Newark Board Of Education

First Grade Science Curriculum

Roger León, Superintendent

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2021

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Office of Teaching and Learning Philosophy

The Office of Teaching and Learning believes that educating our students requires children to pursue learning in ways that are culturally engaging and academically rigorous. In order to accomplish this goal, we understand curriculum as dynamic rather than static. This means the teacher is always in conversation with the curriculum as informed by student voice, needs, strengths, culture, interests, and the world. Curriculum documents are not meant as scripts to dictate what happens each moment in the classroom, but instead serve as guides to create lived moments that are full of invention, inquiry, joy, creativity, and academic rigor. We believe that curriculum should be culturally responsive and sustaining, putting the student at the center of the learning process.

The success of curricular implementation calls for teachers to make informed choices as they use the materials in meaningful and purposeful ways. These choices include, but are not limited to making learning student-centered, differentiating learning, and infusing past and current events to critique the world. Both teachers and students bring with them a wealth of knowledge and experience to the classroom. These experiences are a resource that should be leveraged to make choices that continually invent and reinvent the curriculum.

The Office of Teaching & Learning values:

- Teachers as Intellectuals,
- Culturally Responsive and Sustaining Teaching,
- Equity, and
- Academic Rigor.

The Office of Teaching & Learning affirms the following beliefs:

- We believe in the power and freedom of inquiry, imagination, and joy.
- We believe that all students bring with them valuable knowledge.
- We believe that the knowledge and expertise of teachers is critical to the development, implementation, and success of the curriculum process.
- We believe that teachers should co-construct curriculum with students.
- We believe that teachers are advocates of students.
- We believe in teaching and learning that is culturally responsive and sustaining.
- We believe that teaching, learning, and curriculum, as Bettina Love