Resources:
- G0K Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 3		
Brief Description: Students investigate the forces associated with collisions and predict the outcomes of different collisions. Student apply their understanding to describe pushes and pulls in play and predict the outcomes of play collisions. Students investigate with toy cars, and generic classroom items. Class data is collected and analyzed by the students. Students apply the crosscutting concepts of patterns and cause and effects to describe the outcomes of their crash investigations.		
Suggested Pacing: 1.5 - 2 hrs		
Lesson-Level Phenomenon/Design Problem: Crash Day! How do you change the direction of an object (collisions) using pushes and pulls?		
Relationship to Anchoring Phenomena/Design Problem: Students apply their understanding of pushes and pulls in play to predict the outcomes of collisions.		
Learning Sequence Driving Question: What happens when play objects crash into one another?		
Student Expected Outcomes: ● Students will make observations and describe patterns in the natural world to understand how pushes and pulls can have different directions and can be affected by change of motion. ● Students will collaborate with peers to plan and conduct an investigation to understand how pushes and pulls can have different directions and can be affected by change of motion. ● Students will analyze data from tests of an object or tool to understand how pushes and pulls can have different directions and can be affected by change of motion.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Planning and Carrying Out Investigations ● With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) **Analyzing and Interpreting Data** ● Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) (K-2ETS1-3) ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) **Asking Questions and Defining Problems**	**PS2.A: Forces and Motion** ● Pushes and pulls can have different strengths and directions. (K-PS2-1) (K-PS2-2) ● Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1) (K-PS2-2) **PS2.B: Types of Interactions** ● When objects touch or collide, they push on one another and can change motion. (K-PS2-1) **PS3.C: Relationship Between Energy and Forces** ● A bigger push or pull makes things speed up or slow down more quickly.	**Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1) (K-PS2-2) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Back to Top of Page

• Ask questions based on observations to find more information about the natural and/or designed world(s). • Define a simple problem that can be solved through the development	*(secondary)* (K-PS2-1) **ETS1.A: Defining Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. *(secondary)* (K-PS2-2) • Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem.	

Related Performance Expectation(s) in this Bundle:

- K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
  - [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.]
  - [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]
- K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.*
  - [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.]
  - [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]
- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Possible Common Core State Standards Connections:

ELA/Literacy -

- RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)
- SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)
- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-PS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1)

Back to Top of Page

- K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference. (K-PS2-1)

Prior Student Knowledge:
None can be assumed.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Show the students the toy car *Collision Video* (the video stops at various points for questioning).
- Students make observations from the video and record their ideas on an *I Notice, I Wonder Template*.
- Ask students to pose a variety of questions about the slow motion video.
  - You may need to prompt them to think about force, pushes, and pulls.
  - Students should ask questions like: Why does the stopped (red) car move when the blue car hits it? Why did the blue car turn after hitting the red car? Why did the blue car spin around after it hit the red car?
- Get kids thinking about pushes, pulls and force in collisions. For now students will use the word crash, by the end of the sequence please hold students accountable to using the word collision.
- Show the students the paused image of the collision, and ask them to identify the push or the pull.
  - There is a pause in the edpuzzle to elicit student thought.
- After showing the video, students work in pairs to play with the toy cars to make their own collisions and to add to the class’ I Notice, I Wonder chart. Possible interactions can include:
  - What happens when:
    - a moving object strikes a non-moving object?
    - two moving objects collide?
    - one car is moving fast and the other slow?
    - the cars collide but are moving perpendicular to one another?
- *Optional discussion: To build on the outdoor play experiences ask the students to share their experiences with sudden changes in motion as they have played on the playground. What caused those sudden changes? Think about the swings, have you ever bumped the side or another object, what happened?*

Resources:

- Video:
  - Collision Video YouTube (start the video at the 18-second time mark)
  - Collision Video edpuzzle
- I Notice, I Wonder Template

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:
Crash Day!

- Students work in small groups to test the effect of collisions on an object's motion/change in motion.
- Teacher provides each group with:

Back to Top of Page

- 1 marble
- 1 track (ruler with groove down center and books)
- Objects for marble to collide with- books, folded paper, sponges, Legos, boxes, cotton balls, etc. (refer to slides 1 and 2 of the *Learning Sequence #3 Slideshow*)

- Have the students explore the actions and reactions associated with different collisions.
- Students make predictions and test their predictions.
- Students record their predictions and observations on slides 3 and 4 of the *Learning Sequence #3 Slideshow*.
  - Ask probing questions to redirect students' investigations:
    - How can you make the marble collide with the object?
    - What happens when you tilt the object in another direction?
    - What do you notice and/or wonder?
    - Does this remind you of anything?
    - What personal connections can you make?
  - Remind students to place the object the same distance away from their track to ensure accurate results (use a piece of tape to mark placement spot)

Resources:
- Learning Sequence #3 Slideshow

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:
During this discussion, students focus on the two crosscutting concepts: Patterns and Cause and Effect.
- Students share ideas about what happened in the Explore activity.
  - Use the Crosscutting Concept Discussion Cards (the top portion of the cards is geared toward early elementary thinking) to help scaffold the discussion so that the students can share their ideas specifically to build a strong foundation for future grades.
- Teacher posts the last slide from the investigation, the class data page. As the students share their observations, record the data by coloring the boxes on the data sheet. Color one box per group that experiences the marble changing direction after striking the object.
- Ask the students to identify:
  - Which objects made the marble turn more?
  - Which object(s) did not make the object turn?
  - How were the objects that made the object turn the same? different?
  - How were the objects that DID NOT allow the marble to turn the same? different?
- Teacher uses the following guiding questions:
  - What things caused the marble to change direction? Which things did not?
  - What did you notice about the objects that caused the marble to change direction?
  - Do you think it would make a difference if we moved the object farther away from the end of the ramp?

Back to Top of Page

- What if we rolled something bigger down the ramp? What if we rolled something like a bowling ball? Would any of these objects cause the bowling ball to change direction? What are some things that might be able to cause a bowling ball to change direction?
- Help students begin to understand that sometimes a push or a pull is not strong enough for the object to (visibly) change its motion. Collisions are pushes, some collisions are strong pushes, others are weak pushes. Some collisions cause objects to change their direction of motion, others will just make the object's speed change. Look at the data table you generated which collisions were strong (big) pushes, and which were weak (little) pushes?

Resources:

- Crosscutting Concept Discussion Cards
    - Crosscutting Concept Slides (Kindergarten Questions: Patterns and Cause and Effect)

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: collide, straight-line, direction, left, right, push, pull, strong, weak, turn, change direction, data, investigation

ELABORATE (Applications / Extensions)

Activity Description:

- Students generate their own investigations (Slides 7-9 of the *Learning Sequence #3 Slideshow*) using the marble (or alternate object) to test change in motion resulting from a collision.
- Students work in small groups and to decide on the items (from the classroom) that they would want to run the marble (or alternate object) into to see if the marble/alternate object changes direction.
- Students can change the objects at the bottom of the ramp or they can keep those objects consistent and change the object they roll down the ramp to a ping pong ball, tennis ball, etc.) The goal here is to have the KIDS decide what they want to investigate.
- Before testing, have the students make predictions. Have the students share their predictions with the class. Make sure the students provide a rationale for their prediction.
- Students test multiple times, after testing have students record their results on Slide #9.
- Prompt students to identify if their predictions were correct.
    - Let students know that having a correct prediction in science is not as important as explaining what happened in the final outcome or explaining why your prediction was correct or not.
- Students should identify patterns as the results are shared (i.e. heavier objects caused the object to change direction)
- Use Slide #10 to bring the discussion back to the playground.
- Students become Crash Test Engineers to investigate how collisions can be dangerous. Show the students Slide #11.
- As a class, students discuss the impending collision and ask questions and make observations about the situation.
- Ask students what they can design to reduce the effect of this possible collision? Students must be creative and use what they've learned to solve this problem.
- Student Turn and Talk with a neighbor to create a plan to reduce the effects of the collision.
- Students share their ideas with the class.

Back to Top of Page

Resources:

- Learning Sequence #3 Slideshow

Teacher Action(s):

- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence:

- ❏ **SEP:** *Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Asking Questions and Defining Problems*
- ❏ **DCI:** *PS2.A: Forces and Motion; PS2.B: Types of Interactions; PS3.C: Relationship Between Energy and Forces; ETS1.A: Defining Engineering Problems*
- ❏ **CCC:** *Cause and Effect; Patterns*

Summative Assessment Description(s)

- Student discussion and sharing from the two investigations

Optional Instructional Strategy

- Summary Table - recommended to complete as a class

Additional Resources:

- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 4
Brief Description: Play can occur in many different locations both indoors and outdoors. This means that play can be impacted by weather. In this sequence, students look at wind as a force used to move play objects such as kites, pinwheels, sailboats, etc. Students review the monthly wind data to identify trends. Students define the different forces of wind-breeze, gust, etc. As play engineers students will design and test flying play objects. Students will define the roles of pushes, pulls and force strength in their design and test process.
Suggested Pacing: • 1.5 - 2 hrs for the 5-Es • 0.5 hrs for the Culminating Performance Task
Lesson-Level Phenomenon/Design Problem: Playing with wind.
Relationship to Anchoring Phenomena/Design Problem: Play can be impacted by weather.
Learning Sequence Driving Question: How can weather make things move? Why do some play objects (toys) fly in the wind better than others?
Student Expected Outcomes: • Students will make observations and describe patterns in the weather to understand how wind pushes and can have different directions and can change the motion or speed of an object. • Students will collaborate with peers to plan and conduct an investigation to understand how wind pushes and can have different directions and can change the motion or speed of an object. • Students will engineer objects/playthings that will fly in the wind.
CONNECTIONS TO STANDARDS
Three Dimensions Related to the Specific Learning Performance(s):

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Planning and Carrying Out Investigations • With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1) **Analyzing and Interpreting Data** • Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2) (K-2ETS1-3) • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1) **Asking Questions and Defining**	**PS2.A: Forces and Motion** • Pushes and pulls can have different strengths and directions. (K-PS2-1) (K-PS2-2) • Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1) (K-PS2-2) **PS2.B: Types of Interactions** • When objects touch or collide, they push on one another and can change motion. (K-PS2-1) **ESS2.D: Weather and Climate** • Weather is the combination of sunlight, wind, snow or rain, and temperature in a	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1) (K-PS2-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

Back to Top of Page

Problems ● Ask questions based on observations to find more information about the natural and/or designed world(s). ● Define a simple problem that can be solved through the development of a new or improved object or tool.	particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1) **ETS1.C: Optimizing the Design Solution** ● Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2ETS1-3)	

Related Performance Expectation(s) in this Bundle:

- K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
  - [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days vs cloudy days in different months.]
  - [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]
- K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-3)

Mathematics -

- MP.2 Reason abstractly and quantitatively. (K-ESS2-1)(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-ESS2-1)(K-2-ETS1-3)
- K.CC.A Know number names and the count sequence. (K-ESS2-1)
- K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1)
- K.MD.B.3 Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-3)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-3)

Prior Student Knowledge:
None can be assumed.

Possible Preconceptions/Misconceptions:
Students may believe that:

- a kite can fly with or without wind

Back to Top of Page

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Read the story, *Kite Day* by Will Hillenbrand, to activate prior knowledge about how weather/wind relates to pushes and pulls and how wind can cause motion in objects.
- Students discuss the pushes and pulls in the different scenes of the text.
  - Bear looks into the sky and exclaims "Kite day!
    - What does he observe about the weather? Why is that good for kite flying?
  - When the story says "The breeze grew into a gust"
    - What is the difference between a breeze and a gust? Why would a gust break the string of a kite?
  - What type of weather could the gusts of wind be a sign of? Should you fly a kite in inclement weather?
  - Where did you see pushing in the book? Where did you see pulling?
    - pushing the shovel into the ground
    - pulling the string of the kite
    - the wind pushing the kite
- Refer to Unit 2, Learning Sequence 2 Explore/Explain Part #1 to review data collected on when Bear goes out to play (Character weather tracker).
  - What months are the best months for flying a kite based on the weather data we have collected?
  - What type of wind do you think Bear needs to fly a kite?
  - What are the characteristics of a kite?
  - How does wind make a kite fly?
  - Are some months windier than others?
  - Are there any windy months you would not want to fly a kite?
  - What are some ways that weather can determine how we play?
- This sequence must be as much about the weather as it is about pushes and pulls. Helps students to understand that weather plays a role in how we play, where we play and the type of play we can engage in.

Resources:

- *Kite Day* by Will Hillenbrand on epic! Books
- Character Calendar template (U2 LS2 Explore/Explain - *Character Calendar Template*)

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- Students think about the characteristics of objects that are moved by the wind.
- Show the students a variety of objects: marker, tissue, straw, spoon, paper, wooden block, button, and pencil.
- Students make predictions on the *Student Activity Sheet* to identify which objects they think can be blown by the wind and which objects cannot be blown by the wind.

Back to Top of Page

- After students make their predictions, set-up fan in the classroom.
    - **Safety Note**: Do not allow students to touch or get within ONE foot of the fan.
    - Mark off a region where students cannot go related to the fan.
    - Set up the fan so there is a location to place objects in front of the fan to determine if the "wind" is able to move the object.
- Students now record the objects that the wind moved by circling them on the *Student Activity Sheet*.

Resources:

- Student Activity Sheet

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:

- Students discuss how the wind moved the object.
    - What patterns did you notice about all of the objects the wind was able to move?
    - How were these objects alike?
    - What objects did the wind not move?
    - Why do you think the wind could not push these objects?
    - Is the wind acting on these objects as a push or a pull? How do you know?
        - Helps students to think about the wind as a force. They can qualify (strong/weak) the strength of the force to help them understand the types of objects the winds can move.
        - Ask students to share their predictions and outcomes. Did anything surprise them?
        - Ask the students to share their ideas about different items that are designed to fly in the wind: kites, pinwheels, windsocks, leaves, sailboats, wind mill, etc.
- Engineering Design Task
    - Students design an object that can be pushed by the wind.
    - Provide students with a variety of arts and craft supplies; to differentiate include some materials that are heavier and will not fly well. It is important for students to think about not only the shape of their flying objects but the materials.
    - Students design and construct their own kites or pinwheels
        - Let the students know that not only will they design their kites, but they will test them using the classroom fan.
        - Before getting access to the supplies, have the students draw an initial model of their design on the *Engineering Design Task* handout. Engineering is about planning and thinking about how to achieve a goal.
        - Students will need to think about their designs PRIOR to constructing.

Back to Top of Page

        - Students can draw their ideas and label designs (a single letter label will suffice, i.e. P=paper).
- Provide a forum for the students to share their designs and materials ideas with the class. You can also allow students to be a critical friend as those designs are shared.

Resources:
- Engineering Design Task

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: prediction, improve , engineer, design, test, push, pull, strong, weak, wind, blow, gust, kite

ELABORATE (Applications / Extensions)

Activity Description:

Continue with the engineering design task.
- Once students have planned their designs, they construct and test their designs using the fan.
    - Keep the classroom fan set-up and blowing, so that as students complete their designs they can see if their designs "fly in the wind".
        - Just as in previous lessons, DO NOT ALLOW STUDENTS TO HAVE DIRECT CONTACT WITH THE FAN! Remind students they are NOT allowed to touch ANY part of the fan and they can only place their items on a specific location to test the design.
- Let the students know that engineers often fail in their early attempts and that they have to make adjustments to their designs to make them successful.
- Students modify their designs as needed if time allows
- Students test and share their ideas about why it worked or why it did not work.
    - To make the tests consistent consider placing an "X" or a square in tape on the table near the fan.
    - Have the students place their items there to see if the fan makes the item fly.
    - Students should describe how their objects work using appropriate vocabulary!
    - They should also share their ideas about the best days to bring their designs outdoors to test in the real wind.
- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. Students discuss which designs performed the best in the given conditions and what design features were the most helpful.

Optional: On a windy day, allow students to bring their flying objects outside to further test their designs.

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations

Back to Top of Page

- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence:
- ❏ **SEP:** *Planning and Carrying Out Investigations; Analyzing and Interpreting Data; Asking Questions and Defining Problems*
- ❏ **DCI:** *PS2.A: Forces and Motion; PS2.B: Types of Interactions; ESS2.D: Weather and Climate; ETS1.C: Optimizing the Design Solution*
- ❏ **CCC:** Cause and Effect; Patterns

Summative Assessment Description(s)
- Final engineering design explanation of how it worked (pushes, pulls, strong, weak) and what aspects of the design worked and which did not. Allow the students to share their thoughts about improving their designs.

Optional Instructional Strategy
- Summary Table - recommended to complete as a class

Culminating Performance Task:

Students will present their final wind propelled object to the class. Their presentation must include:
- The final model of their design - a drawing showing a push and pull with arrows.
- Highlight one modification they made based on their testing results.

Resources:
- Engineering Design Task

Additional Resources:
- G0K Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only ____________________ **Board Meeting Date** February 24, 2022

Decision Requested X **Agenda Code** **11 b.**

AGENDA REPORTING FORM

Agenda Topic: Out of State: Approval of Out of State/Overnight Field Trip

Summary of Issue: The Board of Education must give approval for field trips that are over 200 miles in distance from Southington, trips to foreign countries, or overnight field trips. Presented here is the following trip:

- DECA International Career Development Conference – Atlanta, GA
  April 22, 2022 to April 27, 2022

Background: N/A

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** ____________________

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve the field trip request as presented by the administration.

Titles of Attachments:
1. Field Trip Application

Frank Pepe

Signature of Staff Member Submitting Report

Steve Madancy

Signature of Superintendent of Schools

DECA International Career Development Conference
Atlanta, GA

April 22nd, 2022 to April 27th , 2022

Southington Public Schools
Southington, Connecticut

Submit to Assistant Superintendent

Date: January 21, 2022
Out of State: Yes ☑ No ☐
Overnight: Yes ☑ No ☐
Miles Round Trip: 1933

Southington High School	DECA	April 22-27, 2022
School	**Class/Group**	**Date of Trip**

Name and Address of Destination **Georgia World Congress Center**
285 Andrew Young International Blvd NW
Atlanta, GA 30313

Reasons for Field Trip **DECA International Career Development Conference**

Itinerary (attach if needed)

Departure Date/Time Friday April 22, 2022 **Return Date/Time** Wednesday April 27, 2022

# of Students 5-10 **# of Teacher/Chaperones** 2 **# of Buses** **0**

Have definite arrangements been made at the field trip destination? ☐ Yes ☑ No

☐ **Have met with nurse to address student health needs.**

Nurse's Signature ______________ ***Date*** ______________

☑ **Have NOT met with the nurse. Will meet with the nurse to address student health needs when the student roster is complete. This meeting will take place approximately one-month prior to the scheduled trip.**

Destination is handicap accessible: Yes ☑ No ☐ **Lift Van Needed?** Yes ☐ No ☑

****

COST AND FINANCING

Source of Funds	**Totals**	**Additional Notes**
TOTAL Anticipated Cost of Trip	**$ 5000.00**	
Board of Education Contribution	$0	
Other	$0	
Fundraising Activity	($1250.00)	school store funds
BALANCE	**$ 3750.00**	
Student Contribution		
Transportation	$ 2500.00	5 Students @ $500
Entrance Fees, Room & Board	$ 2500.00	5 Students @ $500
TOTAL Cost of Trip to Each Student	**$ 750.00**	

SIGNATURES

Teacher Teresa Brooks/Sandy Spinello **Date**

Dept. Head Lillian Schena **Date**

Principal **Date**

Comments

Assistant Superintendent **Date** 1.25.22 **Approved** ☑ Pending COVID Restrictions
Not Approved ☐

Board of Education Approval* YES☐ NO☐ Date**

DECA

ATLANTA | 2022

INTERNATIONAL CAREER DEVELOPMENT CONFERENCE

FRIDAY, APRIL 22

12:00 PM - 6:00 PM	**REGISTRATION** *For Chartered Association Advisors. Chapter advisors register with their chartered association advisor at their assigned hotel.*	B401-B402
12:00 PM - 9:00 PM	**HEADQUARTERS + ATTRACTION TICKET BOOTH**	B401-B402
12:00 PM - 9:00 PM	**SHOP DECA + BLAZER SHOP**	B401-B402
6:30 PM	**CHARTERED ASSOCIATION ADVISOR DINNER** *(by invitation only)*	B404

SATURDAY, APRIL 23

7:00 AM - 8:30 PM	**HEADQUARTERS + ATTRACTION TICKET BOOTH**	B401-B402
7:00 AM - 8:30 PM	**SHOP DECA + BLAZER SHOP**	B401-B402
8:00 AM - 5:00 PM	**DECA DAY AT SIX FLAGS OVER GEORGIA** *(Advance ticket purchase required)*	
9:00 AM	**OFFICER CANDIDATE ORIENTATION + INTERVIEWS**	B319
9:30 AM	**EVENT DIRECTORS' + ASSISTANT EVENT DIRECTORS' BRIEFING**	GWCC
1:00 PM - 5:00 PM	**EXHIBIT BOOTH SET-UP**	Hall B3
5:00 PM	**PARADE OF CHARTERED ASSOCIATIONS REHEARSAL**	Mercedes-Benz Stadium
6:00 PM	**NATIONAL ADVISORY BOARD + EXECUTIVE MENTOR RECEPTION** *(by invitation only)*	Mercedes-Benz Stadium
8:30 PM	**GRAND OPENING SESSION**	Mercedes-Benz Stadium
12:30 AM	**CURFEW** *Chapters and chartered associations may set earlier curfew times.*	Assigned Hotel

SUNDAY, APRIL 24

7:00 AM - 5:00 PM	**HEADQUARTERS + ATTRACTION TICKET BOOTH**	B401-B402
7:00 AM - 5:00 PM	**SHOP DECA + BLAZER SHOP**	B401-B402
7:30 AM	**JUDGES' ORIENTATION**	Hall B2
7:30 AM	**VIRTUAL BUSINESS CHALLENGE BRIEFING** *(required)*	GWCC
8:00 AM - 11:30 AM	**SCHOOL-BASED ENTERPRISE ACADEMY | FOOD OPERATIONS** *Sponsored by Otis Spunkmeyer and Intuit*	B302-B304
8:00 AM - 4:00 PM	**CAREER EXHIBITS + SHOP DECA** *(Advisors only from 8:00 AM - 9:00 AM)*	Hall B3
8:00 AM - 5:00 PM	**COMPETITIVE EVENT TESTING** *Principles of Business Administration Events, Personal Financial Literacy, Team Decision Making Events, Individual Series Events, Integrated Marketing Campaign Events, Professional Selling and Consulting Events*	GWCC
8:00 AM - 5:00 PM	**COMPETITIVE EVENT PRELIMINARY COMPETITION** *Business Operations Research Events, Project Management Events, Entrepreneurship Written Events, Stock Market Game, Virtual Business Challenge*	GWCC
8:30 AM - 4:00 PM	**EMERGING LEADER SERIES**	GWCC + Omni Hotel
9:00 AM - 3:00 PM	**ADVISOR PROFESSIONAL LEARNING SERIES**	B308-B309
9:30 AM - 1:00 PM	**EXECUTIVE MENTOR PROGRAM**	GWCC
12:00 PM	**MDA LUNCHEON** *Sponsored by Muscular Dystrophy Association (by invitation only)*	B404
12:30 PM - 4:00 PM	**SCHOOL-BASED ENTERPRISE ACADEMY | RETAIL OPERATIONS** *Sponsored by Otis Spunkmeyer and Intuit*	B302-B304
4:00 PM	**VOTING DELEGATES' BRIEFING + CANDIDATE CAMPAIGN SESSION**	GWCC
	DECA NIGHT AT THE GEORGIA AQUARIUM + THE WORLD OF COCA-COLA *(Advance ticket purchase required)*	Georgia Aquarium + World of Coca-Cola
12:30 AM	**CURFEW** *Chapters and chartered associations may set earlier curfew times.*	Assigned Hotel

MONDAY, **APRIL 25**

7:00 AM - 5:00 PM	SHOP DECA	B401-B402
7:00 AM - 7:00 PM	HEADQUARTERS + ATTRACTION TICKET BOOTH	B401-B402
7:30 AM	JUDGES' ORIENTATION	Hall B2 + Hall B4
8:00 AM - 4:00 PM	CAREER EXHIBITS + SHOP DECA	Hall B3
8:00 AM - 7:00 PM	COMPETITIVE EVENT PRELIMINARY COMPETITION *Principles of Business Administration Events, Personal Financial Literacy, Team Decision Making Events, Individual Series Events, Integrated Marketing Campaign Events, Professional Selling and Consulting Events, School-based Enterprise, Virtual Business Challenge*	Hall B1-B2 + Hall B3
8:30 AM - 10:30 AM	JOHNSON & WALES SCHOLARSHIP AWARD BREAKFAST *Sponsored by Johnson & Wales University (by invitation only)*	B404
8:30 AM - 3:30 PM	EMERGING LEADER SERIES	GWCC + Omni Hotel
9:00 AM - 3:00 PM	ADVISOR PROFESSIONAL LEARNING SERIES	B308-B309
NOON - 1:30 PM	CHARTERED ASSOCIATION OFFICER/ADVISOR LUNCHEON *(by invitation only)*	B312-B314
2:00 PM - 3:30 PM	LEADERSHIP RECOGNITION *(by invitation only)*	B310
2:30 PM - 4:30 PM	MEET THE CANDIDATES SESSION *(open to all)*	B302-B304
3:30 PM - 4:30 PM	COMPETITIVE EVENTS UPDATE WORKSHOP *(Advisors Only)*	B308-B309
	DECA EXCLUSIVE CONCERT *Advance ticket purchase required*	Mercedes-Benz Stadium
12:30 AM	CURFEW *Chapters and chartered associations may set earlier curfew times.*	Assigned Hotel

TUESDAY, **APRIL 26**

7:30 AM - 10:30 AM	JUDGES' ORIENTATION	Hall B2
7:30 AM - 6:00 PM	HEADQUARTERS	B401-B402
8:00 AM	ACHIEVEMENT AWARDS SESSION	Mercedes-Benz Stadium
8:30 AM - 6:00 PM	SHOP DECA + FINALIST T-SHIRT + RECOGNITION ITEMS	B401-B402
8:30 AM - 6:00 PM	COMPETITIVE EVENT FINAL COMPETITION	Hall B2
NOON	BUSINESS + ELECTION SESSION	Omni Hotel
7:00 PM - 8:00 PM	SCHOLARSHIP + NATIONAL ADVISORY BOARD RECEPTION *Sponsored by National Advisory Board Partners (by invitation only)*	Mercedes-Benz Stadium
8:30 PM	GRAND AWARDS SESSION	Mercedes-Benz Stadium
12:30 AM	CURFEW *Chapters and chartered associations may set earlier curfew times.*	Assigned Hotel

WEDNESDAY, **APRIL 27**

9:00 AM - 1:00 PM	NEW EXECUTIVE OFFICER ORIENTATION	Omni Hotel

Check **deca.org/ICDC** for updates. Events will be held in the **GEORGIA WORLD CONGRESS CENTER, BUILDING B** unless otherwise noted.

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** **February 24, 2022**

Decision Requested **Agenda Code** **11c**

AGENDA REPORTING FORM

Agenda Topic: Policy 3542.1 – Purposes and Facilities – Food Service - Policy Revision – First Reading

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 3542.1– Purposes and Facilities – Food Service.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Policy & Personnel Committee is bringing the draft Policy 3542.1 to the full Board for a First Reading.

Frank Pepe
Signature of Staff Member Submitting Report

Titles of Attachments:

1. DRAFT Policy 3542.1

Steve Madancy
Signature of Superintendent of Schools

Policy 3542.1

Purposes and Facilities – Food Service – Policy Revision

Draft

Purposes and Facilities: Food Service

~~The school lunch program shall be an integral part of the total educational program. An attractive, wholesome, well-balanced lunch is essential for the best work from students.~~

~~To accomplish this objective with appropriate economy, all administration of the food services program will be coordinated in the office of the Operations Administrator. Business functions to be centralized will include central purchasing of food and supplies, a district-wide salary schedule for all food service employees, centrally planned menus, and regular audit of all accounts.~~

~~The educational aspects of the school lunch program will be the responsibility of each school principal, subject to advice, counsel and direction from the Superintendent of Schools.~~

The goal of the District's food services program is to provide students with nutritious and healthy foods that enhance learning.

The Southington Board of Education (Board) has an agreement with the Connecticut State Department of Education to participate in one or more school Child Nutrition Programs and accepts full responsibility for adhering to the federal and state guidelines and regulations pertaining to these school Child Nutrition Programs. The Board also accepts full responsibility for providing free or reduced-price meals to eligible elementary and secondary students enrolled in the District's schools. Applicants for such meals are responsible to pay for meals until the application for the free or reduced-price meals is completed and approved. All applications for free and reduced-price lunch and any related information is considered strictly confidential and not to be shared outside of the District's food services program.

Meals are planned to meet the specified nutrient standards outlined by the United States Department of Agriculture for children based on their age or grade group.

Purposes and Facilities: Food Service

Charging

Although not required by law, because of the District's participation in the Child
Nutrition Programs, the Board approves the establishment of a system to allow a student to charge a meal.

The Board realizes that funds from the nonprofit school food service account, according to federal regulations, cannot be used to cover the cost of charged meals that have not been paid.

Moreover, federal funds are intended to subsidize the meals of children and may not be used to subsidize meals for adults (teachers, staff and visitors). Adults are not allowed to charge meals and shall pay for such meals at the time of service or through prepaid accounts.

The Board prohibits the public identification or shaming of a child/student for any unpaid charges, including, but not limited to, the following:

- Delaying or refusing to serve a meal to such student,
- Designating a specific meal option for such student or otherwise taking any disciplinary action against such student.

A student needing to charge a meal will be informed of his/her right to purchase a meal, which may exclude a la carte items, for any school breakfast, lunch or other feeding.

To sustain the District's food services program, the District cannot permit the excessive charging of student meals. Therefore, any charging of meals must be consistent with this policy and any accompanying regulations. The Superintendent or his/her designee shall develop regulations designed to effectively and respectfully address family responsibility for unpaid meals.

Purposes and Facilities: Food Service

Charging continued

Any parent/guardian who anticipates a problem with paying for meals is encouraged to contact the Food Services Manager/Director and/or the applicable school Principal for assistance. The Board encourages all families who may have a child eligible for free or reduced-price lunch to apply.

Elementary Students

1. The District uses an automated prepayment system, which allows parents/guardians to view their child's meal account balance and purchases, receive low-balance notifications, as well as, make deposits, to their child's school meal account. Any student whose account has insufficient funds (i.e., is at the charging limit) and does not bring a meal from home may charge any combination of meals up to an amount not to exceed the cost of thirty (30) meals. Negative balance status can be avoided by making a payment in the form of cash, check, or by credit card to the automated prepayment website.

2. Students shall be allowed up to thirty (30) reimbursable meal charges. All other a-la-carte items shall not be charged. After thirty charges, the parents/guardians of such child will be referred to the District's homeless education liaison. When a charge is incurred, a written notification shall be sent home to parents. All credited meals must be repaid.

3. No student shall be deprived of a reimbursable meal due to forgotten or lost meal money. The school Principal is responsible for maintaining a fund of money to loan to students without meal money. The Principal or his/her designee is responsible for collecting money loaned to students. Students will be responsible for repaying all loaned money within an established timeframe. A note shall be given to the student to take home or mailed to the student's home to inform parents of the loan obligation. In situations in which a student is consistently without meal money, the Principal or his/her designee should encourage the parent/guardian to apply for free or reduced price meals.

4. All charges must be paid in 10 days. Parents will be notified and asked for prompt payment after 3 charges.

5. Communications with parents/guardians regarding collection of a child's unpaid meal charges shall include information on local food pantries, application for free or reduced-price meals and the Department of Social Services' supplemental nutrition assistance program and a link to the District's website that lists any community services available to town/city residents.

<u>Purposes and Facilities: Food Service</u>

<u>Charging continued</u>

Secondary Students

1. Students may charge up to two meals at the middle school level and two meals at the high school level and be subtracted from the Food Service House Account.

2. Students shall be allowed to charge up to two meals. The student will be given the same reimbursable meal that other children are provided. Parents of students who charge shall be notified by phone, after their child has received the meal. After charging four meals, the parents shall receive written notification. If a pattern of charging continues, attempts will be made to discuss the issue with the parents/guardians and encourage them to complete a free and reduced meal application.

Delinquent Debt and Bad Debt

The District's efforts to recover from households money owed due to the charging of meals must not have a negative impact on the children involved and shall focus primarily on the adults in the household responsible for providing funds for meal purchases. The school food authority is encouraged to consider whether the benefits of potential collections outweigh the costs which would be incurred to achieve those collections. Money owed because of unpaid meal charges shall be considered "delinquent debt," as defined, as long as it is considered collectable and reasonable efforts are being made to collect it. Such debt must be paid by June 30, effective within the current school year.

After reasonable attempts are made to collect the delinquent debt, and it is determined that further collection efforts are useless or too costly, the debt must be reclassified as "bad debt." Such debt shall be written off as an operating loss not to be absorbed by the nonprofit school food service account but must be restored using non-federal funds.

<u>Definitions</u>

"Delinquent Debt" are unpaid meal charges, like any other money owed to the nonprofit school food service account when payment is overdue, as defined by state or local policies.

"Bad Debt" are when unpaid meal charges are not collected and are considered a loss. Such debt must be written off as an operating loss, which cannot be absorbed by the nonprofit school food service account, but must be restored

Purposes and Facilities: Food Service

Charging continued

using nonfederal funds.

The Board will accept gifts, donations, or grants from any public or private sources for the purpose of paying off any unpaid charges for school meals.

Purposes and Facilities: Food Service

Dissemination of Policy

This policy shall via an electronic post on each school's web page.

This policy shall be available to all households at all times via student/parent handbooks, on online portals that households use to access student accounts, placed on the District's website, on the website of each school, and published at the beginning of each school year at the time information is distributed regarding free and reduced price meals and again to the household the first time the policy is applied to a specific child.

This policy shall be provided to all school staff and/or school food authority staff responsible for its enforcement. In addition, school social workers, nurses, the homeless liaison, and other staff members assisting children in need or who may be contacted by families with unpaid meal charges also should be informed of this policy.

The District's school food authority shall maintain, as required, documentation of the methods used to communicate this policy to households and school or school food authority-level staff responsible for policy enforcement.

Legal Reference: Connecticut General Statutes

10-215 Lunches, breakfasts and other feeding programs for public school children and employees. (as amended by PA 21-46)

10-215a Nonpublic school and nonprofit agency participation in feeding programs.

10-215b Duties of State Board of Education re feeding programs.

State Board of Education Regulations:

State of Connecticut, Bureau of Health/Nutrition, Family Services and Adult Education Operational Memorandum No. 4-17, "Guidance on Unpaid Meal Charges and Collection of Delinquent Meal Payments," Nov. 2, 2016

Operational Memorandum #19-10, State of Connecticut, Bureau of Health/Nutrition, Family Services and Adult Education "Unallowable Charges to No-profit School Food Service Accounts and the Serving of Meals to No-paying Full and Reduced Price Students"

National School Lunch Program and School Breakfast Program; Competitive

Foods. (7 CFR Parts 210 and 220, Federal Register, Vol 45 No. 20, Tuesday, January 29, 1980, pp 6758-6772

USDA Guidance:

SP 46-2016, “Unpaid Meal Charges: Local Meal Charge Policies”

SP 47-2016, “Unpaid Meal Charges: Clarification on Collection of Delinquent Meal Payment”

SP 57-2016 “Unpaid Meal Charges: Guidance and Q and A”

SP 58-2016 “2016 Edition: Overcoming the Unpaid Meal Challenge: Proven Strategies from Our Nation’s Schools”

Policy adopted: October 1988

Policy reviewed: April 2003

Policy Revised: ____, 2022

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** **February 24, 2022**

Decision Requested ______ **Agenda Code** **11 e.**

AGENDA REPORTING FORM

Agenda Topic: Science – Grade 1 Units - First Reading

Summary of Issue: The Curriculum & Instruction Committee has reviewed Science – Grade 1 Units

Background: ______

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the Science – Grade 1 Units to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal

Frank Pepe
Signature of Staff Member Submitting Report

Steve Madancy
Signature of Superintendent of Schools

Southington Public Schools

Grade 1 Science Units

Melissa O'Neil- *K-5 Science Specialist*
Amy Zappone- *District Math & Science Curriculum Coordinator*

01

Playground Shadows

02

Film Animation

03

Senses in Nature

04

Seasonal Changes

Unit 1 Overview- Playground Shadows

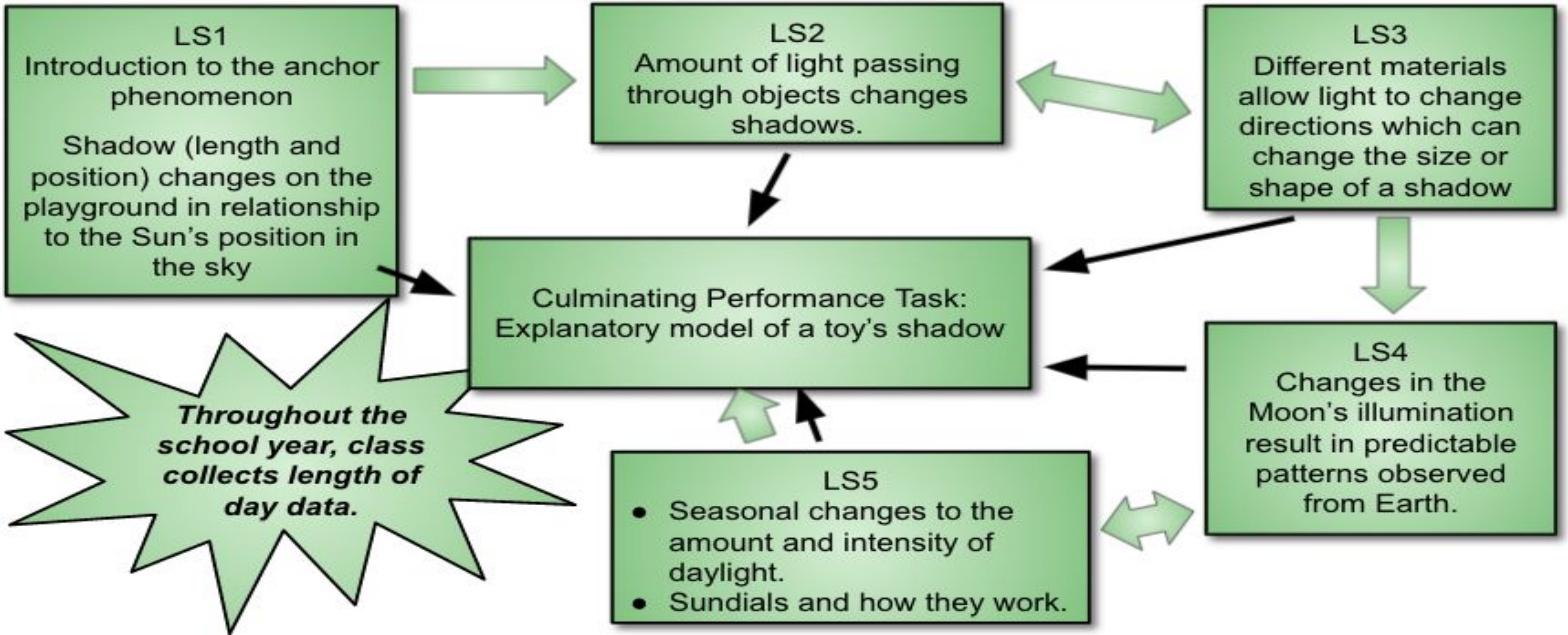
Unit Driving Question: What causes a shadow's length and position to change?

Students start this unit by exploring their own shadows on the playground. They trace their shadows at three specific times during the day to look for observable patterns. They investigate how their shadows change in length and location relative to the position of the sun. This observation of shadows leads to new questions about what makes a shadow and what causes a shadow's length and position to change?

The students experiment with light and explore how some materials allow light to be redirected. They make observations of the moon and observe its pattern over time, learning how shadows affect its appearance. The students begin their year long data recording of the seasonal patterns of how many hours of daylight happen, and start to notice seasonal patterns of overall daylight length. The culminating activity of creating a model that shows how the sun affects a toy's shadow over time further deepens their understanding of sunlight and shadow patterns throughout the day.

Unit Flow Chart

G1 U1 - *Seeing Objects*: Playground Shadows



Unit 2 Overview- Film Animation

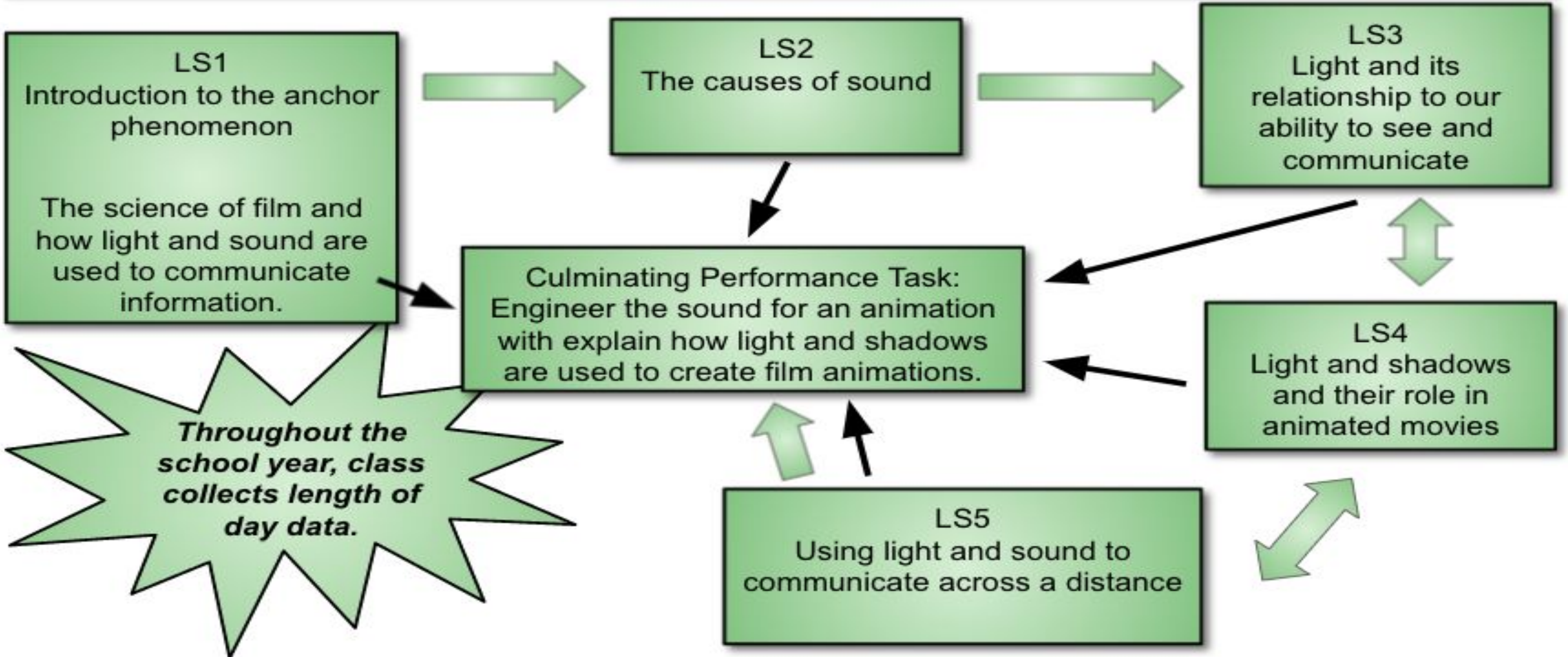
Unit Driving Question: How do sound and light communicate information?

Students start this unit by viewing an animation of *Mickey's Steamroller* to build a connection between the use of both light and sound in order to better understand how they work together to communicate a message. Students investigate throughout the unit the things needed to produce a sound, what mediums allow light to pass through them to varying degrees (or not at all), what people use to communicate over long distances, and how certain sound and light effects can be used to trigger behaviors and enhance the understanding of the message being communicated.

To demonstrate their understanding of these diverse topics and tie them all together, students are tasked with improving a *Nuggets* animation in their culminating performance task. Students become engineers of both sound and light to create a specific message with a soundtrack for a simple animation to be shared with their class.

Unit Flow Chart

G1 U2 - *Sound and Light*: Film Animation



Unit 3 Overview- Senses in Nature

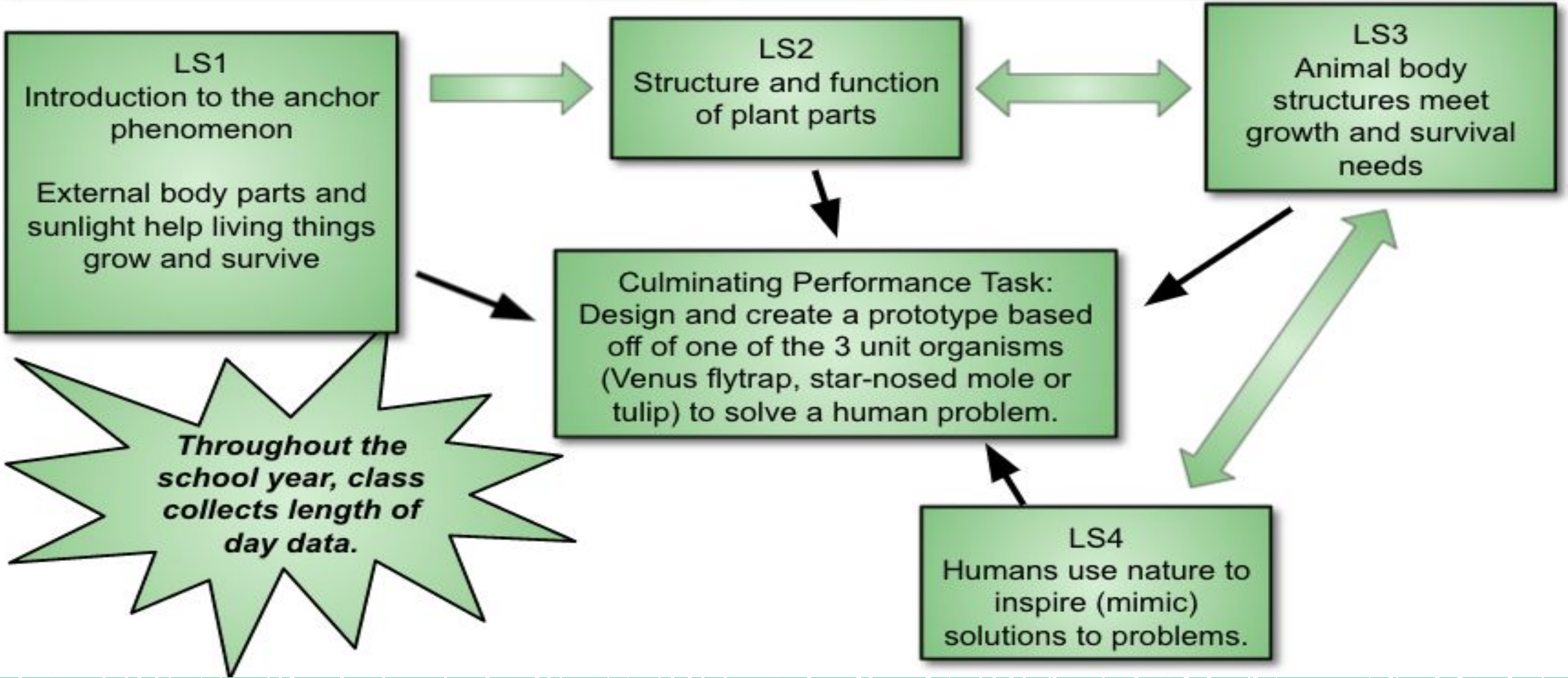
Unit Driving Question:How do external parts and sunlight help living things grow and survive?

Students become plant and animal scientists who use their powers of observation and curiosity on a journey of figuring out how plants and animals use their external parts to help them meet their needs in order to grow and survive. Students will initially view three video clips that show the amazing lives of three organisms; a tulip, venus flytrap and the star-nosed mole. The students will be asked to view the video clips through two lenses: I wonder and I notice. From their observations, students will start to develop initial theories on why these organisms look the way they do and why they behave the way they do.

By the end of this unit, students will be introduced to the concept of biomimicry, learning from nature to make things better. Students will be able to explain the structures and functions of animals and plants as well as identify survival growth needs for both plants and animals. The culminating learning sequence will have the students take all information learned throughout the unit and tie it together to create/engineer a problem that needs to be solved.

Unit Flow Chart

G1 U3 - *Organisms and Sunlight*: Senses in Nature



Unit 4 Overview- Seasonal Changes

Unit Driving Question: How do living things prepare and behave in order to survive in the different seasons?

Through patterns of the sunlight and Earth's seasons, students will explore how living things respond to seasonal changes. Unlike humans, animals and plants have strong biological seasonal cycles that are linked to the amount of sunlight in their day. The response from plants and animals to these changes in daylight through the year include reproduction, denning, migration, hibernation, changes to coat thickness, coloration, leaf production, growth and dormancy. These characteristics and behaviors connect offspring to their parents in both their traits (offspring that are alike and not exactly alike their parents) and their survival.

Students learn what it is like to be a field biologist. They will study the different living things in the local region or deciduous biome in order to generate a field guide. Using a variety of media, students will investigate how living things change with the seasons and record these findings on the pages of the field guide. To continue in their role as field biologists, students record the ways in which parents help their offspring to survive.

Unit Flow Chart

G1 U4 - *Patterns in the Natural World*: Seasonal Changes

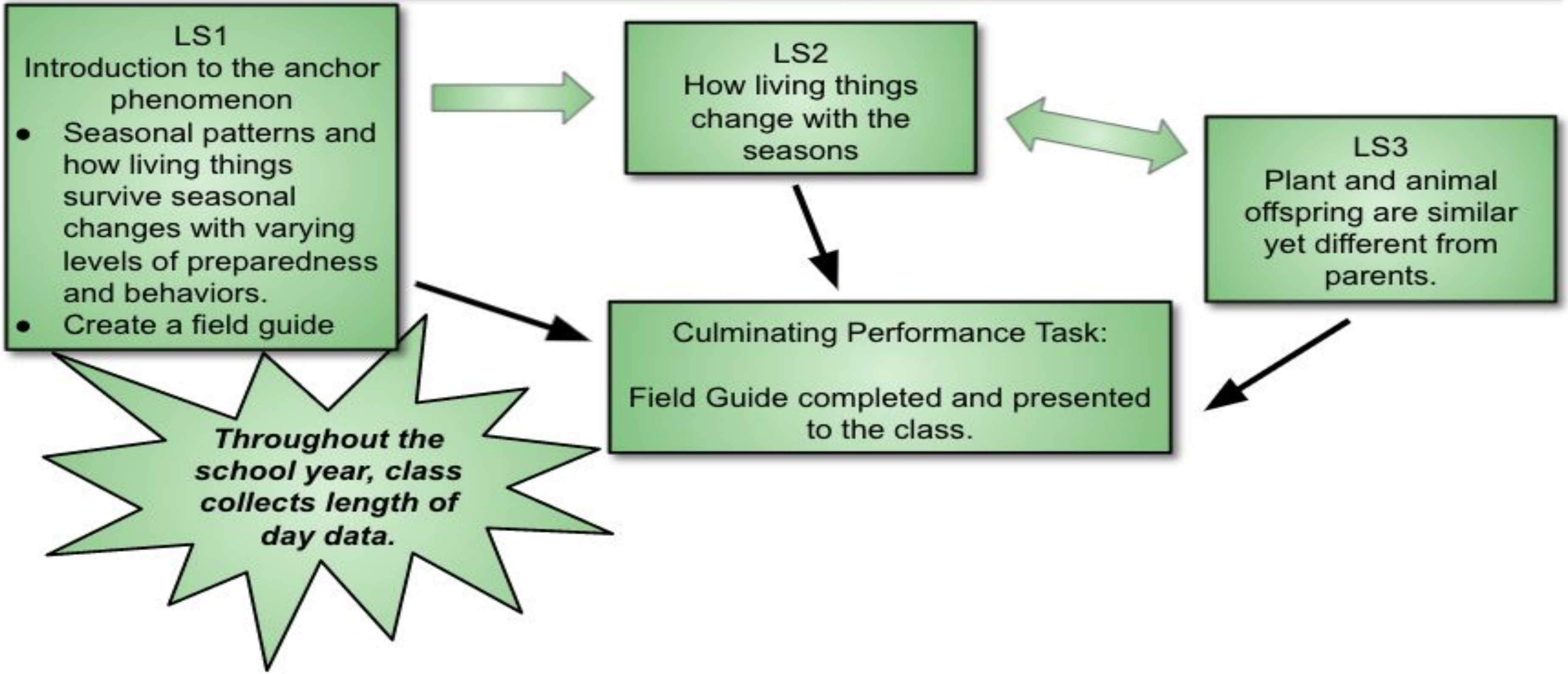


Table of Contents

Back to Top of Page

Unit 1 - Playground Shadows
Students start this unit by exploring their own shadows on the playground. They trace their shadows at three specific times during the day to look for observable patterns. They investigate how their shadows change in length and location relative to the position of the sun. This observation of shadows leads to new questions about what makes a shadow and what causes a shadow's length and position to change? The students experiment with light and explore how some materials allow light to be redirected. They make observations of the moon and observe its pattern over time, learning how shadows affect its appearance. The students begin their year long data recording of the seasonal patterns of how many hours of daylight happen, and start to notice seasonal patterns of overall daylight length. The culminating activity of creating a model that shows how the sun affects a toy's shadow over time further deepens their understanding of sunlight and shadow patterns throughout the day. To access the flowchart for this unit, click here.
Suggested Pacing: 9 -11 hrs
Anchoring Phenomenon/Design Problem: Shadow changes on the playground
Unit Driving Question: What causes a shadow's length and position to change?
Culminating Performance Task: Explanatory Model of a toy's shadow
Three Dimensions that form the Foundation for these NGSS Performance Expectations:
NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements) ● 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. ○ [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.] ■ *This PE is not fully accessible Unit #1, but will be continued in Unit #2. ● 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. ○ [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] ○ [Assessment Boundary: Assessment does not include the speed of light.] ● 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.

Back to Top of Page

- ○ [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.]
- ○ [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
  - ○ [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
  - ○ [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Constructing Explanations and Designing Solutions • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2) **Analyzing and Interpreting Data** • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1) **Planning and Carrying Out Investigations** • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**PS4.B: Electromagnetic Radiation** • Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2) **ESS1.A: The Universe and its Stars** • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) **ESS1.B: Earth and the Solar System** • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Common Core State Standards Connections:

ELA/Literacy —

- W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-2) (1-ESS1-1)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-2) (1-ESS1-1)(1-ESS1-2)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-2

Mathematics —

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)
- MP.4 Model with mathematics . (1-ESS1-2)

Back to Top of Page

- MP.5 Use appropriate tools strategically. (1-ESS1-2)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR:
Class collects length of day data throughout the school year.

- Plan at least 10 dates (1x/9 month) to collect length of day and graph on a class chart.
- It is suggested to gather the data over the summer and use this data to model how to collect the data for the school year.
- This ongoing observation fully covers the PE (1-ESS1-2 - Make observations at different times of year to relate the amount of daylight to the time of year.)
- Resources:
- Website for data collection
- Sample bar graph
- Optional: amount of daylight each month

Learning Sequence 1:

- Learning Sequence Driving Question
  - What causes a shadow's length and position to change?
- Learning Sequence 1
- Relationship to Anchoring Phenomena/Design Problem:
  - This is the introduction to the anchoring phenomenon of how shadows change on the playground.
- Student Expected Outcomes:
  - Students will make first hand observations to show how the position of the Sun in the sky changes their shadows in length and position.

Learning Sequence 2:

- Learning Sequence Driving Question
  - What do you need to make a shadow?
- Learning Sequence 2
- Relationship to Anchoring Phenomena/Design Problem
  - Students explore how differing amounts of light passing through objects changes shadows.
- Student Expected Outcomes:
  - Students will make observations to understand that some materials will allow all light, some light and no light to pass through.
  - Students plan and carry out investigations on how much light passes through various objects by using simple tests to support their ideas.

Learning Sequence 3:

- Learning Sequence Driving Question
  - How can we change the direction of light? If we change the direction of light, what happens to our shadow?

Back to Top of Page

- Learning Sequence 3
- Relationship to Anchoring Phenomena/Design Problem
  - Different materials allow us to change the direction of light. This change in direction can help to illuminate an object to make it visible or change the size or shape of a shadow cast.
- Student Expected Outcomes:
  - Students will make observations as well as plan and carry out investigations to understand that some materials will allow light to be reflected (mirrors) and that some materials will allow light to be redirected (prisms).

Learning Sequence 4:

- Learning Sequence Driving Question
  - Why does the moon's appearance change?
- Learning Sequence 4
- Relationship to Anchoring Phenomena/Design Problem
  - Changes in illumination of the Moon by the Sun causes its appearance to change on Earth. These changes are predictable patterns. This same effect occurs to the shadows on the playground as the light source (Sun) changes position.
- Student Expected Outcomes:
  - Students will make observations using moon models and calendar to identify and predict patterns.
  - Students will draw a model of what's needed to see the Moon at night from Earth.

Learning Sequence 5:

- Learning Sequence Driving Questions
  - How does the amount and intensity of daylight change with the seasons?
  - How do sundials work?
- Learning Sequence 5
- Relationship to Anchoring Phenomena/Design Problem
  - Student shadows on the playground would change with the seasons. Summer months would produce shadows for more hours during the day than shadows cast in the winter months. Shadows cast with more intense light appear darker. Shadows created by sundials move throughout the day according to the position of the sun in the sky.
- Student Expected Outcomes:
  - Students will be able to observe, describe, and predict the differences in daylight time associated with the seasons.
  - Students will make observations and identify patterns associated with light and shadows.
  - Students will explore how their shadows on the playground change season by season.
  - Students will create a class sundial and explain the inner workings of a sundial using observed data and patterns.

Assessments:

- Culminating Performance Task
  - Students are provided with an explanatory model template, flashlight, and small toy/object to enact the motion of the sun through the sky over their small toy (you will need to turn off the classroom lights) and draw an explanatory model of what happens or present their thoughts verbally to the class.
    - Explanatory Model Template
- Grade 1 Performance Expectations Rubrics and Prompts
- Elementary Assessment Resources

Back to Top of Page

Additional Resources:

- G1 Unit Materials List
    - Click on specific tab for unit-specific materials
- EPIC! Digital Library - G1 U1 List
    - Includes ebooks and videos
    - Must have an educator user account for free access

Back to Top of Page

Learning Sequence 1		
Brief Description: Students will go outside three times throughout the day (sunny day) to observe and record their shadows, paying particular attention to the changes in the size and location of shadow throughout the day. Students explore the patterns of the sun and how their shadows change.		
Suggested Pacing: 1.5 - 1.75 hrs (includes 15 minutes 3x same day morning, noon, afternoon)		
Lesson-Level Phenomenon/Design Problem: Peter Pan's Shadow - How do shadows really behave?		
Relationship to Anchoring Phenomena/Design Problem: This is the introduction to the anchoring phenomenon of how shadows change on the playground.		
Learning Sequence Driving Question: What causes a shadow's length and position to change?		
Student Expected Outcomes: ● Students will make first hand observations to show how the position of the Sun in the sky changes their shadows in length and position.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Analyzing and Interpreting Data** ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1) **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be	**Disciplinary Core Ideas:** **ESS1.A: The Universe and its Stars** ● Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-2) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Back to Top of Page

used to make comparisons. (1-ESS1-2)		

NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements)
- 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
  - [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.]
  - [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

Common Core State Standards Connections:
1-ESS1-1:
ELA /Literacy -
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1)

Prior Student Knowledge:
N/A

Possible Preconceptions/Misconceptions:
Students may believe that:
- the Sun is moving across the sky as opposed to the Earth moving.
- the Moon is only present /viewable at night.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
- Show *Peter Pan Video Clip*.
  - Optional Video Clips (resulting in lesson level phenomenon change): *Fantasia Clip* or *Toddler Video*
- Discuss Peter's shadow and ask:
  - Is that behavior typical of a shadow?
  - Did Peter Pan's shadow behave as expected?

Resources:
- Peter Pan Video Clip (start at 53 seconds)
- Fantasia Clip
- Toddler Video

Teacher Action(s):

Back to Top of Page

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Ask questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Turn and Talk-What will happen to your shadow at different times of the day?
- How can we figure out how our shadow changes or behaves at different times of the day?
    - Show students sidewalk chalk to get them thinking about ways to investigate their shadow.
    - Through class discussion, students help to develop an investigation to determine how their shadows change throughout the day (make students feel as though they have developed the investigation).
- Prior to going outside to make observations, have students make predictions about what they think will happen if they trace their shadows in the morning, at lunch time, and in the afternoon.
- Students work in pairs to trace their partner's shadow three times in one day:
    - Students go outside three different times in one day, stand in the exact same spot and record their shadow with colored chalk. Trace the student's footprint at the first observation. Each observation, students will use a different color chalk to indicate time of day. Students will stand in the same footprint each time they go out to trace their shadow.
    - Students draw the shape of their entire shadow on Page #1 of the *Observation Sheet* starting from their feet. They need to use a different color for each observation throughout the day.
        - An extra observation could include the position of the Sun in the sky relative to their bodies. (CAUTION: do not let students look directly at the Sun)
    - If space is limited, use any of the following options:
        - Class traces the teacher's shadow
        - Students work in small groups instead of pairs to trace just one shadow.
        - Students can create gingerbread people cutouts from the patterns on page 4 of the Observation Sheet to the shadow on a piece of paper. It is necessary to position the gingerbread men and paper in the exact same place throughout the day to see the change in shadow.
            - Put an X on the paper where the gingerbread man is positioned and outline the paper so the same place is used for each observation.
- Students should compare their observations with other student groups to identify similarities and differences (patterns).
- Students record observations of their shadows three times throughout the day, using their *Observation Sheet.*
- Students make and modify predictions with each new subsequent observation throughout the day.

Teacher Note: This will be further explained in Learning Sequence #2.

Resources:
- Observation Sheet

Back to Top of Page

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Students watch the *How Shadows Change video*.
- Students watch the *Sunrise and Sunset Time-Lapse*
- Students turn and talk about the following questions:
  - Do you think the shadows changing is related to the sun's place in the sky?
  - Why does the sun appear to move across the sky?
- Discuss that the sun's light only shines on half of the Earth at a time and ask: What does that mean?
  - A good demonstration of this is to use a flashlight, a Styrofoam ball with a tack in the spot where Connecticut should be to model day and night. The tack represents where they are standing on Earth. As a volunteer rotates the styrofoam ball, the students observe that sometimes the tack is on the light side of the ball and sometimes it is on the dark side.
- Students read *Day and Night* by Patricia Armentrout on epic! Books.
- Reinforce all of these ideas with another quick demonstration showing how day and night happen on Earth.
  - Ask a student to stand up and face the teacher (who is holding a flashlight).
  - Shine the light toward them and ask: Is it day or night?
  - Tell the class that the sun is now setting and have the student rotate around (so their back is facing the flashlight)
  - Ask the class: Is it day or night?
  - Tell the class that the sun is now rising and have the student rotate around (so they are now facing the flashlight again).
  - Continue to repeat these steps (with new volunteers) until the class can easily predict the pattern of when sunrise, sunset, day and night happen.

Resources:
- How Shadows Change video
- Sunrise and Sunset Time-Lapse
- Day and Night by Patricia Armentrout on epic! Books
- Parts of this activity are taken from BetterLesson

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words

Back to Top of Page

- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: day, night, shadow, sunrise, sunset, rotate, sun

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❏ **SEP:** *Analyzing and Interpreting Data; Planning and Carrying Out Investigations*
- ❏ **DCI**: *ESS1.A: The Universe and its Stars*
- ❏ **CCC**: *Cause and Effect; Patterns*

Summative Assessment Description(s):
- As a class, add any new information to the *Summary Table*.

Resources:
- Summary Table

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2		
Brief Description: Students will explore with a light source and different objects to see if light passes through, if some light passes through, or if no light passes through.		
Suggested Pacing: 2 - 2.25 hrs		
Lesson-Level Phenomenon/Design Problem: What do you need to make a shadow?		
Relationship to Anchoring Phenomena/Design Problem Students explore how differing amounts of light passing through objects changes shadows.		
Learning Sequence Driving Question: What do you need to make a shadow?		
Student Expected Outcomes: ● Students will make observations to understand that some materials will allow all light, some light and no light to pass through. ● Students plan and carry out investigations on how much light passes through various objects by using simple tests to support their ideas.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-PS4-3)	**Disciplinary Core Ideas:** **PS4.B: Electromagnetic Radiation** ● Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-2) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Back to Top of Page

Related Performance Expectation(s) in this Unit:

- [1-PS4-3](#) Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
  - [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
  - [Assessment Boundary: Assessment does not include the speed of light.]

Possible Common Core State Standards Connections:

ELA/Literacy

- W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-2)(1-PS4-3)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-2)(1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-2)(1-PS4-3)

Prior Student Knowledge:

N/A

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Referencing the shadow tracing activity, engage students to share their observations and predict if all objects will cast the same kinds of shadows.
  - Do all objects cast the same kind of shadows?
- The teacher will cast a variety of shadows (without students seeing the objects), students can predict what the characteristics of the object may be based upon the shadow cast. Sample items: ball, toy car, plastic bag, something made of glass, rock/sea shell, a tupperware container, etc.

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- Students shine the flashlight through a variety of cups (translucent, transparent and opaque).

Back to Top of Page

- Students will record their findings on the Recording Sheet.
  - If students test objects other than the cups, they will need access to more than one observation sheet.
- The students generate questions and wonderings about how different materials will affect the light passing through them and the shadow (darker/lighter) it will cast. It may be helpful to turn off the classroom light as the students manipulate the objects and flashlights.
- After students have had time to manipulate and play with the flashlight and cups, prompt student discourse about what they noticed. Record student ideas on the board or chart paper.
  - What did you notice about the shadows cast by the different objects?
  - Why do you think these shadows were different?
  - (Lead students to the idea that different objects allow different amounts of light to pass through)
- Students will form new predictions and hypotheses about what they think will happen with the different objects and the light source and how shadows will change.

Resources:
- Recording Sheet
- Examples of cups

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Students share their observations of what objects allowed all light to pass through, some light to pass through, or no light to pass through.
- Create a class data table that lists the materials used and the students will share their findings from their exploration and recording sheet.
- Read books on shadows listed in *Resources* or any other media source.
- After students share their findings, the teacher will help the class to come up with definitions for some of the key words/concepts they noted. These terms should at minimum include: light, light source, shadow, all light (transparent*), some light (translucent*), no light (opaque*).
- Create an anchor chart and use the kids' ideas to complete the chart around each of the Vocabulary terms listed. Give students guidance toward proper definitions.

Resources:
- Follow It! Learn About Shadows by Pamela Hall on epic Books!

Back to Top of Page

- Playing with Light and Shadows by Jennifer Boothroyd on epic Books!
- Sample Anchor Chart

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: light, light source, shadow, all light (transparent *), some light (translucent *), no light (opaque *).
* These terms do not have to be used.

ELABORATE (Applications / Extensions)
Activity Description:
- Students engineer a shadow puppet. The teacher can provide printables for students if they can't make their own shapes. Students will need to select appropriate materials to create their shadow puppet and their desired effects (amount of light passing through the puppet).
- Teacher provide materials for students to plan and engineer a shadow puppet. Teacher can explain that some shadow puppets allow light to pass through to create an effect and others block all light from passing through.
    - Materials:
        - popsicle sticks
        - oak tag (heavy paper)
        - glue
        - plastic wrap/cellophane in a variety of colors
        - wax paper
        - scissors
        - hole punch
    - Optional: shape templates (gingerbread man, star, heart, car, animal, etc.) depending on student need -cut and uncut versions
- Students create their shadow puppets and share their expected effects and shapes based on the materials selected PRIOR to applying a light source. As students explain their design concepts they should use appropriate academic vocabulary.
- Teacher note: Save shadow puppets for Unit 2 Shadow Puppet Show.

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Back to Top of Page

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❏ **SEP:** *Planning and Carrying Out Investigations*
- ❏ **DCI:** *PS4.B: Electromagnetic Radiation*
- ❏ **CCC:** *Cause and Effect; Patterns*

Summative Assessment Description(s):
- Students will construct explanations and identify similarities and differences for what occurred on the playground (with their shadow) and what occurred in the classroom with the shadow puppets using the *Model Template Handout.*
- The students will stand in front of the class and explain their shadow puppet, they will compare their light source to the Sun and to the length and location of the shadow that the puppet makes. They can also communicate their reason for choosing one material over another.
- Optional class discussion questions:
    - Where will we see the sun in the sky tomorrow at_____o'clock? How do you know that?
    - What do you expect your shadow to be later in the day? longer or shorter? What is your evidence?
    - In Alaska, there is light all night and all day in the summer. What kind of window would I want in my bedroom during the summer?
    - What kind of glass would I want to have in a bathroom window? Why?
    - What kind of glass would you use for a goldfish that your grandmother bought you? Why?
- As a class, add any new information to the *Summary Table*.

Resources:
- Model Templates Handout
- Summary Table

Additional Resources:
- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 3		
Brief Description: Students experiment with mirrors, prisms, and light (flashlight) in order to explain the ways we can change light.		
Suggested Pacing: 1.5-1.75 hrs		
Lesson-Level Phenomenon/Design Problem: Disco Ball		
Relationship to Anchoring Phenomena/Design Problem Different materials allow us to change the direction of light. This change in direction can help to illuminate an object to make it visible or change the size or shape of a shadow cast.		
Learning Sequence Driving Question: How can we change the direction of light? If we change the direction of light, what happens to our shadow?		
Student Expected Outcomes: ● Students will make observations as well as plan and carry out investigations to understand that some materials will allow light to be reflected (mirrors) and that some materials will allow light to be redirected (prisms).		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Constructing Explanations and Designing Solutions** ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2) **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**Disciplinary Core Ideas:** **PS4.B: Electromagnetic Radiation** ● Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-2)

Back to Top of Page

Related Performance Expectation(s) in this Unit:

- 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
  - [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
- 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
  - [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
  - [Assessment Boundary: Assessment does not include the speed of light.]

Possible Common Core State Standards Connections:

ELA/Literacy

- W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-2)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-2)

Prior Student Knowledge:

N/A

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Show students a few seconds of the *Disco Ball Video*.
- Prompt a class discussion with the following questions:
  - What do you notice?
  - What do you think is happening?
  - What other things can create the same effect?

Resources:

- Disco Ball Video

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

Back to Top of Page

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:

- Teacher sets up a variety of targets (one for each group) around the room. Be sure to create a space for students to stand (approximately 10 feet away), so that they have to reflect the light in order to hit the target.
    - Depending on the light sources, students may have to adjust their distance to the target.
- Students complete the *Exploration Instructions activity*.
- Students work with partners using a flashlight, small mirror, prism, and sheet of white copy paper.
- Students complete three challenges:
    - students use the materials to get the light from the flashlight to hit a *Target* on the wall without directly pointing the light at the target.
    - students make observations and test predictions to gather evidence on the ways to get the light to hit the target.
    - students get the prism to make a rainbow on the sheet of paper (do not tell the students they will make a rainbow - let them figure that out).
- Safety: Please make sure that students do not shine the flashlight or reflected light into each other's eyes.

Resources:

- Exploration Instructions activity
- Target (teacher copies and displays 5-10 targets randomly around the room)

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:

- Students share their findings and create a whole class chart to help them understand that a mirror reflects light (and a prism redirects it - optional).
    - What did you notice happened? Teacher will give a basic understanding of how light can be reflected and redirected using diagrams and discussion to solidify understanding.
    - If used optional prism activity: What was the difference between using the prism and using the mirror?
- Introduce vocabulary as students share their explorations with the whole class.

Back to Top of Page

- Look through *Light by Andrea Rivera* and *Light by Ellen Lawrence on epic! Books*.
- Help students to define and depict science terms on the *Note Catcher*.
  - Students may work in cooperative groups to complete the note catcher after an initial discussion relating the exploration to the noted academic vocabulary.
- Recall the shadows cast on the playground phenomenon (learning sequence 1), ask students why they think the size or shape of their shadow changed. See if they can relate the concept to the change in angle of illumination. You may have to prompt students to help them make this connection.

Resources:
- Light by Ellen Lawrence on epic! Books
- Light by Andrea Rivera on epic! Books
- Note Catcher

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: aim, data, illuminate, mirror, *opaque*, organize, prism, rainbow, reflect, spectrum, *translucent*, *transparent*

ELABORATE (Applications / Extensions)
Activity Description:
- Students will construct an *Explanatory Model* to describe the actions/behaviors of light associated with a disco ball.
- Teacher asks students:
  - Why do you think this happened?
  - What do you think the difference was between the mirror and the prism?

Resources:
- Explanatory Model

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design

Back to Top of Page

experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❏ **SEP:** *Constructing Explanations and Designing Solutions; Planning and Carrying Out Investigations*
- ❏ **DCI**: *PS4.B: Electromagnetic Radiation*
- ❏ **CCC**: *Cause and Effect*

Summative Assessment Description(s):
- Class Discussion- Post Explore activity
- Student note catchers
- Explanatory model-Disco Ball, see Elaborate section.
- As a class, add any new information to the *Summary Table*.

Resources:
- Summary Table

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Learning Sequence 4		
Brief Description: This sequence allows students to conceptualize how shadows create changes in how the Moon looks from Earth. Students match patterns of Moon shadows to Moon phases and explore the patterns over an entire calendar year. The shadows change size and shape in response to the location of the light source. In the case of the Moon, the Sun and Moon and Earth interactions cast shadows affecting the amount of the Moon illuminated.		
Suggested Pacing: 2 - 2.25 hrs		
Lesson-Level Phenomenon/Design Problem: Shadows on the Moon		
Relationship to Anchoring Phenomena/Design Problem: Changes in illumination of the Moon by the Sun causes its appearance to change on Earth. These changes are predictable patterns. This same effect occurs to the shadows on the playground as the light source (Sun) changes position.		
Learning Sequence Driving Question: Why does the Moon's appearance change?		
Student Expected Outcomes: ● Students will make observations using Moon models and calendar to identify and predict patterns. ● Students will draw a model of what's needed to see the Moon at night from Earth.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Constructing Explanations and Designing Solutions** ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2) **Analyzing and Interpreting Data** ● Use observations (firsthand or from media)	**Disciplinary Core Ideas:** **ESS1.A: The Universe and its Stars** ● Patterns of the motion of the Sun, Moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) **PS4.B: Electromagnetic Radiation** ● Objects can be seen if light is available to illuminate them or if they give off their own light.	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2) **Cause and Effect** ● Simple tests can be designed to gather evidence to support or

Back to Top of Page

to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)		refute student ideas about causes.

Related Performance Expectation(s) in this Unit:

- 1-ESS1-1 Use observations of the Sun, Moon, and stars to describe patterns that can be predicted.
  - [Clarification Statement: Examples of patterns could include that the Sun and Moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our Sun are visible at night but not during the day.]
  - [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
- 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
  - [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
    *This PE is not fully accessible Unit #1, but will be continued in Unit #2.

Possible Common Core State Standards Connections:
ELA/Literacy

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1)

Prior Student Knowledge:
N/A

Possible Preconceptions/Misconceptions:
Students may believe that:

- the Moon has its own light source.
- the Moon only exists at night.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:

- Show the students the *Shadows on the Moon* video.
- In small groups, have students complete the *Observation Chart*. They should make observations and write questions about the phenomenon.
- Share and discuss with the class.

Resources:

- Shadows on the Moon
- Observation Chart

Back to Top of Page

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Shows today's Moon shadow (phase) on the board based on the *Moon Calendar*.
- Students complete the *Shadows on the Moon Activity.*
- Class discusses their observations.
- Students revisit their findings from the Engage activity.
- Show the students *One Year of Moon Phases Slide*.
- Ask students to make observations and identify patterns.
    - Have students use appropriate science vocabulary to construct an explanation of how the different phases occur over the year.
    - Help students identify the patterns of predictability of the moon phases.

Resources:
- Moon Calendar
- Shadows on the Moon Activity
- Lesson adapted from the Moon Phases Matching from Astronomical Society of the Pacific
- One Year of Moon Phases Slide

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Show the video- *Why does the Moon change?*
    - There are also several nonfiction texts related to the different Moon phases available on epic! Books.
- Teacher explains that the illumination of the Moon requires Sunlight and that the Moon is not a light

Back to Top of Page

source.

- To make the connection between the Moon and the Sun (ongoing data collection-length of day observations), students watch the *Moon Rise Time-Lapse video* and the *Sunrise and Sunset Time-Lapse video* to prompt a discussion about how the pattern of the Moon appearing to rise and set is similar to that of the Sun's.

Resources:
- *Why does the Moon change?* video
- *The Moon Book* by Gail Gibbons available on epic! Books
- Moon Rise Time-Lapse
- Sunrise and Sunset Time-Lapse

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: pattern, moon phase, full moon, new moon, Earth, shadow, sunlight, night sky, Sun's position, light source, illumination

ELABORATE (Applications / Extensions)
Activity Description:
- Students discuss the differences in light, the Sun generates its own light and the Moon is illuminated by the Sun.
- Ask students: When the Sun's light does not reach the Moon, what do we see from Earth?
- Students discuss the questions on Slide #1 of the *Elaborate Slideshow*.
- Students discuss the prompts on Slide #2 of the *Elaborate Slideshow*.
- Students draw a model of what's needed to see the Moon at night from Earth (Slide #3 of the *Elaborate Slideshow*).

Resources:
- Elaborate Slideshow

Teacher Action(s):
- Expect the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations

Back to Top of Page

- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
FORMATIVE MONITORING (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP:** *Constructing Explanations and Designing Solutions*; *Analyzing and Interpreting Data*
- ❏ **DCI:** *ESS1.A: The Universe and its Stars; PS4.B: Electromagnetic Radiation*
- ❏ **CCC:** *Patterns; Cause and Effect*

Summative Assessment Description(s):
- Elaborate-Discussion and Moon model
- As a class, add any new information to the *Summary Table.*

Resources:
- Summary Table

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 5		
Brief Description: Students will observe the differences in light intensity and daylight time associated with the seasons. Students will then apply these ideas to the shadows they produced on the playground and how they change throughout the seasons. Students will create a class sundial to demonstrate how shadows can be used.		
Suggested Pacing: 1.5 - 2 hrs for the 5Es 0.5-0.75 hrs for the Culminating Performance Task		
Lesson-Level Phenomenon/Design Problem: Seasonal activities change because of daylight and sunlight intensity.		
Relationship to Anchoring Phenomena/Design Problem Student shadows on the playground would change with the seasons. Summer months would produce shadows for more hours during the day than shadows cast in the winter months. Shadows cast with more intense light appear darker. Shadows created by sundials move throughout the day according to the position of the sun in the sky.		
Learning Sequence Driving Questions: How does the amount and intensity of daylight change with the seasons? How do sundials work?		
Student Expected Outcomes: ● Students will be able to observe, describe, and predict the differences in daylight time associated with the seasons. ● Students will make observations and identify patterns associated with light and shadows. ● Students will explore how their shadows on the playground change season by season. ● Students will create a class sundial and explain the inner workings of a sundial using observed data and patterns.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Constructing Explanations and Designing Solutions** ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)	**Disciplinary Core Ideas:** **ESS1.A: The Universe and its Stars** ● Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Back to Top of Page

Analyzing and Interpreting Data • Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1) **Planning and Carrying Out Investigations** • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**ESS1.B: Earth and the Solar System** • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	

Related Performance Expectation(s) in this Unit:

- 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.
  - [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.]
  - [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
  - [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
  - [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.

Possible Common Core State Standards Connections:

ELA/Literacy

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1

Mathematics

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)
  MP.4 Model with mathematics. (1-ESS1-2)
  MP.5 Use appropriate tools strategically. (1-ESS1-2)
  1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
  1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

Back to Top of Page

Prior Student Knowledge:
N/A

Possible Preconceptions/Misconceptions:
- Shadows stay the same in different seasons

LESSON PLAN – [5-E Model]

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
- Students work in collaborative groups to draw examples of their seasonal activities on the Seasonal Activities handout. Students groups will draw their activities on 4 different sheets of paper, one for each season.
    - Students consider how their activities and clothing choices change with the seasons.
    - Students share their rationales about how the amount of sunlight changes with the seasons and why they think the amount of sunlight changes.
    - This activity is meant to elicit ideas and conceptions already known about the season, please do not provide students with any information or lead them to a specific idea about the seasons.

Resources:
- [Seasonal Activities]

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Student groups observe, manipulate, and identify patterns in the *daylight hour data* (refer to yearlong data collection bar graph as well).
- Students complete an *I Notice, I Wonder* organizer as they review the data.
- Students will post their group drawings in the specified locations around the classroom, we suggest one wall/area per season.
    - Please assign 4 regions around the room for students to post their season drawings.
- Teacher facilitates a whole group discussion as students *Gallery Walk* the different seasons to discuss how the amount of daylight factors into the activities represented in each season.
    - Please do not debunk student misconceptions at this point, only gather information about misconceptions, preconceptions and where you need to begin when you explain the content later on.
        - What months did you look at for this season?
        - What did you notice about the amount of daylight in this season?

Back to Top of Page

- How do you think the amount of sunlight in this season impacts the activities you participate in and clothes you wear?

Resources:
- Daylight hour data
- Sample Yearlong Data Collection bar graph
- I Notice, I Wonder Organizer

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Teacher shares from epic! Books one (or a few) books on seasons (some options listed in Resources) and the *Why do we have seasons?* video.
- Class discusses the different seasons and then relates seasonal light levels to how shadows change.
- Show the Shadows throughout the year image (zoom in on the three pictures) and quickly discuss.
  - Ask students to notice the season, the boy's clothes and the length of the shadow in each of the three pictures.

Resources:
- Books on Epic:
  - Why Does Earth Have Seasons? by Marne Ventura
  - Seasons by Robin Nelson
- Why do we have seasons? (stop at 2:09) - This video is a little high-level, but it is short and has great visuals.
- Shadows throughout the year image

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others

Back to Top of Page

- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: Fall, winter, spring, summer, sun, daylight, season, shadow, intensity

ELABORATE (Applications / Extensions)
Activity Description:

- Ask students: Can shadows be useful?
- Show students the various types of sundials.
    - Let students know that before clocks were invented, people used sundials to tell time. Help students to identify the common features between the different sundials shown below. Prompt students to explain how they think sundials might work.
        - Stone Sundial
        - Pedestal Sundial
        - Sundial Image
- Elicit responses that uncover what students know about how sundials work. Students should be able to connect how their shadow changed over time with how a sundial works.
- Students watch *Make Your Own Sundial video.*
- Ask probing questions to get students thinking about the necessary parts of a sundial.
- As a class, complete the *Crayola Human Sundial* activity
- Class discusses their observations and questions.

Resources:

- Stone Sundial
- Pedestal Sundial
- Sundial Image
- Make Your Own Sundial video
- Crayola Human Sundial

Optional Activity:

- Students use the Engineering Design Worksheet to complete the activity.
- Show the students a variety of art supplies (markers, crayons, colored pencils, paper plates (various sizes), cardboard, drinking straws, popsicle sticks, sharpened pencils, rulers). Allow students to engineer (plan) their own sundial, based on the ones seen in the engage/explore phase on paper.
- Ask students to share their ideas for their engineered sundial with their peers. Allow students to offer feedback to one another. After eliciting feedback, students should REVISE their designs before they begin their build.
- When students have met the design criteria for their sundial, allow them to begin crafting.
- Upon completion of their designs, students should test their designs outside or with a light source in the classroom. During the testing phase students should collect observations. These observations should help them determine if their sundial works as a clock

Optional Resources:

- Engineering Design Worksheet

Teacher Action(s):

- Expect the students to use formal labels, definitions, and explanations provided previously

Back to Top of Page

- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
FORMATIVE MONITORING (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence:
- ❑ **SEP:** *Constructing Explanations and Designing Solutions; Analyzing and Interpreting Data; Planning and Carrying Out Investigations*
- ❑ **DCI:** *ESS1.A: The Universe and its Stars; ESS1.B: Earth and the Solar System*
- ❑ **CCC:** *Patterns*

Summative Assessment Description(s):
- Explore-Student communication and data analysis of daylight hours and its application to the seasons and the activities that are conducted during that season. Formative monitoring will occur during student discourse and sharing.

Resources:
- Summary Table

Culminating Performance Task:
- Provide student groups with Explanatory Model Template (please print on 11x17 paper), a flashlight and small toy or object (Pez dispensers work great).
- Ask students to enact the motion of the sun through the sky over their small toy (you will need to turn off the classroom lights) and draw an explanatory model of what happens or present their thoughts verbally to the class.
- As a class, add any new information to the *Summary Table.*

Resources:
- Explanatory Model Template

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Unit 2 - Film Animation
Students start this unit by viewing an animation of *Mickey's Steamroller* to build a connection between the use of both light and sound in order to better understand how they work together to communicate a message. Students investigate throughout the unit the things needed to produce a sound, what mediums allow light to pass through them to varying degrees (or not at all), what people use to communicate over long distances, and how certain sound and light effects can be used to trigger behaviors and enhance the understanding of the message being communicated. To demonstrate their understanding of these diverse topics and tie them all together, students are tasked with improving a *Nuggets* animation in their culminating performance task. Students become engineers of both sound and light to create a specific message with a soundtrack for a simple animation to be shared with their class. To access the flowchart for this unit, click here.
Suggested Pacing: 8-10 hrs
Anchoring Phenomenon/Design Problem: The science of film
Unit Driving Question: How do sound and light communicate information?
Culminating Performance Task: Students will engineer the sound for a simple animation and construct an explanation for how film animation works using light and shadows.

NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements)
• 1-PS4-1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
  ○ [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]
• 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
  ○ [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
• 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
  ○ [Clarification Statement: Examples of materials could include those that are transparent (such

Back to Top of Page

as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
    - [Assessment Boundary: Assessment does not include the speed of light.]
- 1-PS4-4 Use tools and material to design and build a device that uses light or sound to solve the problem of communicating over a distance.
    - [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.]
    - [Assessment Boundary: Assessment does not include technological details for how communication devices work.]
- 1-ESS1-2* *Make observations at different times of year to relate the amount of daylight to the time of year.*
    - *[Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]*
    - *[Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]*
    - *(This PE is something that will be ongoing from the beginning of the year (making and collecting regular observations) until the collected observations can be analyzed within a later Unit (3 or 4).*
- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Three Dimensions that form the Foundation for these NGSS Performance Expectations:

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Planning and Carrying Out Investigations • Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (1-PS4-3) • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Constructing Explanations and Designing Solutions** • Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4) **Asking Questions and Defining Problems** • Ask questions based on	**PS4.A: Wave Properties** • Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1) **PS4.B: Electromagnetic Radiation** • Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (1-PS4-3) **PS4.C: Information Technologies and Instrumentation** • People also use a variety of devices to communicate (send and receive information) over long	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Back to Top of Page

observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) ● Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	distances. (1-PS4-4) **ESS1.B: Earth and the Solar System** ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2) **ETS1.A: Defining and Delimiting Engineering Problems** ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)	

Possible Common Core State Standards Connections:

ELA/Literacy —

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1)(1-PS4-3)(1-PS4-4)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1)(1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1)(1-PS4-3)RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Mathematics —

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)(K-2-ETS1-1)
- MP.4 Model with mathematics .(1-ESS1-2)(1-ESS1-2)(K-2-ETS1-1)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)(1-PS4-4)(K-2-ETS1-1)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of

Back to Top of Page

		adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
•	1.MD.A.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.(1-PS4-4)
•	1.MD.A.2	Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4)
•	1.MD.C.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)
•	2.MD.D.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR: *This refers to the on-going length of day data collection introduced in G1 U1.*

- Plan *at least* 10 dates (1 per month) to collect length of day and graph on a class chart. May do three dates - 1st, 10th, 20th of the month.
- *It is suggested that you gather the data over the summer and use this data to model how to collect the data for the school year.*
- This ongoing observation fully covers the PE: 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Resources:

- Website for data collection, Sample bar graph, and optional: *amount of daylight each month*

Learning Sequence 1

- **Learning Sequence Driving Question**
  - How do sound and light communicate information?
- **Learning Sequence 1**
- **Relationship to Anchoring Phenomena/Design Problem**
  - This is the introduction to the anchoring phenomenon - the science of film.
- **Student Expected Outcome:**
  - Students will make observations about how people use sound and light to send and receive information.

Learning Sequence 2

- **Learning Sequence Driving Question**
  - What causes sound?
- **Learning Sequence 2**
- **Relationship to Anchoring Phenomena/Design Problem**

Back to Top of Page

- To create sound, there needs to be a source of vibration.

- **Student Expected Outcomes:**
    - Students will engage in simple tests to investigate how sound can make matter vibrate.
    - Students will engage in simple tests to investigate how vibrating matter can make sound.

Learning Sequence 3

- **Learning Sequence Driving Questions**
    - Is light necessary to see?
    - How can light be used to communicate a message?
- [Learning Sequence 3]
- **Relationship to Anchoring Phenomena/Design Problem**
    - Light is necessary to create the animation.
- **Student Expected Outcomes:**
    - Students will conduct simple tests to predict, compare, and explain how a beam of light can be used to communicate information.
    - Students will conduct simple tests to predict, compare and explain how darkness affects how much you can see.
    - Students will investigate what can be seen in the dark.

Learning Sequence 4:

- **Learning Sequence Driving Question**
    - How can we use shadows to tell a story?
- [Learning Sequence 4]
- **Relationship to Anchoring Phenomena/Design Problem**
    - Light and shadows are used to create the animated figures and items within animated movies.
- Student Expected Outcomes:
    - Students will conduct simple tests to predict, compare, and explain how a beam of light can be used to communicate information.
    - Students will conduct simple tests to predict, compare and explain how darkness affects how much you can see.
    - Students will investigate what can be seen in the dark.

Learning Sequence 5:

- **Learning Sequence Driving Question**
    - How are light and sound used to communicate across a distance?
- [Learning Sequence 5]
- **Relationship to Anchoring Phenomena/Design Problem**
    - Light and sound are used to communicate different messages across a distance in different ways.
- **Student Expected Outcomes:**
    - Students will explain how people use a variety of devices to receive and send messages in the community.
    - Students will make observations about how people and animals send and receive information.
    - Students will collect data about how different devices are used to communicate.

Back to Top of Page

- ○ Students will make comparisons with the data collected regarding how the different devices are used to communicate.
- ○ Students will design a way of using light and sound to communicate with a friend during a storm.

Optional Learning Sequence:

- **Learning Sequence Driving Question**
  - Can we see in the dark?
- **Optional Learning Sequence**
- **Relationship to Anchoring Phenomena/Design Problem**
  - How the amount of light impacts what we see.
- **Student Expected Outcomes:**
  - Students will analyze data by recording and sharing observations and using them to describe patterns across everyone's data to determine how many of us could see the number of shapes that were actually at each station in the darker versus better lit parts of the room.
  - Students will ask questions based on observations from this experience and from other prior experiences we've had where (we've seen similar patterns) it has been difficult to see something in a dark place. Define problems and brainstorm solutions related to the question, "how can I make the space I am looking in as dark as possible?"
  - Students will plan and conduct an investigation collaboratively to produce data to help determine which materials will be the best (patterns) for blocking out the light coming through the windows in our classroom.

Assessments:

- **Culminating Performance Task:**
  - Group discussion on Mickey's Steamroller animation focused on light and sound.
  - Students will engineer the sounds for the Birdie animation* using classroom objects. All engineers define the sounds/problem prior to enacting a solution, and must also describe how the animation (from film) works.
    - Birdie animation*
      - *Animation Source: Hykade, Andreas , director. *Nuggets*, Film Bilder, 13 Oct. 2014, www.youtube.com/watch?v=HUngLgGRJpo
    - Student assessment
- **Grade 1 Performance Expectation Rubrics and Prompts**
- **Elementary Assessment Resources**

Additional Resources:

- G1 Unit Materials List
  - Click on specific tab for unit-specific materials
- EPIC! Digital Library - G1 U2 List
  - Includes ebooks and videos
  - Must have an educator user account for free access

Back to Top of Page

Learning Sequence 1		
Brief Description: Students are introduced to an animation featuring Mickey Mouse and asked to make observations when the animation is played with sound only, then picture only and again with sound and picture. Students are asked to share their ideas about how sound and light communicate information.		
Suggested Pacing: 0.5 - 1 hr		
Lesson-Level Phenomenon/Design Problem: Mickey's Steamroller		
Relationship to Anchoring Phenomena/Design Problem: This is the introduction to the anchoring phenomenon - the science of film.		
Learning Sequence Driving Question: How do sound and light communicate information?		
Student Expected Outcomes: ● Students will make observations about how people use sound and light to send and receive information.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Asking Questions and Defining Problems *** ● Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)	**Disciplinary Core Ideas:** **PS4.C: Information Technologies and Instrumentation *** ● People also use a variety of devices to communicate (send and receive information) over long distances.	**Crosscutting Concepts:** **Cause and Effect *** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3) **Patterns *** ● Patterns in the natural world can be observed, used to describe

Back to Top of Page

		phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. *
  - [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.]
  - [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

*Learning Sequence #1 is an incomplete 5-E model, as it is an introduction to the unit's anchoring phenomenon, therefore the three dimensions and PEs will only be partially covered in this Learning Sequence.

Possible Common Core State Standards Connections:

ELA/Literacy —

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1)(1-PS4-3)(1-PS4-4)(1-ESS1-2)

Mathematics —

- MP.5 Use appropriate tools strategically. (1-ESS1-2)(1-PS4-4)(K-2-ETS1-1)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)
- 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4)

Prior Student Knowledge:

- K.ETS1.A (1-PS4-4)

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:

- Teacher asks students to list different ways people communicate, and then records their ideas on the board.
- Students come to the board with different colored post-it notes to identify which forms of communication use light and which ones use sound?

Back to Top of Page

- Teacher plays the Mickey Steamroller video (approximately 4:50 to 5:50) with AUDIO ONLY. Do not show them the video for this part.
  - Teacher asks: What story is the sound telling you? What different sounds did you hear? How do you know?
  - Use the *Mickey Steamroller Recording Sheet* as a guide.
- Teacher plays the video again of the same video (4:50-5:50 clip) without the sound this time.
  - Teacher asks: Does seeing the video change what you thought was happening when you only heard the sound? How does seeing the video increase your understanding of what is happening?
  - Record ideas using page 2 of the *Mickey's Steamroller Recording Sheet.*
- Teacher plays video for a 3rd (& final) time with both audio and video together.
- Students complete page 3 of the *Mickey's Steamroller Recording Sheet.*
- Class shares their ideas of how animations use light and sound to communicate, and then they discuss page 4 of the *Mickey's Steamroller Recording Sheet.*

Resources:
- Mickey's Steamroller video (approx 4:50 to 5:50) *if video not available Google it*
- Mickey Steamroller Recording Sheet (use pages 1, 2, and 4 as a class discussion tool, might want to print page 3 for student recording)

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

Additional Resources:
- G1 Unit Materials List
  - Click on the corresponding tab for unit-specific materials.

Back to Top of Page

Learning Sequence 2		
Brief Description: Students explore how sound is made through vibration.		
Suggested Pacing: 2 - 3 hrs		
Lesson-Level Phenomenon/Design Problem: Cartoon sounds		
Relationship to Anchoring Phenomena/Design Problem: To create sound, there needs to be a source of vibration.		
Learning Sequence Driving Question: What causes sound?		
Student Expected Outcomes: • Students will engage in simple tests to investigate how sound can make matter vibrate. • Students will engage in simple tests to investigate how vibrating matter can make sound.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** • Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (1-PS4-3) • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**Disciplinary Core Ideas:** **PS4.A: Wave Properties** • Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)	**Crosscutting Concepts:** **Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes (1-PS4-1) (1-PS4-3)

Back to Top of Page

Related Performance Expectation(s) in this Unit:

- 1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
  - [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

Possible Common Core State Standards Connections:

ELA/Literacy —

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1)

Prior Student Knowledge:

None can be assumed

Possible Preconceptions/Misconceptions:

- Sound comes from people's mouths.
- Sound can't travel in liquids or solids.
- Sound travels in one direction like a flashlight beam.
- You can see and hear a distant event at the same moment.
- Hitting an object harder changes its pitch.
- Sound can be produced without using any material objects.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Students listen to a variety of sounds, such as *Cartoon Sound Effects* or the *Musical Instruments Sounds For Kids*.
- Students discuss the question: How are these sounds made?
- Students share their ideas.

Resources:

- Cartoon Sound Effects
- Musical Instruments Sounds For Kids (27 Instruments)

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions

Back to Top of Page

- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Teacher sets up Sound Stations and gives students the *Student Observation Recording Sheets*.
- Students explore different items that produce sound using ruler, rubber bands, tuning forks, and water trying to answer the following questions about sound:
    - What is sound?
    - What makes sound happen?

Resources:
- Sound Stations Description/ Directions
- Student Observation Recording Sheets
- Alternate investigation-Spoon Sounds

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity #1 Description:
- Debrief the Explore activity. Provide students time to share their observations and wonderings by station. Prompt student thinking:
    - What did each station have in common?
    - What happened to the materials at each station that gave off sound?
    - What did you do to the objects to change the sound?
    - How can you make the sound louder? deeper or higher?
- Teacher creates an anchor chart to begin recording some of the students' bigger ideas regarding sound and sound generation. Help students to pair their exploration observations to key vocabulary. Help students to identify things that vibrate/make sound.

Back to Top of Page

- Teacher shares books and videos about sound
    - *Vibrations Make Sound* by Jennifer Boothroyd
    - *What is Sound? video by SciShow Kids*

Activity #1 Resources:

- *Vibrations Make Sound* by Jennifer Boothroyd available on epic Books
- What is Sound? video by SciShow Kids
- Another good resource is *Sounds All Around (Let's-Read-and-Find-Out Science)* by Wendy Pfeffer, Anna Chernyshova (may be available in your school library)

Activity #2 Description:
Students will go on a Listening Walk around the school with the goal of connecting what they hear to what is causing the sounds/vibrations.

- Teacher reads/shows the book "The Listening Walk" by Paul Showers
- Teacher asks: What sounds do we hear in our school?
- Teacher records student responses on chart paper.
- Teacher introduces the Listening Walk using the *Listening Walk Student Sheet* - students circle or color in the appropriate box on their sheets indicating what they hear as they walk with their partner through the hallways of their school; students may create boxes on the back of the sheet for anything not listed on the front.
- When they return, partner's share out their findings with the class - teacher adds any new sounds to the anchor chart and asks:
    - What are causing these sounds?
    - What is vibrating to make these sounds?
    - How are you hearing them?
    - Were the sounds near or far from you? How do you know?
    - What do we already know about sound that can help us understand what is happening?

Activity #2 Resources:

- *The Listening Walk* by Paul Showers (youtube read may be available)
- Listening Walk Student Sheet

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: vibrate, vibration, matter, energy, waves, tuning fork, sound

Back to Top of Page

ELABORATE (Applications / Extensions)
Activity Description:

- Whole group discussion to determine if students have understood the concept of how sounds are made, how sounds change with different positions and different materials.
- Provide time for students to predict what objects may have been used to generate the cartoon noises found in the engagement activity.
- Select one of the noises from the *Sound Cartoon FX* and play it for the students. Let them think about what objects they could use in the classroom to replicate their sound ideas. Have students share their ideas.
- Students are given time and materials to complete the *Design a Sound Maker Performance Task* - What sounds can you make with common objects that can make at least two different kinds of sounds?
    - Students demonstrate an understanding of sound and its connection to vibration through the creation of their own sound makers exploring how to make the pitch higher or lower, and louder or softer.
    - Students can use various materials including: Kleenex boxes, different sized food containers with lids, metal cans, seeds/rice, sticks, spoons.
    - Students share the following:
        - What materials did you use?
        - Explain how your sound maker produces different sounds.
        - Show us how you make sound with your device.
        - Explain how you can change the sounds (high, low, loud, soft) your sound maker creates.
- Allow time for classmates to compare their sound makers to identify the cause and effect trends as well as patterns that occur amongst the instruments.

Resources:

- [Cartoon Sound Effects]
- [Design a Sound Maker Performance Task]

Teacher Action(s):

- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think...?

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Back to Top of Page

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP**: *Planning and Carrying Out Investigations*
- ❏ **DCI**: *PS4.A: Wave Properties*
- ❏ **CCC:** *Cause and Effect*

Summative Assessment Description(s):

- The Sound Maker Performance Task found in the Elaborate section.

Additional Resources:

- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 3		
Brief Description: Students explore light by conducting an investigation to determine the effects of how light travels in order to then use it to communicate with others.		
Suggested Pacing: 1.25 - 1.75 hrs		
Lesson-Level Phenomenon/Design Problem: Do you need light to see?		
Relationship to Anchoring Phenomena/Design Problem: Light is necessary to create the animation.		
Learning Sequence Driving Questions: Is light necessary to see? How can light be used to communicate a message?		
Student Expected Outcomes: ● Students will conduct simple tests to predict, compare, and explain how a beam of light can be used to communicate information. ● Students will conduct simple tests to predict, compare and explain how darkness affects how much you can see. ● Students will investigate what can be seen in the dark.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Constructing Explanations and Designing Solutions** ● Use tools and materials	**Disciplinary Core Ideas:** **PS4.B: Electromagnetic Radiation** ● Objects can be seen if light is available to illuminate them or if they give off their own light. ● Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3) **Patterns** ● Patterns in the natural world can be observed,

Back to Top of Page

provided to design a device that solves a specific problem. (1-PS4-4)	beyond them, where the light cannot reach. ~~Mirrors can be used to redirect a light beam.~~ (1-PS4-3) **PS4.C: Information Technologies and Instrumentation** ● People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)	used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-PS4-2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
    - [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]
- 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
    - [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
    - [Assessment Boundary: Assessment does not include the speed of light.]

Possible Common Core State Standards Connections:

ELA/Literacy —

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-3)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-3)

Prior Student Knowledge:

None can be assumed

Possible Preconceptions/Misconceptions:

- Light only reflects from mirrors and shiny objects.
- If students are asked what helps you see? Most will answer glasses, seeing-eye dogs, binoculars, hand lenses, or microscopes, not light.
- White light is colorless light.
- Sunlight is red, yellow or orange.
- Light travels from our eyes so we can see.

Back to Top of Page

- Light comes from the object being looked at
- Bright light travels further than dim.
- Light only travels a short way.
- Humans can see in complete darkness after the eyes adjust.
- A shadow is something that exists on its own.
- A mirror reverses everything.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:

- Teacher gives each student a sticky note.
- Teacher asks: Do you need light to see an object?
- Students write Yes or No on their sticky note and hands it back to the teacher (no names on their papers)
- Teacher creates a vertical bar graph with their responses and discusses the graph.

Resources:

- Adapted from The Looking Tube Lesson - Better Lesson

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:

- As a class, complete the *Looking Tube Handout.*
  - Teacher gathers materials prior to starting.
  - Students work in pairs

Resources:

- Looking Tube Handout
- Adapted from The Looking Tube Lesson - Better Lesson

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary

Back to Top of Page

- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Teacher will encourage the students to explain concepts about their exploration.
  - In which situation(s) were we able to see the object?
  - What was necessary to see the object?
  - Did the color of the object help us or prevent us from seeing it in the Looking Tube at any time?
- Ask students to share their ideas and to support their ideas with evidence from their partner work, as well as from their *Looking Tube Handout*.
- As a class, read *Light Helps Me See* by Jennifer Boothroyd.

Resources:
- *Light Helps Me See* by Jennifer Boothroyd on epic Books

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: prediction, observe, clear, dark, light, reflect, transparent, translucent, opaque, illuminate, shadow, light source

ELABORATE (Applications / Extensions)
Activity Description:
- Show students a visual of the *Batman signal* and ask:
  - What is this and what message is it communicating?
  - How is it created?
  - Could we see the bat symbol during the day?

Back to Top of Page

  - Why do we see the bat symbol better at night?
  - How can we communicate like a superhero?
- Students design their own Superhero symbol (teacher provides a variety of items such as: laminator scraps and sharpies, oak tag paper, cardboard, plastic lids, color cellophane, transparency sheets, wax/parchment paper, paper towel tubes, construction paper, etc. to choose from)
- Students conduct simple tests of how effective their symbol would be for communicating during the day versus the night using flashlights.
- As a class, discuss the *Looking Tube vs Batman Handout* to compare what they saw in the looking tube to the superhero symbol and identify similarities and differences between the two scenarios and how light is used?
  - Reinforce learning of translucent, transparent and opaque from Unit 1 - Shadows on the Playground..

Resources:
- Batman signal
- Looking Tube vs Batman Handout

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think...?"

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring (Questioning / Discussion):
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.
- ❏ SEP: *Planning and Carrying out Investigations; Constructing Explanations and Designing Solutions*
- ❏ DCI: *PS4.B: Electromagnetic Radiation; PS4.C: Information Technologies and Instrumentation*
- ❏ CCC: *Cause and Effect; Patterns*

Summative Assessment Description(s):
- Student development of a Superhero communication device using light (Elaborate).
- Student comparison of the looking tube to the Batman Symbol (Elaborate)

Elaborate Further / Reflect / Enrichment: Optional
Activity Description:
- Optional Learning Sequence

Back to Top of Page

Additional Resources: ● G1 Unit Materials List ○ Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 4		
Brief Description: Students will explore how shadows are made by creating a puppet show to determine the effects of how light travels in order to then use it to communicate with others.		
Suggested Pacing: 1.5 - 2 hrs		
Lesson-Level Phenomenon/Design Problem: Jack and the Beanstalk puppet show		
Relationship to Anchoring Phenomena/Design Problem: Light and shadows are used to create the animated figures and items within animated movies.		
Learning Sequence Driving Question: How can we use shadows to tell a story?		
Student Expected Outcomes: ● Students will conduct simple tests to predict, compare, and explain how a beam of light can be used to communicate information. ● Students will conduct simple tests to predict, compare and explain how darkness affects how much you can see. ● Students will investigate what can be seen in the dark.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (1-PS4-3) ● Make observations (firsthand or from media) to collect data that can be	**Disciplinary Core Ideas:** **PS4.B: Electromagnetic Radiation** ● Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. ~~Mirrors can be used to redirect a light beam.~~ (1-PS4-3)*	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3)

Back to Top of Page

used to make comparisons. (1-ESS1-2)	**PS4.C: Information Technologies and Instrumentation** • People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4) *This portion of the DCI was fully covered in Unit 1.	

Related Performance Expectation(s) in this Unit:

- 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
  - [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror)
  - [Assessment Boundary: Assessment does not include the speed of light.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-3)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-3)

Prior Student Knowledge:

None can be assumed

Possible Preconceptions/Misconceptions:

- Light only reflects from mirrors and shiny objects.
- If students are asked what helps you see? Most will answer glasses, seeing-eye dogs, binoculars, hand lenses, or microscopes, not light.
- White light is colorless light.
- Sunlight is red, yellow or orange.
- Light travels from our eyes so we can see.
- Light comes from the object being looked at
- Bright light travels further than dim.
- Light only travels a short way.
- Humans can see in complete darkness after the eyes adjust.
- A shadow is something that exists on its own.
- A mirror reverses everything.

Back to Top of Page

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
- Students watch the *Jack and the Beanstalk puppet show.*
- Students are asked: How is light being used to tell (communicate) the story of Jack and the Beanstalk?
- Students share their ideas.
- Teacher Note: Remember the goal is to identify prior experiences and misconceptions, not to provide content or instruction during this discussion.

Resources:
- Jack and The Beanstalk puppet show

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Use shadow puppets student created from Unit 1 or provide students with a variety of materials to create new shadow puppets (possible materials: variety of transparent/translucent/opaque materials, flashlight, small toy, light)
- Allow students to explore how to create a shadow puppet show (with a screen works). Show the Jack and the Beanstalk video to play on the screen as they explore the materials.
  - Where does the light have to be?
  - How should the color selection of the puppets compare to the screen color?
  - Where do the puppets need to be to cast a shadow similar to the one seen in Jack and the Beanstalk?
- Students record their ideas on page #1 of the *Shadow Puppet Show Template.*

Resources:
- Shadow Puppet Show Template

Optional:
- Students create and perform a mini-shadow puppet show. *Shadow Puppet Screen* and shadow puppet templates (print on 11x17 paper).
- Working with small groups, the students will create their own shadow puppets to tell a story. Students will have to come to a consensus about what story they want to tell prior to making their shadow puppets.
- Be sure the students can describe HOW a shadow puppet works. Hold students accountable for using

Back to Top of Page

appropriate academic vocabulary. Fix any student misconceptions as you hear them through questioning tactics.

Optional Resources:
- Shadow Puppet Screen

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:
- Ask students to share their findings from the puppet show exploration.
- Prompt students to share ideas about the set-up necessary for creating a shadow puppet show, the colors of the puppets, the thickness of the screen, the location and strength of the light source. Encourage students to use appropriate vocabulary.
- Students complete page #2 of the *Shadow Puppet Show Template* to explore alternative set-ups that could work for making a shadow puppet show.
  - As students generate different set-up options, allow students to critique the options posed.
  - Help students to understand that scientists often help each other find a solution to a problem by helping them identify strengths and weaknesses in science ideas. Students will need help critiquing others. You may need to provide sentence stems to scaffold the conversation.
  - Make sure that as students critique their peers' ideas and they link their analysis to experience.
    - Students fill in the *Give Me Five* organizer (page #3 of the *Shadow Puppet Show Template*) provides a forum for allowing students to engage in constructive criticism.
- Ask partner groups to join with another partner group - they should describe and swap their models.
- Partners should review the drawing/model and completed *Give Me Five Protocol*.
- Allow time for the groups to share their findings with one another.

Resources:
- Shadow Puppet Show Template

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Back to Top of Page

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: prediction, observe, clear, cloudy, dark, light, reflect, medium, transparent, translucent, opaque, absorbed, illuminate, shadow

ELABORATE (Applications / Extensions)

Activity Description:
- Show students the sample film from *Making Comparisons* activity. Print the slide on transparency film, so students can see transparent components.
- Allow students to manipulate the film with a flashlight as they think of the similarities and differences.

Resources:
- Making Comparisons

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?"

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring (Questioning / Discussion):

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP**: *Planning and Carrying out Investigations*
- ❏ **DCI**: *PS4.B: Electromagnetic Radiation; PS4.C: Information Technologies and Instrumentation*
- ❏ **CCC**: *Cause and Effect*

Summative Assessment Description(s):
- Student discussion with the teacher about the way in which a shadow puppet show works.
- Ask students to compare shadow puppets and Mickey's Steamroller in Elaborate activity

Back to Top of Page

Additional Resources:

- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Learning Sequence 5		
Brief Description: Students explore the concept of sound and light and how they are used individually and together to communicate messages both near and far.		
Suggested Pacing: 1.75 - 2.25 hrs for 5Es 0.75 - 1 hrs for Culminating Performance Task		
Lesson-Level Phenomenon/Design Problem: Card Sort: How are sound and light used to communicate?		
Relationship to Anchoring Phenomena/Design Problem: Light and sound are used to communicate different messages.		
Learning Sequence Driving Question: How are light and sound used to communicate across a distance?		
Student Expected Outcomes: • Students will explain how people use a variety of devices to receive and send messages in the community. • Students will make observations about how people and animals send and receive information. • Students will collect data about how different devices are used to communicate. • Students will make comparisons with the data collected regarding how the different devices are used to communicate. • Students will design a way of using light and sound to communicate with a friend during a storm.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) • Plan and conduct	**Disciplinary Core Ideas:** **PS4.C: Information Technologies and Instrumentation** • People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)	**Crosscutting Concepts:** **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Back to Top of Page

investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (1-PS4-3) **Asking Questions and Defining Problems** ● Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) ● Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	**ETS1.A: Defining and Delimiting Engineering Problems** ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)	

Related Performance Expectation(s) in this Unit:

- 1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*
    - [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.]
    - [Assessment Boundary: Assessment does not include technological details for how communication devices work.]
- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Possible Common Core State Standards Connections:

ELA/Literacy —

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-4)

Mathematics —

- MP.5 Use appropriate tools strategically. (1-PS4-4)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)
- 1.MD.A.2 Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4)

Prior Student Knowledge:

Back to Top of Page

K.ETS1.A

Possible Preconceptions/Misconceptions:

- Sound comes from people's mouths.
- Sound can't travel in liquids or solids.
- Sound travels in one direction like a flashlight beam.
- You can see and hear a distant event at the same moment.
- Hitting an object harder changes its pitch.
- Sound can be produced without using any material objects.
- Light only reflects from mirrors and shiny objects.
- If students are asked what helps you see? Most will answer glasses, seeing-eye dogs, binoculars, hand lenses, or microscopes, not light.
- White light is colorless light.
- Sunlight is red, yellow or orange.
- Light travels from our eyes so we can see.
- Light comes from the object being looked at
- Bright light travels further than dim.
- Light only travels a short way.
- Humans can see in complete darkness after the eyes adjust.
- A shadow is something that exists on its own.
- A mirror reverses everything.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Help students to understand that there are forms of communication all around us.
- Provide students with the *Card Sort Activity*.
- Ask students to work together to classify images into groups-LIGHT and SOUND. Some of the images can be represented in both, such as morse code.
- Students share the results of the sorting activity as a group and must have a valid scientific reasoning for the category they select for the image.
- If the teacher notices there are certain pictures that are misclassified, ask the students to share why they chose what they did, and ask students who got it right to explain why they classified the image the way they did.
- Ask students to identify patterns or similarities between the light examples and in sound examples.
- Ask students if they can name some cause and effect relationships in the photos.

Resources:

- Card Sort Activity
- Communicating with Light and Sound Picture Sort Answer Key

Teacher Action(s):

- Creates interest
- Generates curiosity

Back to Top of Page

- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description: Light and Sound Hunt
Students walk around the school and grounds looking for and identifying a variety of communication forms.
- Students design a list of "look fors" and a way of collecting data. Students should work together to share their ideas in collecting data. This is a great way to link to mathematics- tally marks. While a *Light and Sound Hunt* template is provided, the standard specifically asks students to work collaboratively to plan and carry out an investigation. Therefore you may need to modify the document to showcase their ideas.
- Question prompts for class discussion:
  - Where else in the world do we see light sources, light going through different materials, and different materials making shadows?
  - How does light help you see things and communicate with others?
  - How does sound send us different types of messages?
  - How does sound help us communicate with others?
  - How do light and sound work together to make communication more clear?
- Students will take part in a *Light and Sound Hunt* within or around the school building.

Resources:
- Light and Sound Hunt data collection template

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:

Back to Top of Page

- Class comes back together as a group to share and explain their findings. Help students to identify which form of communication was most commonly seen in the building. Prompt student thinking:
    - What were some of the examples you drew for light, sound or both?
    - Did the___ (light example) act as a light source or create a shadow?
    - What message was the object communicating?
    - What message was the ___(sound example) communicating?
    - How did light and sound work together to communicate a message?
    - What message did the (light and sound device) communicate to us?
    - What type of communication type was the most/least common? How do you know?
    - What type of communication can be used for closer and farther distances?
    - Would the most popular form of communication within the school work for communicating across town, across the state, and across the country/world? Why or why not?
- Class reads and discusses *Sending Messages with Light and Sound* by: Jennifer Boothroyd on Epic Books

Resources:
- Light and Sound Hunt data collection template
- Sending Messages with Light and Sound by Jennifer Boothroyd on Epic Books

Teacher Action(s):
- Encourages the students to explain their classification choices in their own words.
- Asks for justification (evidence) and clarification from students
- Formally provides explanations of reasons for classifying particular images.
- Uses students' previous experiences as the basis for explaining concepts.

Student Action(s):
- Explain possible answers to others
- Listen critically to others' explanations.
- Questions others' explanations.
- Listens to and tries to comprehend explanations the teacher offers.
- Refers to previous activities.

Vocabulary: light, shadow, light beam, light source, reflective, color, reflect, sound, vibrate, vibration, communication

ELABORATE (Applications / Extensions)
Activity Description:
- Tell students that a bad storm has knocked out the power and phones. Their best friend lives next door, and he/she wants to check on them to make sure they are doing ok with the storm and the power outage. The students are not allowed to go outside because of the weather, so what are the different ways students can use light and sound to communicate with their friend?
- Show students the available materials (some possible examples could be a light source to send signals, paper cups and string to make telephones or drums to create a pattern of beats).
    - Teacher Note: Do not tell the students what the materials can be used for, just let them figure it out.

Back to Top of Page

- Ask students to complete the *Draw a Model Handout* representing how they would communicate and check on their best friend. Ask students to label their models or add zoom out boxes for deeper explanations regarding the use of light and sound.
- Students use a variety of materials to build their ideas from their *Draw a Model Handout*.
- Students share their communication devices.

Resources:

- Draw a Model Handout

Teacher Action(s):

- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?"

Student Action(s):

- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s) (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❏ **SEP**: *Planning and Carrying out Investigations; Asking Questions and Defining Problems*
- ❏ **DCI**: *PS4.C: Information Technologies and Instrumentation; ETS1.A: Defining and Delimiting Engineering Problems*
- ❏ **CCC:** *Patterns*

Summative Assessment Description(s)

- Student models using light and sound to communicate with a friend from Elaborate.

Culminating Performance Task:

- Remind students of Mickey's Steamroller animation. In a group discussion, prompt students to share their ideas about how the animation communicated a message using light and sound.
- Ask students how the light and sound worked together to help the person watching understand what was happening.
- Ask students to think about the importance of the sounds. Could we change the message of the animation by changing the sounds?
- Students will engineer the sounds for the Birdie animation* using classroom objects. All engineers define the sounds/problem prior to enacting a solution.

Back to Top of Page

- Students preview the Birdie animation (WITHOUT SOUND) and brainstorm ways to improve the communication of the animation by adding sounds they can create in the classroom using common and available materials.
- Students must also describe how the animation (from film) works. You can provide time for students to use electronic devices to view the animation and test their sound ideas.
- Student assessment-please print on 11x17 paper.

Resources:
- Birdie animation*
- Student assessment

***Animation Source**: Hykade, Andreas , director. *Nuggets*, Film Bilder, 13 Oct. 2014

Additional Resources:
- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Optional Learning Sequence
Brief Description: Up until this moment, students may never have considered whether or not they can see in total darkness. This lesson will draw upon their individual experiences to create a shared experience. Students need to figure out how the amount of darkness affects how much they can see. Students will be guided to wonder what we would see if we could make the room as dark as possible. Encourage students to suggest ways to make that happen. Questions being looked at include: What can we see in our room? How can we block the light that's coming into our room through the windows? Which materials will block the light best (to help us make our room as dark as possible)? *Citation: *These materials were developed through with support from the Michigan Department of Education; the Gordon and Betty Moore Foundation, and support from the NGSX Project at Clark University, Tidemark Institute, and Northwestern University* and adapted by the CREC Consortium.
Suggested Pacing: 1-1.5 hrs
Lesson-Level Phenomenon/Design Problem: ● What could we see if we made our room completely dark? ● How can we make our room as dark as possible?
Relationship to Anchoring Phenomena/Design Problem: How the amount of light impacts what we see.
Learning Sequence Driving Question: Is light necessary to see? Can we see in the dark?
Student Expected Outcomes: ● Students will analyze data by recording and sharing observations and using them to describe patterns across everyone's data to determine how many of us could see the number of shapes that were actually at each station in the darker versus better lit parts of the room. ● Students will ask questions based on observations from this experience and from other prior experiences we've had where (we've seen similar patterns) it has been difficult to see something in a dark place. Define problems and brainstorm solutions related to the question, "how can I make the space I am looking in as dark as possible?" ● Students will plan and conduct an investigation collaboratively to produce data to help determine which materials will be the best (patterns) for blocking out the light coming through the windows in our classroom.
CONNECTIONS TO STANDARDS

Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1) (1-PS4-3) ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Constructing Explanations and Designing Solutions** ● Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4) **Asking Questions and Defining Problems** ● Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1) ● Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)	**Disciplinary Core Ideas:** **PS4.B: Electromagnetic Radiation** ● Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)	**Crosscutting Concepts:** **Cause and Effect** ● Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1) (1-PS4-3) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1) (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-PS4-3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
  - [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
  - [Assessment Boundary: Assessment does not include the speed of light.]
- K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Back to Top of Page

Possible Common Core State Standards Connections:
1-PS4-3:
ELA/Literacy —
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-3)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-3)
- SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-3)

K-2-ETS1-1:
ELA/Literacy —
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Mathematics —
- MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1)
- MP.4 Model with mathematics. (K-2-ETS1-1)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

Prior Student Knowledge:
N/A

Possible Preconceptions/Misconceptions:
- Light only reflects from mirrors and shiny objects.
- If students are asked what helps you see? Most will answer glasses, seeing-eye dogs, binoculars, hand lenses, or microscopes, not light.
- White light is colorless light.
- Sunlight is red, yellow or orange.
- Light travels from our eyes so we can see.
- Light comes from the object being looked at
- Bright light travels further than dim.
- Light only travels a short way.
- Humans can see in complete darkness after the eyes adjust.
- A shadow is something that exists on its own.
- A mirror reverses everything.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Back to Top of Page

Activity Description:

- Students move around the darkened room trying to see what shapes (that have been strategically placed around the room) they can see and to what degree they can see them - **see pages 2-10** of the Teacher's Guide for directions.
- Students record their responses on **pages 1-3** of the Student Resource.
- Teacher then debrief findings with the students using the questions below.
  - What kinds of patterns are we seeing from our station observations?
  - What are some other experiences you've had when it has been difficult to see in the dark?
  - What could we see in the room if we made it as dark as we possibly could?
  - Could we ever make it completely dark?
  - What more can we find out about this?
- Teacher encourages students to suggest ways to make the room as dark as possible.
- Teacher records the students' ideas for further investigation.

Resources:

- Teacher's Guide
- Student Resource

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- Students investigate how darkness affects how much/how well they can see.
- Students use **page 5** of Student Resource (from Engage) to make predictions.
- Teacher provides materials (cardboard, fabric, paper, tissue paper, towels, construction paper, transparencies, wax paper, mylar, plastic wrap, cardstock, etc.) to test various answers to the question: What could we see in the room if we made it as dark as we possibly could?
- Students work in small groups to test their earlier predictions about what will block the light to try to make the room as dark as possible.
- Students test alternatives and discuss them with their group.
- Teacher asks:
  - How successful were you in blocking out the light coming into our room?
  - What materials worked better than others?
  - If the window was too large what kinds of design solutions can we think of?
- Record their observations on the Student Resource.

Resources:

- Student Resource

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher

Back to Top of Page

- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
- Students discuss their possible solutions and answers as to how best to make the room (or an area entirely dark) so they can see if they can see objects in the dark.
- Students use their recorded observations in explanations.
- Teacher encourages students to explain light concepts about their exploration.
- Record their findings on a teacher made anchor chart and help the class to analyze their data together to come up with any noticeable patterns.
    - Help students to include scientific vocabulary as they share their findings.

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: prediction, observe, clear, cloudy, dark, light, reflect, mediums, transparent, translucent, opaque, absorbed, illuminate, shadow, redirect, light source

ELABORATE (Applications / Extensions)
Activity Description:
- Students work in pairs to discuss possible designs to make the classroom completely dark.
- Pairs complete the Modifications Handout.
- Pairs present their ideas to the class.

Resources:
- Modifications Handout

Back to Top of Page

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think...?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❏ **SEP**: *Planning and Carrying Out Investigations; Constructing Explanations and Designing Solutions; Asking Questions and Defining Problems*
- ❏ **DCI**: *PS4.B: Electromagnetic Radiation*
- ❏ **CCC**: *Cause and Effect; Patterns*

Summative Assessment Description(s):
- Students final ideas and presentation to the class from Elaborate.

Resources:
- Modifications Handout

Additional Resources:
- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Unit 3 - Senses In Nature
Students become plant and animal scientists who use their powers of observation and curiosity on a journey of figuring out how plants and animals use their external parts to help them meet their needs in order to grow and survive. Students will initially view three video clips that show the amazing lives of three organisms; a tulip, venus flytrap and the star-nosed mole. The students will be asked to view the video clips through two lenses: I wonder and I notice. From their observations, students will start to develop initial theories on why these organisms look the way they do and why they behave the way they do. By the end of this unit, students will be introduced to the concept of biomimicry, learning from nature to make things better. Students will be able to explain the structures and functions of animals and plants as well as identify survival growth needs for both plants and animals. The culminating learning sequence will have the students take all information learned throughout the unit and tie it together to create/engineer a problem that needs to be solved. To access the flowchart for this unit, click here.
Suggested Pacing: 10-12 hrs
Anchoring Phenomenon/Design Problem: How do the external parts of the Venus flytrap, star nosed mole, and tulip help them grow and survive?
Unit Driving Question: How do external parts and sunlight help living things grow and survive?
Culminating Performance Task: Biomimicry - Students will consider how the external parts of the Venus flytrap, star nosed mole, and tulip help them grow and survive and design an invention that could help solve a human problem
NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements) ● 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* ○ [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.] ● 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year. ○ [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] ○ [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]* ○ *(This PE is something that will be ongoing from the beginning of the year (making and collecting*

Back to Top of Page

regular observations) until the collected observations can be analyzed within a later Unit (3 or 4).

- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

*1-ESS1-2 is only partially assessed.

Three Dimensions that form the Foundation for these NGSS Performance Expectations:

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Constructing Explanations and Designing Solutions ● Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1) **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Developing and Using Models** ● Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) **Analyzing and Interpreting Data** ● Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)	**LS1.A: Structure and Function** ● All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) **LS1.D: Information Processing** ● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) **ESS1.B: Earth and the Solar System** ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2) **ETS1.B: Developing Possible Solutions**	**Structure and Function** ● The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) (K2-ETS1-2) **Patterns** ● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-2)

Back to Top of Page

	● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2) **ETS1.C: Optimizing the Design Solution** ● Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)	

Possible Common Core State Standards Connections:

ELA-

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-2)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-3)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics —

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)(K-2-ETS1-3)
- MP.4 Model with mathematics .(1-ESS1-2)(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)(K-2-ETS1-3)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-3)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR: *This refers to the on-going length of day data collection introduced in G1 U1.*

Back to Top of Page

- Plan *at least* 10 dates (1 per month) to collect length of day and graph on a class chart. May do three dates - 1st, 10th, 20th of the month.
- *It is suggested that you gather the data over the summer and use this data to model how to collect the data for the school year.*
- This ongoing observation fully covers the PE: 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Resources:

- Website for data collection, Sample bar graph, and optional: *amount of daylight each month*

Learning Sequence 1

- **Learning Sequence Driving Question**
  - How do external parts and sunlight help living things grow and survive?
- **Learning Sequence 1**
- **Relationship to Anchoring Phenomena/Design Problem**
  - This is the introduction to the anchoring phenomenon.
- **Student Expected Outcomes:**
  - Students will make observations and ask questions about plants, animals and light to identify that all organisms have different body parts and use their parts in different ways to grow and survive.

Learning Sequence 2

- **Learning Sequence Driving Question**
  - How do plant parts help the plant meet its needs?
- **Learning Sequence 2**
- **Relationship to Anchoring Phenomena/Design Problem**
  - Students use the anchoring phenomena and their questions to discover patterns in the structure and function of plant parts to help them design a solution to a human problem.
- **Student Expected Outcomes:**
  - Students will make and record observations and develop theories to recognize patterns in various plant structures.
  - Students will use evidence of their plant parts observations to develop explanations on how plant parts help a plant meet its needs.

Learning Sequence 3

- **Learning Sequence Driving Question**
  - How do animal body structures help it meet its needs for growth and survival?
- **Learning Sequence 3**
- **Relationship to Anchoring Phenomena/Design Problem**
  - Students use the anchoring phenomena of the star-nosed mole and their questions based on animal structures and functions to discover patterns in the structure and function of animal parts to help them develop a solution to a human problem.
- **Student Expected Outcomes:**
  - Students will make and record observations to recognize patterns in various animal structures.
  - Students will use evidence of their animal part research to develop explanations on how animal parts helps it meet its needs.

Back to Top of Page

Learning Sequence 4

- **Learning Sequence Driving Question**
  - How have humans used nature to solve their problems? How can I mimic nature to develop a solution to my problem?
- **Learning Sequence 4**
- **Relationship to Anchoring Phenomena/Design Problem**
  - Students use the anchoring phenomena videos and their explorations of animal and plant part structure and function to identify a human problem and design a solution using their knowledge of the natural world.
- **Student Expected Outcomes:**
  - Students will explore how humans have used nature to inspire solutions to their problems.
  - Students will design a solution to a human problem using their knowledge of how plants and animals use their external parts to meet their needs.

Assessments:

- **Culminating Performance Task:**
- Using the structure of the Sandra Markle texts, ask students to create their own biomimicry page. Students choose Venus Flytrap, Star-nosed Mole, Tulip or other plant/animal to mimic.
  - ❏ On the left page identify the structure to mimic from one of the given choices and draw that structure and identify the function.
  - ❏ On the right page draw their invention and label the material they would use. In the zoom out bubble, they will describe how their invention helps humans.
  - ❏ If time allows, have students create a prototype of their ideas.
  - ❏ Student Biomimicry Page

- **Grade 1 Performance Expectation Rubrics and Prompts**
- **Catalyst Elementary Assessment Guide**

Additional Resources:

- G1 Unit Materials List
  - Click on specific tab for unit-specific materials
- EPIC! Digital Library - G1 U3 List
  - Includes ebooks and videos
  - Must have an educator user account for free access

Learning Sequence 1		
Brief Description: Students become plant and animal scientists who use their powers of observation and curiosity on a journey of figuring out how plants and animals use their external parts to help them meet their needs in order to grow and survive. Students will initially view three video clips that show the amazing lives of three organisms; a tulip, venus flytrap and the star-nosed mole. The students will be asked to view the video clips through two lenses: I wonder and I notice. From their observations, students will start to develop initial theories on why these organisms look the way they do and why they behave the way they do.		
Suggested Pacing: 0.5 - 1 hr		
Lesson-Level Phenomenon/Design Problem: These videos set the stage for the students to figure out how plants and animals use their external parts to help them meet their needs necessary for growth and survival while considering the role that sunlight plays in their development: ● 22 day life cycle of a tulip plant in a garden ● Venus flytrap Teacher Background on the Venus Flytrap ● Star nosed Mole		
Relationship to Anchoring Phenomena/Design Problem: This is the introduction to the anchoring phenomenon.		
Learning Sequence Driving Question: How do external parts and sunlight help living things grow and survive?		
Student Expected Outcomes: ● Students will make observations and ask questions about plants, animals and light to identify that all organisms have different body parts and use their parts in different ways to grow and survive.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be	**Disciplinary Core Ideas:** **LS1.A: Structure and Function** ● All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp	**Crosscutting Concepts:** **Structure and Function** ● The shape and stability of structures of natural and designed objects are related to their function(s).

Back to Top of Page

used to make comparisons. (1-ESS1-2)	objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) **LS1.D: Information Processing** ● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)	(1-LS1-1) (K2-ETS1-2)

Related Performance Expectation(s) in this Unit:

- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*
  - [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

Possible Common Core State Standards Connections:

ELA/Literacy -

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)

Prior Student Knowledge:

K.ETS1.A, K-LS1-1, K-ESS3-1

Possible Preconceptions/Misconceptions:

- Plants do not eat insects.
- Insects eat plants only.
- Moles use their eyes to see.
- Moles use all their senses equally.
- Plants do not move.
- Plants do not need the sun.

Back to Top of Page

LESSON PLAN – [5-E Model]

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
- Teacher shows the following videos with little explanation:
  - *Venus Flytrap Video*
  - *Tulip Video*
  - *Star-nosed Mole Video* (show without sound)
- The students should view the videos at least twice while completing an I Notice, I Wonder Student Sheet:
  - to make observations about what they noticed related to plants and animals
  - to generate questions based on each video.

Resources:
- Videos:
  - Venus Flytrap Video
  - Tulip Video
  - Star-nosed Mole Video *(show without sound)*
- I Notice, I Wonder Student Sheet

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
- Debrief as a class and record the variety of questions and observations. As students recall the videos and refer to their I Notice, I Wonder Sheet ask:
  - How do animals and plants use their parts to grow and/or survive during different times of the day?
- Record students' questions.
  - Teacher can prompt students to come up with 3 questions they want answered to understand and describe how the structures and functions of plants and animals help them survive, as well as the role sunlight plays in the organism's habitat.
  - Teacher collects student questions and records them under the general themes: Plant Structures, Animal Structures, Behaviors in Light or Dark, and Survival (Growth and Needs)
- Periodically, check off questions that students have answered through their investigations and readings.
  - *Note the goal of this lesson is to get students curious about how structures and their related*

Back to Top of Page

functions help plants and animals live and grow as well as the role sunlight plays in their environment.

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❏ **SEP**: *Planning and Carrying Out Investigations*
- ❏ **DCI**: *LS1.A: Structure and Function; LS1.D: Information Processing*
- ❏ **CCC**: *Structure and Function*

Summative Assessment Description(s):
- Teacher should facilitate the development of an ongoing class *Summary Table* of the learning that progresses throughout the unit. After each learning sequence the teacher should go back to the Summary Table to capture the learning from that sequence making sure connections are made to the progression of learning from the previous sequence. This is a fluid document that should be visible to all students during the instruction of this unit.

Resources:
- Summary Table

Additional Resources:
- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2		
Brief Description: In this sequence students explore the ideas of plants' structures and function and the role of sunlight in the plant's life cycle. Students will be exploring plants in a variety of learning stations to determine the functions of plant parts. Students will recall from kindergarten that all plants need sunlight, soil and water to grow and survive and that all plants start as a seed, grow into a plant (bush, tree, single plant or vine).		
Suggested Pacing: 2.5 - 3.5 hrs *Station Five - Takes a week for observations*		
Lesson-Level Phenomenon/Design Problem: Lima bean growth video and revisit the tulip video		
Relationship to Anchoring Phenomena/Design Problem: Students use the anchoring phenomena and their questions to discover patterns in the structure and function of plant parts to help them design a solution to a human problem.		
Learning Sequence Driving Question: How do plant parts help the plant meet its needs?		
Student Expected Outcomes: • Students will make and record observations and develop theories to recognize patterns in various plant structures. • Students will use evidence of their plant parts observations to develop explanations on how plant parts help a plant meet its needs.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** • Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)	**Disciplinary Core Ideas:** **LS1.A: Structure and Function** • All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers,	**Crosscutting Concepts:** **Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) (K2-ETS1-2) **Patterns**

Back to Top of Page

Developing and Using Models ● Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	fruits) that help them survive and grow. (1-LS1-1) **LS1.D: Information Processing** ● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) **ETS1.B: Developing Possible Solutions** ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (*This DCI is not fully accessible in this LS, but will be continued in LS3 and LS4.)	● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*
    - [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]
- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
    - [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
    - [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]*
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

*1-ESS1-2 is only partially assessed.

Possible Common Core State Standards Connections:

ELA/Literacy —

- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)

Back to Top of Page

- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics —
- MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)

Prior Student Knowledge:
K-LS1-1
K-ESS3-1

Possible Preconceptions/Misconceptions:
Students may believe that:
- all plants look alike (similar to our climate)
- all plants only need sun and water to survive
- plants don't grow/change

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
- As a class, read *Plants Can't Sit Still by Rebecca Hirsch*
- Students will observe the *Lima Bean Video and Tulip Video* (again) in a whole group setting and add more questions to the plant structures portion of the class observation and question chart based on the book and videos. Be sure to prompt the students about the role of the sun if this concept doesn't come up during the questioning session.
- Teacher asks students to make connections between the two videos.
- Discuss how the two plants are alike and different with a partner at the carpet.
- After discussing with their partners, have students share their questions and observations with the class. If there is anything new, add it to the class question and observation chart.

Resources:
- Plants Can't Sit Still by Rebecca Hirsch on Epic Books
- Lima Bean Video
- Tulip Video

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions

Back to Top of Page

- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
Students explore four different learning stations and a class demonstration (prior preparation required):
- Utilize the stations in the way that works best for your classroom because each station is not an equal amount of time.
  - Lima Bean Dissection: to show the connection of the seed to the sprout and mature plant.
  - Fruit Exploration: to show the connection between the fruit of a plant and the seeds.
  - Potted Plant Exploration: A tomato plant or another flowering/fruit plant in a pot to show the function of roots securing plants in the ground.
  - Stem Exploration: Students observe different dyed carnations and then explore with celery and food coloring to show the function of a stem absorbing water.
  - Leaf Exploration:
    - Option #1: Have children observe a house plant with some leaves covered with paper to show the function of photosynthesis. This is only developing an awareness, students do ***not*** need to understand the mechanisms of photosynthesis for Station 5 is set up as a whole class observation.
    - Option #2: Students observe the leaves of the grass plant (the blades) reacting to different amounts of sunlight.
- Students will record their explorations in the *My Plant Scientist Evidence Log*.
- After the class has experienced each of the stations, discuss each station's learning.

Resources:
- Plant Exploration
- My Plant Scientist Evidence Log

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

Back to Top of Page

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:

- Students develop their explanations about what they observed in their plant exploration. Start this phase reviewing their observations to develop a consensus understanding of the plant parts and their function as you read *Plant Secrets* by Emily Goodman. Elicit student sharing as you read the text, stopping at these points to encourage students to share their observations of the explore activities. Be sure to refer to anchors developed in Engage and Explore phases of this learning sequence to students to refer to in the next two phases: Explain and Elaborate.
- As you read Plant Secrets (on epic!) refer to the debriefing for each of the stations:
    - Read pages 3-6, elicit student ideas from their Lima Bean Dissection Station, then read pages 7, 8.
    - Read pages 9-20, elicit student ideas from the Potted Plant, Stem and Leaf Exploration Stations
    - Read pages 21-24, elicit student ideas from the Fruit Dissection Station, then read pages 25-26
- Introduce the idea of a plant life cycle and how each of the stations would connect with that. Read pages 28-32, focusing only on the top section of each part and its function.
- Ask students to think about their on-going daylight hour data collection to connect the changes they are seeing to how that would impact plants.
    - Have a quick class discussion on the seasonal impacts of daylight changes to plant growth and life cycles (no tulips in the winter). This topic is covered in Unit 4.

Resources:

- *Plant Secrets* by Emily Goodman available on epic Books
- Further resources on epic! Books:
    - *Exploring Seeds* by Kristin Sterling
    - *Exploring Stems* by Kristin Sterling
    - *Exploring Flowers* by Kristin Sterling
    - *Exploring Roots* by Kristin Sterling
    - *Exploring Leaves* by Kristin Sterling

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: root, leaf, stem, flower, petal, pollen, branch, thorn, fruit, life cycle, growth, survival, soil, sunlight, water, form

ELABORATE (Applications / Extensions)

Activity Description:

Back to Top of Page

- Show students slides #3-6 from the *Plant Structure Slideshow.*
- Students choose one plant slide and explain the form/shape of the parts as well as the function of each part.
    - Students explain that all plants need sunlight, water and soil to grow and survive.
    - Discuss how plant structures across species are similarly shaped to access those necessary elements for growth and survival.
- Ask students to make comparisons among or between the different plants and identify how they are alike and different.
    - Include discussion of patterns.
- Ask students: How do plant parts help the plant meet its needs?
- Students complete the *Plant Structure Model Handout.*
- On the model, students should choose what needs (sun, soil or water) does the structure use to help the plant live and grow. Students should use their plant evidence logs to help them develop their rationale.
    - Bring the discussion back to the tulip plant video. Using what they know about structures and their function, ask the students to identify if the identified structures are necessary for the tulip to live and grow.
- Ask students: What other structures do plants have that help them meet their needs of survival?
- As a class read: *Meat Eating Plants by Mari Schuh*
- Ask students: Can you think of an example of something humans use that we copied from plants? (example could be animal traps)

Resources:
- Plant Structure Slideshow
- Plant Structure Model Handout
- Meat Eating Plants by Mari Schuh on epic! Books
    - Mari Schuh has Plant Power Series available on epic! Books

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

FORMATIVE MONITORING (Questioning / Discussion)

Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

- ❑ **SEP:** *Planning and Carrying Out Investigations; Developing and Using Models*
- ❑ **DCI:** *LS1.A: Structure and Function; LS1.D: Information Processing; ETS1.B: Developing Possible Solutions*

Back to Top of Page

- ❏ **CCC:** *Structure and Function; Patterns*

Summative Assessment Description(s):

- Teacher should facilitate the development of an ongoing class *Summary Table* of the learning that progresses throughout the unit. After each learning sequence the teacher should go back to the Summary Table to capture the learning from that sequence making sure connections are made to the progression of learning from the previous sequence. This is a fluid document that should be visible to all students during the instruction of this unit.

Resources:

- Summary Table

Additional Resources:

- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Learning Sequence 3		
Brief Description: Students will compare the ways that animals use their external parts to perceive their environment and meet their needs to grow and survive. In the first learning sequence, students were introduced to the star nosed mole, whose sense of smell helps it be the world's fastest eater. Students will research different animals to obtain information on how animals use their external parts to perceive their environment and to meet their needs to grow and survive in their environments.		
Suggested Pacing: 3.5 - 4.5 hrs		
Lesson-Level Phenomenon/Design Problem: How are human body parts similar in function to those of the star nosed mole?		
Relationship to Anchoring Phenomena/Design Problem: Students use the anchoring phenomena of the star-nosed mole and their questions based on animal structures and functions to discover patterns in the structure and function of animal parts to help them develop a solution to a human problem.		
Learning Sequence Driving Question: How do animal body structures help it meet its needs for growth and survival?		
Student Expected Outcomes: ● Students will make and record observations to recognize patterns in various animal structures. ● Students will use evidence of their animal part research to develop explanations on how animal parts help it meet its needs.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Planning and Carrying Out Investigations ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2) **Developing and Using Models**	**LS1.A: Structure and Function** ● All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants	**Structure and Function** ● The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) (K2-ETS1-2) **Patterns** ● Patterns in the natural

Back to Top of Page

• Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) **Analyzing and Interpreting Data** • Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3) **Constructing Explanations and Designing Solutions** • Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)	also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) **LS1.D: Information Processing** • Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) **ETS1.B: Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (*This DCI is not fully accessible in this LS, but will be continued in LS4.) **ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)	world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*
    - [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]
- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of

Back to Top of Page

year.
  - [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
  - [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]*
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

*1-ESS1-2 is only partially assessed.

Possible Common Core State Standards Connections:

ELA/Literacy —
- RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Mathematics —
- MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3)
- MP.4 Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3)

Prior Student Knowledge:

K-LS1-1

K-ESS3-1

Possible Preconceptions/Misconceptions:
- Living objects can change to meet their survival needs.
- Birds, fish, insects and worms are not animals.
- All animals can move from place to place.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:
- Revisit the Star Nosed Mole video and the student generated questions from LS1.

Back to Top of Page

- Ask the students:
    - How are they like the star nosed mole?
    - How are their body parts like the star nosed mole?
        - Generate a list of external body parts for animals and humans
    - How do they (the students) learn about their environment? Senses.
- Record student ideas on an anchor chart, *Double Bubble Comparison* **or** Venn Diagram.
- Listed below are structures common to both humans and star-nosed moles along with an overview of the similar functions.

Teacher Information:

External Body Parts	Function	Senses- Sense Organ
• Eyes • Ears • Nose • Skin/Hair • Tails • Mouths • Feet • Arms/Hands	• seeing • hearing • smelling • protection/touch • protection, • consume food, communicate • move • grasp objects, use tools, communicate	• Sight - Eyes • Hearing-Ears • Smell - Nose • Touch - Skin • Taste - Tongue

Resources:
- Star-nosed Mole Video *(show without sound)*
- Double Bubble Comparison

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
Part 1:
- Introduce the text *What Do You Do With a Tail Like This?* by Steven Jenkins and Robin Page by showing the front cover asking the students:
    - What animal does the tail belong to?
    - Take a few responses and ask the students to cite their reasoning, then flip the back of the book to reveal the lizard.
- Students participate in a *Turn and Talk* to answer the questions:

Back to Top of Page

- How do you think the lizard might use its tail?
- How does a tail help an animal find food or stay safe?

- Then ask the partner to share their partner's ideas. Record student ideas.
- Tell the students they are going to play a game with this book today. As they play this game they will discover how many different animals use their external body parts to help them survive
  - *Sample and Blank Anchor Charts* are available in Resources Part 1
  - As you move through the book, pause after reading each double page with a question about an animal body part.
  - Encourage students to guess which animal the part belongs to.
  - Continue reading how the animals use that external body part.
  - Pay particular attention to unusual external body parts such as the lizard and the archerfish.
- Work with your students to complete the data tables (**Animals with the asterisk have complex body structures - Ask the students if they have ideas about how to complete the data table based on their prior knowledge.)*
  - *This lesson and its components are adapted from *Perfect Pairs-Using Fiction and Nonfiction Picture Books to Teach Life Science, K-2* by Melissa Stewart and Nancy Chesley

Resources Part 1:

- *What Do You Do With a Tail Like This?* by Steven Jenkins and Robin Page
- Sample and Blank Anchor Charts

Part 2:

- Divide your class into six groups, assign each group one of the animal parts (discussed in part 1) for the *Discussion Diamond Activity.*
- Urge students to consider why the same body parts on different animals have different shapes and/or functions.
  - Have each group member share their ideas and come to a consensus on the best responses. List those in the center of the diamond.

Resources Part 2:

- Discussion Diamond Activity
- Discussion Diamond Directions

Part 3:

- Students will design, build and test a food gathering device.
- As a class, refer back to the Mouth and Feet anchor charts (or appropriate pages in *What Do You Do With a Tail Like This?* by Steven Jenkins and Robin Page) to discuss how different animals obtain and eat food.
- Show the *Directions Slideshow*
  - Things to consider for the Class Data Chart (slide #8 of the *Directions Slideshow)*
    - Which device picked up the most food? Why?
    - The way (e.g., physical process, qualities of the solution) each device solves the problem.
    - The strengths and weaknesses of each design feature.

Resources Part 3:

- Directions Slideshow

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact

Back to Top of Page

- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:

- Ask students:
    - How does an animal's body parts help it survive?
- Develop a general list of three or four ways the animals in the text depend on their external body parts. For example:
    - safety
    - get food (searching, catching, eating)
    - moving around
    - using their senses
- After discussion around these ideas that body parts help organisms to survive in their environments, ask students to work in small collaborative groups to research animals through nonfiction texts to identify the ways their structure helps the organism live and grow.
    - May need assistance from your library media specialist to pull texts associated with animals from Explore to help students visualize the organisms and their environmental needs.
    - Use video from explore.org to allow students to make live observations of their animal and its structures and environment.
    - Ask students to draw a model of the animal
        - Models should focus on the specialized structures and their proposed functions.
        - Students will need to incorporate visual imagery and explanatory text in these models.
        - Models can be completed on chart paper or 11x17 paper.
- Ask students to think about their on-going daylight hour data collection to connect the changes they are seeing to how that would impact animals.
    - Have a quick class discussion on the seasonal impacts of daylight changes to animal growth and life cycles (bears hibernate in the winter). This topic is covered in Unit 4.

Resources:

- https://explore.org/livecams
- non fiction texts from epic Books

Teacher Action(s):

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):

Back to Top of Page

- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: grow, body, hear, human, survive, shell, animal features, behavior, skin, nose, ears, tail, mouth, eyes, feet

ELABORATE (Applications / Extensions)
Activity Description:
- Bring the discussion back to the star-nosed mole. Using what we know about structures and their function, ask the students to identify which of the mole's structures help it to find food or stay safe.
- On the *Star-nosed Mole Model*, students should provide a rationale for their ideas/classification of the structure as F for Food or S for Safety.
- As a class read: *National Geographic Readers: Animal Armor by Laura Marsh* or *Back Off! Prickly Animals by Nadia Higgins* on Epic Books
- Ask students: Can you think of an example of something humans use that we copied from animals? (example could be bike helmets inspired by turtle or snail shells)

Resources:
- Star-nosed Mole Model
- On epic! Books (be sure to sign in on epic! prior to clicking the links):
  National Geographic Readers: Animal Armor by Laura Marsh
  Back Off! Prickly Animals by Nadia Higgins

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
FORMATIVE MONITORING (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.

Back to Top of Page

- ❏ **SEP:** *Planning and Carrying Out Investigations; Developing and Using Models; Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions*
- ❏ **DCI:** *LS2.A: Structure and Function; LS1.D: Information Processing; ETS1.B: Developing Possible Solutions*; ETS1.C: Optimizing the Design Solutions
- ❏ **CCC:** *Structure and Function; Patterns*

Assessment Description(s):

- Teacher should facilitate the development of an ongoing class *Summary Table* of the learning that progresses throughout the unit. After each learning sequence the teacher should go back to the *Summary Table* to capture the learning from that sequence making sure connections are made to the progression of learning from the previous sequence. This is a fluid document that should be visible to all students during the instruction of this unit.

Resources:

- Summary Table

Additional Resources:

- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 4		
Brief Description: In this learning sequence students will investigate how humans have used nature to inspire solutions to either solve a problem that helps them meet their needs or make their lives easier.		
Suggested Pacing: 1.5 - 2 hrs for 5-Es 0.5 - 1 hr for Culminating Performance Task		
Lesson-Level Phenomenon/Design Problem: Biomimicry Inventions		
Relationship to Anchoring Phenomena/Design Problem: Students use the anchoring phenomena videos and their explorations of animal and plant part structure and function to identify a human problem and design a solution using their knowledge of the natural world.		
Learning Sequence Driving Question: How have humans used nature to solve their problems? How can I mimic nature to develop a solution to my problem?		
Student Expected Outcomes: • Students will explore how humans have used nature to inspire solutions to their problems. • Students will design a solution to a human problem using their knowledge of how plants and animals use their external parts to meet their needs.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices:	**Disciplinary Core Ideas:**	**Crosscutting Concepts:**
Constructing Explanations and Designing Solutions • Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1) **Planning and Carrying Out Investigations** • Make observations (firsthand or from media)	**LS1.A: Structure and Function** • All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1) (K2-ETS1-2) **Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as

Back to Top of Page

to collect data that can be used to make comparisons. (1-ESS1-2) **Developing and Using Models** ● Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)	them survive and grow. (1-LS1-1) **LS1.D: Information Processing** ● Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1) **ETS1.B: Developing Possible Solutions** ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)	evidence. (1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.*
    - [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]
- K-2-ETS1-2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Possible Common Core State Standards Connections:

ELA -

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-2)
- W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-3)
- W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-3)
- SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2)

Back to Top of Page

Mathematics —

- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)(K-2-ETS1-3)
- MP.4 Model with mathematics. (1-ESS1-2)(K-2-ETS1-3)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)(K-2-ETS1-3)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)
- 2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-3)

Prior Student Knowledge:
K-LS1-1
K-ESS3-1

Possible Preconceptions/Misconceptions:

- Everything that makes our lives easier has been invented.
- We cannot learn from nature because we are smarter.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:

- Read the text, *Wild Ideas Let Nature Inspire Your Thinking* by Elin Kelsey.
- As you read the story, stop at natural points to elicit student thinking with Think, Pair, Share: How do humans do similar things to the animals represented in the text?
    - Squirrels pg. 5 - What can you learn by watching squirrels?
    - Orangutans pg. 9 - Why do you think orangutans stop and think when they feel puzzled? What do you do?
    - Dung beetles pg. 25 - Why do you think dung beetles look to the stars and steer by the Milky Way?

Resources:

- Wild Ideas Let Nature Inspire Your Thinking by Elin Kelsey on epic! Books

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

Back to Top of Page

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- The focus of this lesson is biomimicry - which is the science of studying nature's best ideas and mimic or copy them to solve our problems.
- Introduce the concept of biomimicry through this activity -
  - Create eight groups and distribute to each group a card from the *Biomimicry Phenomena Cards*.
  - Prompt the students to observe the images of humans and living things.
  - Ask students to identify how the living things structure and function is similar to the engineered device used by humans.
    - briar patch - barbed wire
    - burdock plant - velcro
    - dandelion seed - parachutes
    - tree trunk and branches - coat tree
    - kingfisher's bill - Japan's bullet train
    - gecko feet that allow them to climb walls - suction cups for climbing
    - bluebird bill - needle-nose pliers
    - termite mounds - skyscrapers

Resources:

- Biomimicry Phenomena Cards

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:

- Help students begin to understand that engineers often look to living things to help them solve problems. This is known as biomimicry-innovation inspired by nature. All of the engineered designs in the Explore phase used nature as a means of helping engineers design a solution to a problem. Engineers follow an engineering design process that includes the following stages: (1) Ask, (2) Imagine, (3) Plan, (4) Create, (5) Improve
- Read *How and Why Do People Copy Animals* by Bobbie Kalman on epic! Books
- Refer to the special structures on each of the anchor phenomenon:
  - mole (sensing surroundings through touch)
  - venus flytrap (sensing prey through touch)

Back to Top of Page

- tulip (sensing sunlight)
  - Teacher Information - phototropism/heliotropism are responsible for a plant's ability to grow towards and track the sun which much of solar technology mimics
- Provide time for the students to discuss some of the specialized features found within three organisms that help they survive and grow. This would be a good time for them to refer to the contents on the summary table.
- Have the students/student group select one of the structures. The goal is for students to brainstorm a way that humans could use ONE structure (or something inspired by it) to solve a human problem. Example: a walking stick helps a blind person navigate the room by acting as a projected feeler, much like the mole's nose. Example: a walking stick helps a blind person navigate the room by acting as a projected feeler, much like the mole's nose.

Resources:
- *How and Why Do People Copy Animals* by Bobbie Kalman on epic Books
- Optional Resources:
  - The Inspired By Nature Series on epic! Books offers great additional resources

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: design, environment, human, engineer, engineering, material, sketch, diagram, mimic, human-made

ELABORATE (Applications / Extensions)
Activity Description:
- Read at least one of the Sandra Markle texts listed below.
- Discuss with class and note text features (will be used in Culminating Performance Task)

Resources:
- Read *ONE* of the following texts by Sandra Markle:
  - *What if You had Animal Feet?*
  - *What if you had Animal Teeth?*
  - *What if you had Animal Eyes?*
  - *What if you had Animal Ears?*
  - *What if you had An Animal Nose?*
  - *What if you had An Animal Tail?*

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations

Back to Top of Page

- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE

Formative Monitoring Description(s):

Formative monitoring will occur at various times (checks for understanding through questioning and discussion) throughout this learning sequence. Please note the following SEP, DCI and CCC need to be monitored throughout the learning sequence.
- ❑ **SEP:** *Constructing Explanations and Designing Solutions; Planning and Carrying Out Investigations; Developing and Using Models*
- ❑ **DCI:** *LS1.A: Structure and Function; LS1.D: Information Processing; ETS1.B: Developing Possible Solutions*
- ❑ **CCC:** *Structure and Function; Patterns*

Summative Assessment Description(s):
- Teacher should facilitate the development of an ongoing class *Summary Table* of the learning that progresses throughout the unit. After each learning sequence the teacher should go back to the Summary Table to capture the learning from that sequence making sure connections are made to the progression of learning from the previous sequence. This is a fluid document that should be visible to all students during the instruction of this unit.

Resources:
- Summary Table

Culminating Performance Task:
- Using the structure of the Sandra Markle texts, ask students to create their own biomimicry page. Students choose Venus Flytrap, Star-nosed Mole, Tulip or other plant/animal to mimic.
  - On the left page identify the structure to mimic from one of the given choices and draw that structure and identify the function.
  - On the right page draw their invention and label the material they would use. In the zoom out bubble, they will describe how their invention helps humans.
  - If time allows, have students create a prototype of their ideas.

Resources:
- Student Biomimicry Page

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Back to Top of Page

Unit 4 - Seasonal Changes

Through patterns of the sunlight and Earth's seasons, students will explore how living things respond to seasonal changes. Unlike humans, animals and plants have strong biological seasonal cycles that are linked to the amount of sunlight in their day. The response from plants and animals to these changes in daylight through the year include reproduction, denning, migration, hibernation, changes to coat thickness, coloration, leaf production, growth and dormancy. These characteristics and behaviors connect offspring to their parents in both their traits (offspring that are alike and not exactly alike their parents) and their survival.

Students learn what it is like to be a field biologist. They will study the different living things in the local region or deciduous biome in order to generate a field guide. Using a variety of media, students will investigate how living things change with the seasons and record these findings on the pages of the field guide. To continue in their role as field biologists, students record the ways in which parents help their offspring to survive.

To access the flowchart for this unit, click here.

IMPORTANT: Learning Sequence 3 - Engage Part #2 requires 30 days of advance prep!

Suggested Pacing:
9-10 hrs

Anchoring Phenomenon/Design Problem:
Time Lapse of Seasons

Unit Driving Question:
How do living things prepare and behave in order to survive in the different seasons?

Culminating Performance Task:
- Students present their Field Guides to the class.
- As students are presenting their Field Guides, the class should be identifying significant patterns that are similar between all organisms (animals and plants).

NGSS Performance Expectation(s): (Hyperlinks will bring reader to NGSS Evidence Statements)
- 1-LS1-2 Read texts and use media to determine patterns in the behavior of parents and offspring that help offspring survive.
  - [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]
- 1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
  - [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.]
  - [Assessment Boundary: Assessment does not include inheritance or animals that undergo

Back to Top of Page

metamorphosis or hybrids.]

- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
  - [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
  - [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

Three Dimensions that form the Foundation for these NGSS Performance Expectations:

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
Obtaining, Evaluating, and Communicating Information ● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) (1-LS3-1) **Constructing Explanations and Designing Solutions** ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS2-1) (1-LS3-1) **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons.(1-LS3-1)	**LS1.B: Growth and Development of Organisms** ● Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2) **LS3.A: Inheritance of Traits** ● Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1) **LS3.B: Variation of Traits** ● Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1) **ESS1.B: Earth and the Solar System** ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted.(1-ESS1-2)	**Patterns** ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) (1-LS3-1) (1-ESS1-2)

Possible Common Core State Standards Connections:

ELA/Literacy -

- RI.1.1 Ask and answer questions about key details in a text. (1-LS1-2)(1-LS3-1)
- RI.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)
- RI.1.10 With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)

Back to Top of Page

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS3-1)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)(1-ESS1-2)

Mathematics -

- 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without h having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- MP.2 Reason abstractly and quantitatively. (1-LS3-1)(1-ESS1-2)
- MP.4 Model with mathematics .(1-ESS1-2)
- MP.5 Use appropriate tools strategically. (1-LS3-1)(1-ESS1-2)

PROGRESSION OF LEARNING

ONGOING THROUGHOUT THE SCHOOL YEAR: *This refers to the on-going length of day data collection introduced in G1 U1.*

- Plan *at least* 10 dates (1 per month) to collect length of day and graph on a class chart. May do three dates - 1st, 10th, 20th of the month.
- *It is suggested that you gather the data over the summer and use this data to model how to collect the data for the school year.*
- This ongoing observation fully covers the PE: 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.

Resources:

- Website for data collection, Sample bar graph, and optional: *amount of daylight each month*

Learning Sequence 1

- **Learning Sequence Driving Question**

Back to Top of Page

- How can seasonal patterns be described?
- Learning Sequence 1
- **Relationship to Anchoring Phenomena/Design Problem**
    - Students recognize and connect the patterns of seasonal changes to daylight intensity.
- **Student Expected Outcome:**
    - Students will make connections between the changing intensity of daylight over a year to the patterns of seasonal changes in a deciduous forest biome.

Learning Sequence 2

- **Learning Sequence Driving Question**
- How do living things prepare and behave in order to survive in the different seasons?
- Learning Sequence 2
- **Relationship to Anchoring Phenomena/Design Problem**
    - Students learn what it is like to be a field biologist. They study the different living things in the local region in order to generate a field guide. Using a variety of media students investigate how living things change with the seasons and record these findings on the pages of the field guide.
- **Student Expected Outcomes:**
    - Students will use observations to describe and communicate their understanding of seasonal changes/patterns in a deciduous forest biome/local region.
    - Students will describe the patterns of behavior that promote survival in the different seasons.

Learning Sequence 3

- **Learning Sequence Driving Question**
    - How are offspring similar and different from their parents?
- Learning Sequence 3
- **Relationship to Anchoring Phenomena/Design Problem**
    - Students explore how the offspring of both animals and plants are similar, yet different from their parents.
- **Student Expected Outcomes**:
    - Students will observe images or specimens and obtain information from texts to prove that animals and their offspring are similar yet different.
    - Students will describe patterns in behaviors of parents in response to their offspring's cues.

Assessments:

- **Culminating Performance Task**
    - Students present their Field Guides to the class.
    - As students are presenting their Field Guides, the class should be identifying significant patterns that are similar between all organisms (animals and plants).
- **Resources:**
    - Field Guide Template
- Grade 1 Performance Expectation Rubrics and Prompts
- Elementary Assessment Resources

Back to Top of Page

Additional Resources:

- G1 Unit Materials List 2020
  - Click on specific tab for unit-specific materials
- EPIC! Digital Library - G1 U4 List
  - Includes ebooks and videos
  - Must have an educator user account for free access

Back to Top of Page

Learning Sequence 1		
Brief Description: Changes in the amount of sunlight trigger changes in plant responses and animal behaviors. In this sequence, we elicit students conceptions of sunlight, seasonal patterns, and living things. Students revisit the concept of seasonal patterns through the lens of the amount of daylight they investigated in the *Unit 1- Patterns of the Sun and Moon* (Learning Sequence 5) in order to make connections on how living organisms prepare for or respond to seasonal changes. Students will discuss their ideas about how sunlight affects living things, view a video showcasing seasonal changes in the forest, and engage in science talk to discuss their understanding of how the two (daylight and living things) are related. This sets the stage for exploring how organisms prepare for changing seasons.		
Suggested Pacing: 0.5 - 1 hr		
Lesson-Level Phenomenon/Design Problem: Daylight hour data		
Relationship to Anchoring Phenomena/Design Problem: Students recognize and connect the patterns of seasonal changes to daylight intensity.		
Learning Sequence Driving Question: How can seasonal patterns be described?		
Student Expected Outcomes: ● Students will make connections between the changing intensity of daylight over a year to the patterns of seasonal changes in a deciduous forest biome.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Constructing Explanations and Designing Solutions** ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1) **Planning and Carrying Out**	**Disciplinary Core Ideas:** **ESS1.B: Earth and the Solar System** ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) (1-LS3-1) (1-ESS1-2)

Back to Top of Page

Investigations ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)		

Related Performance Expectation(s) in this Unit:

- 1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
  - [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
  - [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

Possible Common Core State Standards Connections:

ELA /Literacy -

- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-2) Mathematics —
- MP.2 Reason abstractly and quantitatively. (1-ESS1-2)
- MP.4 Model with mathematics. (1-ESS1-2)
- MP.5 Use appropriate tools strategically. (1-ESS1-2)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)

Prior Student Knowledge:

- K-ESS2-1 Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time.
- K-ESS3-1 Living things need water, air, and resources from the land, and they live in places that have the things they need.

Possible Preconceptions/Misconceptions:

- The amount of daylight is the same every day.
- Students may think that changes in temperature, rather than in light, cause seasonal cycles in plants and animals.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Back to Top of Page

Activity Description:

- Showcase the ongoing class daylight hour data collected throughout the year (If class data is incomplete, use *Hartford Sunrise/Sunset Times Online or Sample bar graph*).
- Engage the students in an *All Class Science Talk* (sitting in a circle).
- Ask students: How do the changing amounts of sunlight affect living things?
    - Ask the students to think about their ideas silently for 1-2 minutes. Then ask all of the students to face one another.
    - In *All Class Science Talk*, students will share their experiences or discuss the data presented.
    - Students should facilitate the discussion. This is not something the students are used to doing.
    - Allow the students to share and relate to the prompt.

Resources:

- Hartford Sunrise / Sunset Times Online or Sample bar graph
- All Class Science Talk

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:

- After the students share their ideas, show the students the video: *15 month seasonal changes in a forest*.
- As the students watch the video, keep the daylight data posted or accessible to students.
- Break class into eight groups, two groups for each season.
- Assign each group a specific season and instruct each group to watch what happens during their season in order to complete a follow up activity.
    - While video shows the changes to the living things very nicely, the relative amounts of daylight are not readily noticeable. As each season is shown on the video clip, help the students to call attention to the daylight data and to discuss the data and the seasonal changes.
    - Prompt the students to make observations of each season.
        - What did you notice? Both seen and unseen tapping into students' prior knowledge
        - Imagine what animals might live in this forest
        - How intense is the sunlight during each season?
        - What are you wondering?
- Chart the student responses without discussion of ideas. Is the amount of daylight linked to what is occuring to the living things in the video? Tap into what the students know based on their previous work, such as the changes in the amount or intensity of daylight, temperature changes, the life cycle of the vegetation in the video.
- After viewing the video and the daylight data, show the class the provided *Seasons Model* and instruct groups to add to the picture to depict their season.

Back to Top of Page

- Keep posters so that students can add or modify details as new learning occurs.

Resources:
- 15 month seasonal changes in a forest
- Teacher Background for presenting the video
- Seasons Model (print on 11" x 17" sheet)

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

Additional Resources:
- G1 Unit Materials List
  - Click on specific tab for unit-specific materials

Back to Top of Page

Learning Sequence 2		
Brief Description: Students learn what it is like to be a field biologist. They will study the different living things in the local region or deciduous biome in order to generate a field guide. Using a variety of media, students will investigate how living things change with the seasons and record these findings on the pages of the field guide. Students will share their research with their peers and differentiate between needs for survival and behaviors for survival.		
Suggested Pacing: 4 - 4.5 hrs		
Lesson-Level Phenomenon/Design Problem: *First Snow in the Woods* by Carl R. Sams II and Jean Stoick: How do living things change with the seasons?		
Relationship to Anchoring Phenomena/Design Problem: Students learn what it is like to be a field biologist. They study the different living things in the local region or deciduous biome in order to generate a field guide. Using a variety of media, students investigate how living things change with the seasons and record these findings on the pages of the field guide.		
Learning Sequence Driving Question: How do living things prepare and behave in order to survive in the different seasons?		
Student Expected Outcomes: ● Students will use observations to describe and communicate their understanding of seasonal changes/patterns in a deciduous forest biome/local region. ● Students will describe the patterns of behavior that promote survival in the different seasons.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Obtaining, Evaluating, and Communicating Information** ● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) **Constructing Explanations and Designing Solutions** ● Make observations	**Disciplinary Core Ideas:** **LS1.B: Growth and Development of Organisms** ● Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) (1-LS3-1) (1-ESS1-2)

Back to Top of Page

(firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS2-1)(1-LS3-1)		

Related Performance Expectation(s) in this Unit:

- 1-LS1-2 Read texts and use media to determine patterns in the behavior of parents and offspring that help offspring survive.
    - [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

Possible Common Core State Standards Connections:

ELA/Literacy -

- RI.1.1 Ask and answer questions about key details in a text. (1-LS1-2)(1-LS3-1)
- RI.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)
- RI.1.10 With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)

Mathematics -

- 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

Prior Student Knowledge:

K-ESS2-1, K-ESS3-1, K-LS1-1

Possible Preconceptions/Misconceptions:

Students may believe that:

- changes in temperature, rather than in light, cause seasonal cycles in plants and animals.
- all animals migrate or hibernate in winter.
- that if there is snow it is winter.
- if it is warm, it is summer.
- months are the same as seasons.

Back to Top of Page

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

- Read/picture walk the text-*First Snow in the Woods* by Carl R. Sams II and Jean Stoick.
  - Questions prompts:
    - What is the weather like in this picture? (snowy, cold)
    - What season is this? (winter) What's your evidence?/How do you know that?
  - Model your thinking about.
    - I wonder how the deer stay warm.
    - I wonder what they eat in the winter.
  - Explain to the students this photo book contains a lot of information about when winter comes to the forest what changes occur and how various animals prepare for winter.
    - What is different in a forest in the winter compared to the summer?
    - Do you think that deer prepare for the winter? How about other animals?
    - Do you wonder about anything else about life in the forest when winter starts?
  - During the Reading: Ask students to turn and talk to a partner - Record student responses.
    - Is it summer, fall or winter? What clues are there in this picture?
    - Can you tell if it is warm or cool? How do you know?
    - What do you notice about the plants?
    - When have you seen plants look like/do that?
    - Are there any changes in the animals/birds/insects?
    - What else do you notice?
- After reading the text, elicit student ideas about animal and plant responses/ behaviors in the different seasons.
- Divide the students into small groups.
  - Provide each group with a different prompt. Some potential prompts are listed below. You may need to help students think of specific animals. Allow students to discuss their ideas about their prompt.
    - How do ANIMALS change throughout the year?
    - How do PLANTS change throughout the year?
    - How do PLANTS know the season is changing?
    - How do ANIMALS know how the season is changing?
- Ask the class to think about any patterns they notice for how the plants and animals are able to survive and how parents help their offspring.
- Chart students initial ideas by season. *(Possible student ideas - temperature changes, weather events, changing tree colors, grass turns brown, trees and shrubs/bushes lose their leaves, see lots of birds flying in groups south, lots of acorns on the ground, flowers coming up, new leaves on trees/bushes/shrubs, longer or short daylight hours, etc. Possible ideas for behaviors: building nests/dens, bringing food back to young, etc)*

Resources:

- *First Snow in the Woods* by Carl R. Sams II and Jean Stoick (may be available as a Youtube read)

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

Back to Top of Page

- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)

Activity Description:

- Present these images of summer and winter in a deciduous forest.
- Student groups discuss what plants and animals are seen or could live in each scene.
- Students record their ideas.
- After the students record their thinking, have the different student groups share out their ideas about the living things that would be found in each of the scenes, each group should have two separate lists. As students share out, they should be providing a rationale for their ideas.
    - Teacher Background: Animals and Plants that change with the Seasons - deciduous forest and pond biomes
- Prompt deeper thinking and ask the students:
    - Do plants and animals live/behave differently in summer and winter?
- Allow the students time to turn and talk. After a few minutes, have the students share their ideas with the whole class.
- Let the student know that they are going to research some plants and animals that live in a deciduous forest to better understand how living things change with the seasons.

Resources:

- [Images of summer and winter in a deciduous forest]
- [Teacher Background: Animals and Plants that change with the Seasons]

Teacher Action(s):

- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students’ investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):

- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)

Activity Description:

- Show students a variety of field guides (epic! Books has some examples) and point out the important features of a field guide.
    - How do they help people understand all of the different living things in our region?
    - What types of information do the field guides contain?
- Students select a living thing from a deciduous forest or your school yard:
    - Provide students a small list of animals to choose from, include a plant (can select more than one type), mammal, bird, amphibian, fish and reptile if possible - such as: oak tree, squirrel, cardinal, chickadee, bear, trout, frog, snake.

Back to Top of Page

    - *Assign the species to multiple students. The students can generate their own field guide pages (without collaboration). In the Elaborate phase, students with the same species can share their field guide pages and identify the behaviors that the living thing has that help it to survive in the different seasons.*
  - Ask the library media specialist to pull texts on the different living things or find on epic! Books.
  - epic! Books also has a collection of season books:
    - *What happens in Winter?*
    - *What happens in Spring?*
    - *What happens in Summer?*
    - *What happens in Fall?*
    - Each text focuses on a different subset of living things and are "just right" books for grade one.
- Students create a field guide for the changes that these living things exhibit over the different seasons using the *Field Guide Template*.
- Each small student group can focus on a specific living thing, or each student can focus on their own animal or plant.
- In the end, the class will generate its own complete fieldbook for your specific to region or school yard.

Additional Information:
This Explain phase takes several science lessons to complete. Each day can focus on a different season or aspect of the field guide. With the class, generate a page of the field guide together with the students as a model for the content that goes in each of the fields of the guide. Only the season research pages from the *Field Guide Template* should be completed at this point.
- What are the parts of a field guide? What does a complete page look like?
- Season research/writing (slides 3-6)
- Compare parent and offspring (slides 8 or 9) - coming in Learning Sequence 3
- Parents help offspring survive (slide 10) - begin learning in Elaborate but complete slide in Learning Sequence 3

Resources:
- epic! Books
- Field Guide Template

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: deciduous, winter, summer, seasons, changes, biome, hibernation, migration, behavior, survival

ELABORATE (Applications / Extensions)
Activity Description:

Back to Top of Page

- Discuss the term "survival" with the students.
- Ask students to share their ideas about what different living things need to survive. This is a direct connection to Unit 1 in Kindergarten-Mystery Class Pet.
    - Help students to understand that certain behaviors or responses (baby cries/parent brings food) can help living things survive and get the things they need (food and water).
- Students share their field guides with their peers. If multiple students researched the same living thing, have those students share their field guide pages with one another.
    - As a group the students should identify the behaviors or responses their organism has between parents and offspring that help it survive.
    - After the small groups have come to consensus about the behaviors essential to the survival of their living thing, have the group share their findings with the whole class.
- Chart the major behaviors/responses (ex: feeding, comforting, protecting, migrating, hibernating).
- Prompt student discussion about behavior and survival as each living thing is showcased. After the behaviors and response have been charted, encourage the students to identify patterns of survival behaviors/responses (can be seasonally driven).

Resources:
- epic! Books

Teacher Action(s):
- Expects the students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
Formative Monitoring Description(s):
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.
- ❏ **SEP:** *Obtaining, Evaluating, and Communicating Information; Constructing Explanations and Designing Solutions*
- ❏ **DCI:** *LS1.B: Growth and Development of Organisms*
- ❏ **CCC:** *Patterns*

Summative Assessment Description(s):
- Student field guides and corresponding discussion related to behavior and survival.

Additional Resources:
- G1 Unit Materials List
    - Click on specific tab for unit-specific materials
- How plants change with the seasons

Back to Top of Page

Learning Sequence 3		
Brief Description: In this lesson sequence, students explore how the offspring of both animals and plants are similar, yet different from their parents. Key features distinguish living organisms from each other such as: animals versus plants, size and shape of body parts, color, different structures like hair, leaf shape, stem rigidity, etc. Students identify the similarities and differences between young and adult versions of living things and record these ideas in their field guides. Students also come to understand that there is a pattern of development that all living things experience as they live and grow, in that not only do the offspring look like their parents, but parents and offspring have specific behaviors that help the offspring survive. For example, a baby cries and in response, the parent feeds the child. To continue in their role as field biologists, students record the ways in which parents help their assigned offspring to survive.		
Suggested Pacing: 3 - 3.5 hrs for 5Es 0.75 - 1.25 hrs for Culminating Performance Task		
Lesson-Level Phenomenon/Design Problem: *Are you my Mother?* by PD Eastman - Students engage with the text to determine distinguishing features that help us match offspring to parents.		
Relationship to Anchoring Phenomena/Design Problem: Students explore how the offspring of both animals and plants are similar, yet different from their parents.		
Learning Sequence Driving Question: How are offspring similar and different from their parents?		
Student Expected Outcomes: ● Students will observe images or specimens and obtain information from texts to prove that animals and their offspring are similar yet different. ● Students will describe patterns in behaviors of parents in response to their offspring's cues.		
CONNECTIONS TO STANDARDS		
Three Dimensions Related to the Specific Learning Performance(s):		
Science & Engineering Practices: **Planning and Carrying Out Investigations** ● Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-LS3-1)	**Disciplinary Core Ideas:** **LS1.B: Growth and Development of Organisms** ● Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in	**Crosscutting Concepts:** **Patterns** ● Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) (1-LS3-1)

Back to Top of Page

Constructing Explanations and Designing Solutions ● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS2-1) (1-LS3-1) **Analyzing and Interpreting Data** ● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-LS3-1)	behaviors that help the offspring to survive. (1-LS1-2) **LS3.A: Inheritance of Traits** ● Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1) **LS3.B: Variation of Traits** ● Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)	(1-ESS1-2)

Related Performance Expectation(s) in this Unit:

- 1-LS1-2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
  - [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]
- 1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
  - [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.]
  - [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

Possible Common Core State Standards Connections:

ELA/Literacy -
- RI.1.1 Ask and answer questions about key details in a text. (1-LS1-2)(1-LS3-1)
- RI.1.2 Identify the main topic and retell key details of a text. (1-LS1-2)
- RI.1.10 With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2)
- W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS3-1)(1-ESS1-2)
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)(1-ESS1-2)

Mathematics -
- 1.NBT.B.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)
- 1.NBT.C.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings

Back to Top of Page

and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)

- 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- 1.NBT.C.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)
- 1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2)
- 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2)
- MP.2 Reason abstractly and quantitatively. (1-LS3-1)(1-ESS1-2)
- MP.4 Model with mathematics.(1-ESS1-2)
- MP.5 Use appropriate tools strategically. (1-LS3-1)(1-ESS1-2)

Possible Preconceptions/Misconceptions:

- All baby animals look the same.
- Baby animals look exactly like the parents and/or baby animals look nothing like their parents.

LESSON PLAN – 5-E Model

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)

Activity Description:

Part 1- Animal Focus

- Read aloud *Are you my Mother?* by P.D. Eastman to set the stage for thinking about how we know parents and their offspring.
- Ask students: What characteristics could Baby Bird have looked for before asking "Are you my mother?"
    - List the characteristics that the students brainstorm, such as a bird, not a cow, not a plane, body parts, coloring, feathers, lives in a nest, etc.

Resources:

- *Are you my Mother?* by P.D. Eastman (may be available as a Youtube read)

Teacher Action(s):

- Creates interest
- Generates curiosity
- Raises questions
- Elicits responses that uncover what the students know or think about the concept

Student Action(s):

Back to Top of Page

- Asks questions such as, “Why did this happen?” “What do I already know about this?” “What can I find out about this?”
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
Part 1 - Animal Focus
- Have the students view the video *Animal Parents and Babies*.
    - Prompt students to share some of the similarities and differences they notice specific to the animals when the video prompts you.
- Ask the students to work in partnerships to create a comparison of parents and offspring from the video through *Similarities and Differences between Animal Parents and their Babies Graphic Organizer*.
- Provide a forum for the students to share their listed similarities and differences.

Resources:
- Animal Parents and Babies video
- Similarities and Differences between Animal Parents and their Babies Graphic Organizer

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students’ investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Activity Description:
Part 1 - Animal Focus
- Read a book about baby animals - there are several series available on epic! Books. Some options are listed in Resources.
- Refer back to the list of characteristics the students created in the Engage and the similarities and differences from the video.
    - Explain that these features help us understand how offspring/babies are similar to their parents.

Resources:
- Baby Gorillas by Mark Elizabeth Salzmann on epic! Books
- Animal Mothers by Bobbie Kalman on epic! Books
- Penguin Chicks by Julie Murray on epic! Books

Teacher Action(s):

Back to Top of Page

- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: parent, similar, different, offspring, patterns, features, same, types, size

ENGAGE (Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions)
Activity Description:
Part 2 - Plant Focus
- *THIS REQUIRES ADVANCE PLANNING!*
  - One month prior to running this lesson, plant a variety of seeds (kale, radish and snap peas are quick to mature).
    - *DO NOT USE COMMERCIAL GRADE SOIL* because it may contain chemicals harmful to students. Organic soil must be used in the classroom.
  - Once the seeds become seedlings, plant a second set of the same plants (2-3 weeks later).
- Once you have a mature plant and a seedling, let the students know that there has been a mix-up and you forgot to label the second set of plants.
  - We need to know which seedling matches the adult plant, so we can put it in the proper place for it to grow into the adult plant in our garden.
  - Let the students know that you are hoping that seedlings and adult plants have similar enough characteristics so that we can determine the type of plant each of the seedlings are.
  - As a class, have the students explore the plants and seedlings, then come back together to decide which plants match which seedlings.
- Ask students: How do I know which seedling is the offspring of the adult plant?
- Chart the student ideas, set it aside as you will refer back to it as you move through the learning sequence.
- If growing plants is not an option, there are several series on epic! Books that show a wide variety of plants growing.

Resources:
- Plant Life Cycles by Julie Lundgren
- See It Grow series on epic! Books - many options
  - Apple (See It Grow) by Dawn Bluemel Oldfield
- Watch A _____ Grow series on epic! Books - many options
  - Watch a Pumpkin Grow by Kirsten Chang

Teacher Action(s):
- Creates interest
- Generates curiosity
- Raises questions

Back to Top of Page

- Elicits responses that uncover what the students know or think about the concept

Student Action(s):
- Asks questions such as, "Why did this happen?" "What do I already know about this?" "What can I find out about this?"
- Shows interest in the topic

EXPLORE (Lesson Description / Materials Needed / Probing or Clarifying Questions)
Activity Description:
Part 2 - Plant Focus:
- Revisit *Plant Secrets* with the class, reviewing Unit 3 LS2 - Elaborate - where the students had to identify the plant parts for the oak tree, the rose bush, the tomato plant and the pea plant. Discuss what features would help them know if the plant was a young beginning plant versus a full grown plant.
- Students work with a partner to look for patterns in the images between an adult plant and a young plant using *Plant Secrets Venn Diagram*.
  - Students should notice patterns in the size of the plant, leaf size, stem size (rigidity - can it support the weight of its leaves and fruit). Have the students use these patterns to their research.
- The students will be creating field guide pages on an animal and a plant with their offspring including an explanation about how the parent and its offspring are alike and different.

Resources:
- *Plant Secrets* by Emily Goodman on epic! Books
- Plant Secrets Venn Diagram

Teacher Action(s):
- Encourages the students to work together without direct instruction from the teacher
- Observes and listens to the students as they interact
- Asks probing questions to redirect the students' investigations when necessary
- Provides time for the students to puzzle through problems
- Acts as a consultant for students

Student Action(s):
- Thinks freely, within the limits of the activity
- Test predictions and hypotheses
- Forms new predictions and hypotheses
- Tries alternatives and discusses them with others
- Records observations and ideas
- Suspends judgement

EXPLAIN (Concepts Explained / Vocabulary Defined)
Part 2 - Plant Focus:
Activity Description:
- Students add content to their *Field Guide Template* (slide #8 or 9) that describes how the parent and offspring are similar and how the parent and offspring are different.
- Students need access to online resources featuring parents and offspring or text. Contact the Library Media Specialist for assistance in finding texts related to the species the students are using in their field guides.
  - Key features distinguish living organisms from each other such as: animals versus plants, size and shape of body parts, color, different structures like hair, leaf shape, stem rigidity, etc.

Back to Top of Page

- Students identify the similarities and differences between young and adult versions of living things and record these ideas in their field guides.

Resources:
- Field Guide Template - Slide 8 or 9

Teacher Action(s):
- Encourages the students to explain concepts and definitions in their own words
- Asks for justification (evidence) and clarification from students
- Formally provides definitions, explanations, and new labels
- Uses students' previous experiences as the basis for explaining concepts

Student Action(s):
- Explains possible solutions or answers to others
- Listens critically to others' explanations
- Questions others' explanations
- Listens to and tries to comprehend explanations the teacher offers
- Refers to previous activities
- Uses recorded observations in explanations

Vocabulary: parent, similar, different, offspring, patterns, features, same, types, size

ELABORATE (Applications / Extensions)

Activity Description:

To continue in their role as field biologists, students record the ways in which parents help their assigned offspring to survive.

- Relate back to the book *Are you my mother?* by P.D. Eastman
  - Help students to understand that many of the potential mothers in the text were not able to help the baby bird to live and grow. There are certain behaviors that a mother and offspring have that helps them meet their needs and survive. Not only do offspring look like their parents, but parents help their offspring survive. In the book, the potential Moms do not have what it takes to help the baby bird survive.
  - Flip through a few of the pages and ask the students,
    - Why might this potential mother be successful or not as a parent to the baby bird?
- After collecting student ideas, share with the students that offspring have certain cues or behaviors that help their parents understand their needs.
  - We know this because naturalists observe animal behavior and with this information they can perhaps tell if the young are being taken care of by the parents or if they have been abandoned.
- Read *What do Bluebirds do?* by Pamela Kirby or *Born in the Wild: Baby Animals* by Rick Raymos. As the students listen, have them identify behaviors that are helping the birds survive or the ways in which the parent helps the offspring.
- After reading the book and discussing in depth the ways in which the parent helps the offspring survive, students complete Slide #10 of their *Field Guide Template*.
  - Students will need access to online resources or texts about their living thing.
- Teacher Notes:
  - To reinforce the Crosscutting Concept of Patterns, be sure to revisit with students that there is a pattern of development that all living things experience as they live and grow, in that not only do the offspring look like their parents, but parents and offspring have specific behaviors that help the offspring survive. For example, a baby cries and in response, the mother feeds the child.

Back to Top of Page

- Plants can actually take care of their offspring Article
    - shading delicate seedlings, making sure that water is absorbed and not evaporated
    - producing lots of seeds
    - producing thick seed coats

Resources:
- *What do Bluebirds do?* by Pamela Kirby
- Born in the Wild: Baby Animals by Rick Raymos on epic! Books
- Field Guide Template - Slide 10
- Teacher Resource: Plants can actually take care of their offspring Article

Teacher Action(s):
- Expects students to use formal labels, definitions, and explanations provided previously
- Encourages the students to apply or extend the concepts and skills in new situations
- Reminds the students of alternate explanations
- Refers the students to existing data and evidence and asks "What do you already know?", Why do you think…?

Student Action(s):
- Applies new labels, definitions, explanations, and skills in new but similar situations
- Uses previous information to ask questions, propose solutions, make decisions, and design experiments
- Draw reasonable conclusions from evidence
- Records observations and explanations
- Checks for understanding among peers

EVALUATE
FORMATIVE MONITORING (Questioning / Discussion)
Formative monitoring will occur at various times throughout this learning sequence. Please note the following SEP, DCI and CCC needs to be monitored throughout the learning sequence.
- ❑ **SEP:** *Planning and Carrying Out Investigations; Constructing Explanations and Designing Solutions; Analyzing and Interpreting Data*
- ❑ **DCI:** *LS2.B: Growth and Development of Organisms; LS3.A: Inheritance of Traits; LS3.B: Variation of Traits*
- ❑ **CCC:** *Patterns*

Summative Assessment Description(s):
- Completed student field guides
- Students discussions and ideas relative to parents and offspring

Culminating Performance Task:
- Students present their Field Guides to the class.
- As students are presenting their Field Guides, the class should be identifying significant patterns that are similar between all organisms (animals and plants).

Resources:
- Field Guide Template

Teacher Resources:

Back to Top of Page

- Teacher Background on Animals and their Babies
- Parenting behaviors of Eastern Bluebirds:
    - Prior to mating the pair finds a safe space to build their nest. The male feeds the female when she is roosting. Once the eggs are hatched both the male and the female find and provide food for the hatchlings, although the male initially does more of this. Over a period of 5 weeks, the parents take care of the baby birds, until they reach the fledgling stage where the parents start teaching them how to survive on their own.

Additional Resources:

- G1 Unit Materials List
    - Click on specific tab for unit-specific materials

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** **February 24, 2022**

Decision Requested ______ **Agenda Code** **11 f.**

AGENDA REPORTING FORM

Agenda Topic: Library Media Proposal for Grades 3-5 - First Reading

Summary of Issue: The Curriculum & Instruction Committee has reviewed Library Media Proposal for Grades 3-5

Background: ______

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the Library Media Proposal for Grades 3-5 to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal

Frank Pepe
Signature of Staff Member Submitting Report

Steven Madancy
Signature of Superintendent of Schools

Unit Overview	
Unit Title:	**Innovative Designing**
Teacher:	Media Specialist
Grade Level/Course:	3-5
Length/Dates:	December-February
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will follow the design process to identify a problem, develop solutions, construct a product, revise using feedback and reflect on learning.

Stage 1: Desired Results

Standard(s) List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address
ISTE 4a: Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

Other Goal(s) List the content transfer goals that this unit will address
Technology Skills Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and make responsible choices.

Transfer Goals List the long-term and/or school-wide independent student behaviors that this unit will address.
Critical Thinking: Problem Solving/Solution Finding Describes the function of the whole system, names all of the parts, describes the function of each part, and predicts what would happen if a part is missing.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	Coding is a creative process completed by programmers, in which they tell a device or machine how to perform a specific task through a set of sequential instructions.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	What is coding?

What will students <u>know</u> Factual information, vocabulary and basic concepts related to each indicator	**What will students <u>be able to do</u>** Skills, processes and/or knowledge that are related to each indicator and which students will be able to use in new contexts/with new material
<u>Grade 3 - 5</u> ● Coding ● Programming ● Sequencing	**<u>Grade 3</u>** ● Create an algorithm in a coding program. ● Follow the design process. ● Persevere through problems and setbacks. ● Work with a group to complete a task. **<u>Grade 4</u>** ● Work in a group to solve a problem. ● Plan out a program. ● Complete the steps of designing a program. ● Persevere with a problem until it is solved. ● Engage in more complex coding. ● Explain the problem solving process in words. **<u>Grade 5</u>** ● Work in a group to solve a problem. ● Plan out a program. ● Complete the steps of designing a program. ● Persevere with a problem until it is solved. ● Engage in more complex coding. ● Make a variety of programs that offer choices for the user. ● Explain the problem solving process in words.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce?
Students will be able to complete a task which shows their understanding of basic coding/programming skills. Troubleshoot a code that doesn't work.

Evaluative Criteria How will you evaluate this task? How will you provide feedback to students?
● Checklist of skills students use when completing a projects/tasks ● Teacher observation

Coding How does this activity connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this activity provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.
You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources Any materials and resources related to the performance task that the teacher or student would need to be successful.
○ Code.org ○ LightBot.com ○ Scratch.mit.edu ○ Dash & Dot Robots ○ Beebots ○ Ozobots ○ Math is Fun Binary Code ○

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Disclaimer: Resources vary between schools. All schools have access to code.org, LightBot, and Scratch.

Other Evidence

Assessment Evidence
Include other assessment strategies such as tests, quizzes, exit tickets, and any other strategies you may use as information-recall.

- Exit tickets

Evaluative Criteria
How will you evaluate this assessment? How will you provide feedback to students?

- Exit tickets will be made using Google Forms set up as a quiz to assign point values and give feedback to students.

Coding
How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources
Any materials and resources related to the assessment that the teacher or student would need to be successful.

Google Forms

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 3: Instructional Design

Design EACH activity for the unit.

Activity Lesson Planning

Hook
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"
 	
Describe what you will do and what the students will do.
While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose.
 	
Main Lessons for this unit are from Code.org. Create a teacher account to view lesson plans. Students do NOT need accounts to complete the lessons.
 	
Grade 3 (12 Lessons)
Teach Course 2 Lessons 1-11 from Code.org (Course D has additional lessons for grade 3 if needed.)
 	
• Lesson 1: Graph Paper Programming
  ○ Graph Paper Programming
 	
• Lesson 2: Real-life Algorithms: Paper Planes
  ○ Real-Life Algorithms | Paper Airplanes
 	
• Lesson 3: Maze: Sequence
  ○ Maze: Sequence
  ○ Maze: Sequence #1 | Course 2 - Code.org
 	
• Lesson 4: Artist: Sequence
  ○ Artist: Sequence
  ○ Artist: Sequence #1 | Course 2 - Code.org
 	
• Lesson 5: Getting Loopy
  ○ Getting Loopy
 	
• Lesson 6: Maze: Loops
  ○ Maze: Loops
  ○ Maze: Loops #1 | Course 2 - Code.org
 	
• Lesson 7: Artist: Loops
  ○ Artist: Loops
  ○ Artist: Loops #1 | Course 2 - Code.org
 	
• Lesson 8: Bee: Loops
  ○ Bee: Loops
  ○ Bee: Loops #1 | Course 2 - Code.org
 	
• Lesson 9: Relay programming
  ○ Relay Programming
 	
• Lesson 10: Bee: Debugging
  ○ Bee: Debugging
  ○ Bee: Debugging #1 | Course 2 - Code.org

- Lesson 11: Artist: Debugging
    - Artist: Debugging
    - Artist: Debugging #1 | Course 2 - Code.org

Grade 4 (11 Lessons)
Teach Course 2 Lessons 12-17, 19 and Course 3 Lessons 1-3 from Code.org (Course E has additional lessons for grade 4 if needed.)

- ***Course 2 Lessons***
    - Lesson 12: Conditionals
        - Conditionals with Cards
    - Lesson 13: Bee: Conditionals
        - Bee: Conditionals
        - Bee: Conditionals #1 | Course 2 - Code.org
    - Lesson 14: Binary Bracelets
        - Binary Bracelets
    - Lesson 15: The Big Event
        - The Big Event
    - Lesson 16: Flappy
        - Flappy
        - Flappy #1 | Course 2 - Code.org
    - Lesson 17: Play Lab: Create a Story
        - Play Lab: Create a Story
        - Play Lab: Create a Story #1 | Course 2 - Code.org
    - Lesson 19: Artist: Nested Loops
        - Artist: Nested Loops
        - Artist: Nested Loops #1 | Course 2 - Code.org
- ***Course 3 Lessons***
    - Lesson 1: Computational Thinking
        - Computational Thinking
    - Lesson 2: Maze
        - Maze
        - Maze #1 | Course 3 - Code.org
    - Lesson 3: Artist
        - Artist
        - Artist #1 | Course 3 - Code.org

Grade 5 (11 Lessons)
Teach Course 3 Lessons 5-8 and 11-17 from Code.org (Course F has additional lessons for grade 5 if needed.)
- Lesson 5: Artist: Functions
    - Artist: Functions
    - Artist: Functions #1 | Course 3 - Code.org
- Lesson 6: Bee: Functions
    - https://code.org/curriculum/course3/6/Teacher
    - Bee: Functions #1 | Course 3 - Code.org
- Lesson 7: Bee: Conditionals

- Bee: Conditionals
- Bee: Conditionals #1 | Course 3 - Code.org

- Lesson 8: Maze: Conditionals
  - Maze: Conditionals
  - Maze: Conditionals #1 | Course 3 - Code.org

- Lesson 11: Artist: Nested Loops
  - Artist: Nested Loops
  - Artist: Nested Loops #1 | Course 3 - Code.org

- Lesson 12: Farmer: While Loops
  - Farmer: While Loops
  - Farmer: While Loops #1 | Course 3 - Code.org

- Lesson 13: Bee: Nested Loops
  - Bee: Nested Loops
  - Bee: Nested Loops #1 | Course 3 - Code.org

- Lesson 14: Bee: Debugging
  - Bee: Debugging
  - Bee: Debugging #1 | Course 3 - Code.org

- Lesson 15: Bounce
  - Bounce
  - Bounce #1 | Course 3 - Code.org

- Lesson 16: Play Lab: Create a Story
  - Play Lab: Create a Story
  - Play Lab: Create a Story #1 | Course 3 - Code.org

- Lesson 17: Play Lab: Create a Game
  - Play Lab: Create a Game
  - Play Lab: Create a Game #1 | Course 3 - Code.org

Formative Assessments
Provide clear, descriptive, actionable feedback for students and provide feedback to teachers in order to adjust instruction

GRADE 3 ASSESSMENT: https://forms.gle/XP2wuodp4UMitP9P9

GRADE 4 ASSESSMENT: https://forms.gle/CQYrzcRKNstazwH68

GRADE 5 ASSESSMENT: https://forms.gle/6eEETLfyhineNXMZ7

Extension/Modification
Differentiated experiences that provide opportunities for students to engage in active learning around the learning target(s)

Coding
How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources
Support varied student needs and learning styles and include a range of media and print materials.

Suggested Resources
-

Suggested Technology Integration
-

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 4: Reflection

Note: This reflection stage is not done at the time the unit is written. It would be completed as teachers implement the unit. Gather both student and teacher feedback to use in refining the unit.

Student Reflection Provides an opportunity for students to reflect on learning and progress toward indicators; occurs throughout and at the end of a unit; incorporates goal setting

Teacher Reflection Provides an opportunity for teachers to reflect on instruction and student progress toward indicators; occurs throughout and at the end of the unit; is based on student learning and engagement data; can result in changes to the unit, to instructional practice, or both

Unit Overview	
Unit Title:	**Research & Information Literacy**
Teacher:	Media Specialist
Grade Level/Course:	3-5
Length/Dates:	March, April, and May
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students generate questions about a topic and locate materials in order to find answers. Students will identify and use different sources of information, paraphrase and organize information, and credit sources. Students will use technology to create a product that will be shared with appropriate audiences.

Stage 1: Desired Results

Standard(s) List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address
ISTE 3a: Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

Other Goal(s) List the content transfer goals that this unit will address
<u>Research and Reading Skills</u> • Locate pertinent information from varied sources (print and digital) for various reasons (inform vs. enjoyment). <u>Creative Communicator</u> • Participate in meaningful learning experiences by expressing themselves for a variety of purposes using platforms, tools, and digital media.

Transfer Goals List the long-term and/or school-wide independent student behaviors that this unit will address.
<u>Communication: Using 21st Century Communication Tools</u> • When appropriate, uses digital media and environments to enhance oral and written communication, support individual learning, and contribute to the learning of others.

Enduring Understanding(s): What are the big picture understandings that are transferable across	Research is a way of gathering new information, new understanding, and new facts and sharing that information with others.

contexts, places, and times?	

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	● What is research?

What will students know Factual information, vocabulary and basic concepts related to each indicator	**What will students be able to do** Skills, processes and/or knowledge that are related to each indicator and which students will be able to use in new contexts/with new material
Grade 3 - 5 ● Sources of information ● Online databases ● Research strategies ● Presentation	**Grade 3** ● Explore and choose from a variety of pre-selected resources to develop and expand knowledge on a topic ● Develop, with guidance, research questions to support a research project ● Develop basic keywords from the research questions to assist in finding information in print and digital environments ● Use digital sources to locate research material ● Evaluate and select information/media based on usefulness and relevance ● Take bulleted notes to paraphrase information to answer research questions ● Cite sources ● Create final product and share with identified audience **Grade 4** ● Explore and choose from a variety of resources to develop and expand knowledge on a topic ● Develop, with guidance, research questions to support a research project ● Develop and/or combine keywords to investigate a research question in print and digital environments ● Evaluate and select information/media based on usefulness and relevance ● Take notes and paraphrase information from two or more sources to answer research questions

	- Analyze and reflect on note taking progress in order to define further research - Cite sources - Create final product and share with identified audience **<u>Grade 5</u>** - Explore and choose from a variety of resources to develop and expand knowledge on a topic - Collaboratively develop research questions to support a research project - Develop, combine, and/or expand keywords to investigate a research question in digital environments throughout the research process - Evaluate and select information based on usefulness and relevance - Evaluate websites for credibility - Using a variety of print and/or digital graphic organizers, take notes from multiple sources in order to answer the research questions - Analyze and reflect on note-taking progress in order to define further research - Cite sources - Create final product and share with identified audience - Self -evaluate the research product and process using teacher-created scales/rubrics

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce?
Students will be able to showcase their research and share with others utilizing digital presentation software.

Evaluative Criteria How will you evaluate this task? How will you provide feedback to students?
Informal Checklist: ● Participate in developing questions on a topic ● Participate in determining which questions are most important for their learning ● Develop a plan and use feedback to make changes Summative Assessment: ● Show learning through presentation of the final product using a Google Slides Presentation rubric or a teacher created rubric based on project criteria.

Coding How does this activity connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this activity provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.
You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources Any materials and resources related to the performance task that the teacher or student would need to be successful.
● Online databases purchased by SPS ● Library Books/e-books (EPIC, Bookflix) ● Various websites 11 Great Safe Search Engines ● Presentation Software ○ Google Docs ○ Google Slides ○ Google Sites ○ Prezi ○ Padlet

- Flipgrid

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Disclaimer: Timeline varies by school as some schools/teachers collaborate with Media to complete a research project. (Examples: Famous Nutmeggers, Explorers, Kid Governor, Science Invention Convention, Global Read Aloud)

Other Evidence

Assessment Evidence
Include other assessment strategies such as tests, quizzes, exit tickets, and any other strategies you may use as information-recall.

Small group/individual check-ins during research

Evaluative Criteria
How will you evaluate this assessment? How will you provide feedback to students?

Feedback will be provided orally during research check-ins

Coding
How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources
Any materials and resources related to the assessment that the teacher or student would need to be successful.

N/A

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 3: Instructional Design

Design EACH activity for the unit.

Activity
Lesson Planning

Hook
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"

Learning research skills will give students a skill that will serve them over a lifetime. You use research in your everyday lives as you attempt to absorb ever-increasing amounts of information.

Describe what you will do and what the students will do.
While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose.

This is an individual inquiry project and encompasses global issues. Resources for mini units are books located in the library.

- Week 1- Students choose a topic or come in with a given topic (if it's a collaborated unit). Explain the relevancy, discuss the given sites/databases to utilize.
- Weeks 2 & 3 Students will gather information/note take using graphic organizers.
- Weeks 4 & 5 Students will apply feedback and begin to organize data for a presentation of some kind.
- Weeks 6-8 Students will create a presentation.
- Weeks 9 & 10 - Students will present their research.

Formative Assessments
Provide clear, descriptive, actionable feedback for students and provide feedback to teachers in order to adjust instruction.

Teacher will fill out the Google Slides Presentation rubric or a customized rubric based on project criteria. Students will be scored using a point scale

Extension/Modification
Differentiated experiences that provide opportunities for students to engage in active learning around the learning target(s)

Modifications:

- Various reading level and text formats for research
- Assisted note taking
- Speech-to-text for typing
- Alternate presentation options

Coding

How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources

Support varied student needs and learning styles and include a range of media and print materials.

Suggested Resources

- Online databases purchased by SPS (PebbleGo)
- Library Books
- E-books (EPIC)

Suggested Technology Integration

- Google Apps for Education

Comments

Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 4: Reflection

Note: This reflection stage is not done at the time the unit is written. It would be completed as teachers implement the unit. Gather both student and teacher feedback to use in refining the unit.

Student Reflection Provides an opportunity for students to reflect on learning and progress toward indicators; occurs throughout and at the end of a unit; incorporates goal setting

Teacher Reflection Provides an opportunity for teachers to reflect on instruction and student progress toward indicators; occurs throughout and at the end of the unit; is based on student learning and engagement data; can result in changes to the unit, to instructional practice, or both

Unit Overview	
Unit Title:	**Technology Operations and Digital Citizenship**
Teacher:	Media Specialist
Grade Level/Course:	3-5
Length/Dates:	September - November
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will follow technology rules and expectations. Students will log into technology devices and use Google Suite (Classroom, Docs, Slides, Sheets, and Draw). Students will demonstrate keyboarding skills. Students will recognize the rights and responsibilities of belonging to the digital world. Students will identify and demonstrate appropriate online behavior and knowledge of how to stay safe online.

Stage 1: Desired Results

Standard(s) List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address
ISTE 2b: Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices. ISTE 1d: Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

Other Goal(s) List the content transfer goals that this unit will address
Technology Skills Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and make responsible choices.

Transfer Goals List the long-term and/or school-wide independent student behaviors that this unit will address.
Communication Using 21st Century Communication Tools When appropriate, uses digital media and environments to enhance oral and written communication, support individual learning, and contribute to the learning of others.

Enduring Understanding(s): What are the big picture understandings that are	Students are quickly becoming avid users of technology and need to learn various technology operations and that being a digital citizen means how to use technology safely and responsibly.

transferable across contexts, places, and times?	

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	How do I use a computer for educational purposes? How does a good digital citizen behave?

What will students know Factual information, vocabulary and basic concepts related to each indicator	**What will students be able to do** Skills, processes and/or knowledge that are related to each indicator and which students will be able to use in new contexts/with new material
Grade 3 - 5 ● assumption ● Online identity ● Community ● Digital citizen ● Alter photos ● Empathy ● Password ● Pledge	**Grade 3** ● Rules and expectations ● Log into device ● Join Learning Management System (Google Classroom or other) ● Develop keyboard skills ● Google Apps for Education ● Create and present using a digital tool ● Participate in Common Sense Media Digital Citizenship grade level lessons **Grade 4** ● Rules and expectations ● Log into device ● Join Learning Management System (Google Classroom or other) ● Identify computer and hardware components ● Develop keyboard skills ● Google Apps for Education ● Create and present using a digital tool ● Participate in Digital Citizenship grade level lessons **Grade 5** ● Rules and expectations ● Log into chromebook ● Join Learning Management System (Google Classroom or other) ● Identify computer and hardware components ● Develop keyboard skills ● Google Apps for Education ● Create and present using a digital tool of choice ● Participate in Digital Citizenship grade level lessons

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce?
Technology Operations: Students will be able to log into chromebook with assistance Login paper and use technology responsibly to learn, create, and participate in the digital world. I can take care of a chromebook Google Slide **Digital Citizenship:** 3rd Grade- 3rd Grade Assessment 3rd Grade Rubric (can be modified for each grade) 4th Grade- 4th Grade Assessment 5th Grade- 5th Grade Assessment

Evaluative Criteria How will you evaluate this task? How will you provide feedback to students?
• Students will take lesson quizzes provided by Common Sense Media and Kahoot! Games • Teacher observation

Coding How does this activity connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this activity provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.
You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources Any materials and resources related to the performance task that the teacher or student would need to be successful.
• Typing Club • Common Sense Media • Brain Pop • Kahoot! Game Collections • Technology Unit Brain Pop Videos • https://www.getepic.com/app/read/37351

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Disclaimer: This unit will/can take longer than expected. There are many bumps that have to be smoothed out when students are first signing on to their chrome books. (New students to the district, updates to sign in software and teachers might need help with technology.) The LMS is often helping teachers put in tech tickets for students' computers in the beginning of the school year.

Other Evidence

Assessment Evidence
Include other assessment strategies such as tests, quizzes, exit tickets, and any other strategies you may use as information-recall.

Participation strategies- I agree, I disagree, thumbs up responses.

Evaluative Criteria
How will you evaluate this assessment? How will you provide feedback to students?

Meeting with groups of students and conferring with them.

Coding

How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources

Any materials and resources related to the assessment that the teacher or student would need to be successful.

Paper for note taking.

Comments

Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 3: Instructional Design

Design EACH activity for the unit.

GRADE 3

Activity
Lesson Planning

Hook
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"

Describe what you will do and what the students will do.
While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose.

- Weeks 1-3: Google Login to Chromebooks:
    - Explain Chromebook rules and expectations. Learn about the chromebooks, 3rd Graders will be given their new passwords for the first time. Google Sign in sheet (Day 1)
    - Student will practice logins during Library time (Day 2)
    - Students will log into Classlink and accept Google Classroom invite (Day 3) Google Classroom Assignment: I can take care of my chromebook
- Weeks 4-8: Digital Citizenship:COMMON SENSE MEDIA
    - Rings of Responsibility (Day 4)
    - This is Me(Day 5)
    - Our Digital Citizenship Pledge(Day 6)
    - The Power of Words(Day 7)
    - Is Seeing Believing (Day 8)
- **Weeks 9:** Students will play Kahoot game on Digital Citizenship
- **Weeks 10-14:** Students will create a Digital Citizenship Google Slide presentation using vocabulary words. Students will make a FlipGrid describing a good Digital Citizen

Formative Assessments
Provide clear, descriptive, actionable feedback for students and provide feedback to teachers in order to adjust instruction
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"
Students will take Digital Citizenship Quizzes through Google Classroom. Grades 1-5

Extension/Modification
Differentiated experiences that provide opportunities for students to engage in active learning around the learning target(s)

Coding

How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources

Support varied student needs and learning styles and include a range of media and print materials.

Suggested Resources

-

Suggested Technology Integration

- Common Sense Media quizzes assigned through GOOGLE CLASSROOM

Comments

Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 4: Reflection

Note: This reflection stage is not done at the time the unit is written. It would be completed as teachers implement the unit. Gather both student and teacher feedback to use in refining the unit.

Student Reflection Provides an opportunity for students to reflect on learning and progress toward indicators; occurs throughout and at the end of a unit; incorporates goal setting

Teacher Reflection Provides an opportunity for teachers to reflect on instruction and student progress toward indicators; occurs throughout and at the end of the unit; is based on student learning and engagement data; can result in changes to the unit, to instructional practice, or both

Stage 3: Instructional Design

Design EACH activity for the unit.

GRADE 4

Activity
Lesson Planning

Hook
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"

Describe what you will do and what the students will do.
While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose.

- **Week 1: Google Login to Chromebooks:**
    - Explain Chromebook rules and expectations. Learn about the chromebooks, Google Sign in sheet Student will practice logins during Library time Students will log into Classlink and accept Google Classroom invite (Day 1)

Weeks 2-7: Digital Citizenship:COMMON SENSE MEDIA *Brainpop videos can be added*
- My Media Choices (Day 2)
- Private and Personal Information(Day 3) - Interland - Mindful Mountain: Share with Care; Tower of Treasure: Secure your Secrets
- Our Online Tracks (Day 4)
- Keeping Games Fun and Friendly (Day 5)
- Be a Super Digital Citizen(Day 6)

- A Creator's Right and Responsibilities - Mix n Mash activity on Digital Passport

- **Week 8:** Students will play Kahoot game on Digital Citizenship
- **Weeks 9-14:** Students will create a Digital Citizenship Google Slide presentation using vocabulary words. Students will make a FlipGrid describing a good Digital Citizen

Formative Assessments

Provide clear, descriptive, actionable feedback for students and provide feedback to teachers in order to adjust instruction

Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"

Students will take Digital Citizenship Quizzes through Google Classroom. Grades 1-5

Extension/Modification

Differentiated experiences that provide opportunities for students to engage in active learning around the learning target(s)

Coding

How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within the Unit Planner. This connects activities with desired outcomes. You do not need to complete the coding outside of Unit Planner.

Resources

Support varied student needs and learning styles and include a range of media and print materials.

Suggested Resources

-

Suggested Technology Integration

- Google Classroom

Comments

Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 4: Reflection

Note: This reflection stage is not done at the time the unit is written. It would be completed as teachers implement the unit. Gather both student and teacher feedback to use in refining the unit.

Student Reflection Provides an opportunity for students to reflect on learning and progress toward indicators; occurs throughout and at the end of a unit; incorporates goal setting

Teacher Reflection Provides an opportunity for teachers to reflect on instruction and student progress toward indicators; occurs throughout and at the end of the unit; is based on student learning and engagement data; can result in changes to the unit, to instructional practice, or both

GRADE 5

Activity
Lesson Planning

Hook
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"

Describe what you will do and what the students will do.
While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY the event is proposed - its purpose.

- **Week 1: Google Login to Chromebooks:**
    - Explain Chromebook rules and expectations. Learn about the chromebooks, Google Sign in sheet Student will practice logins during Library time Students will log into Classlink and accept Google Classroom invite (Day 1)
- **Weeks 2-7:** Digital Citizenship:COMMON SENSE MEDIA *Brainpop videos can be added*
    - Finding My Media Balance (Day 2) Digital Passport - Twalkers
    - You Won't Believe This(Day 3) - Interland - Reality River: Don't Fall for Fake
    - Beyond Gender Stereotypes (Day 4)
    - Digital Friendships (Day 5)
    - Is It Cyberbullying (Day 6) - Interland - Kind Kingdom: It's Cool to be Kind; Digital Passport - Evolve
    - Reading News Online (Day 7)
- **Week 8:** Digital Citizenship Students will play Kahoot game on Digital Citizenship

- **Weeks 9-14:** Students will create a Digital Citizenship Google Slide presentation using vocabulary words. Students will make a FlipGrid describing a good Digital Citizen

Formative Assessments
Provide clear, descriptive, actionable feedback for students and provide feedback to teachers in order to adjust instruction
Encourages students to access prior knowledge; sparks student interest and engagement, and answers the question, "Why do we need to learn this?"
Students will take Digital Citizenship Quizzes through Google Classroom. Grades 1-5

Extension/Modification
Differentiated experiences that provide opportunities for students to engage in active learning around the learning target(s)

Coding
How does this assessment connect to the big picture (standards, transfer goals, understandings, and essential questions)? How does this assessment provide students with the opportunity to practice, apply, and develop their necessary knowledge and skills? List the items identified in Stage 1.

You will complete the coding within Unit Planner. This connects activities with desired outcomes. You do not need to completing the coding outside of Unit Planner.

Resources
Support varied student needs and learning styles and include a range of media and print materials.

Suggested Resources
-

Suggested Technology Integration
-

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

Stage 4: Reflection

Note: This reflection stage is not done at the time the unit is written. It would be completed as teachers implement the unit. Gather both student and teacher feedback to use in refining the unit.

Student Reflection Provides an opportunity for students to reflect on learning and progress toward indicators; occurs throughout and at the end of a unit; incorporates goal setting

Teacher Reflection Provides an opportunity for teachers to reflect on instruction and student progress toward indicators; occurs throughout and at the end of the unit; is based on student learning and engagement data; can result in changes to the unit, to instructional practice, or both

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only ____________________ **Board Meeting Date** February 24, 2022

Decision Requested X **Agenda Code** 11 g.

AGENDA REPORTING FORM

Agenda Topic: Leonard and Gladys Joll Scholarship Committee Appointment

Summary of Issue: The Leonard and Gladys Joll Scholarship applications will be reviewed prior to the April 28, 2022 Board of Education meeting, and a recipient will be selected to be recommended for Board approval.

Background: Annually the chairperson of the Board of Education appoints a committee of the Board to select a recipient for the Leonard and Gladys Joll Scholarship.

Alternative Strategies: Reject

Cost (if applicable): $300.00 **Funding Source:** Joll Scholarship Fund

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Chairperson of the Board will appoint a committee to select a recipient for the Joll Scholarship.

Frank Rips

Signature of Staff Member Submitting Report

Steven Madancy

Signature of Superintendent of Schools

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only ____________ Board Meeting Date February 24, 2022

Decision Requested X Agenda Code 11 h.

AGENDA REPORTING FORM

Agenda Topic: Southington High School Graduation Date

Summary of Issue: The high school graduation date is traditionally set once the last day of school is determined.

Background: The Southington Public Schools were closed three days due to weather:

January 7, 2022, January 20, 2022, February 4, 2022

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: To approve Friday, June 17, 2022 as the date for the Southington High School graduation ceremony.

Steve Madancy

Signature of Superintendent of Schools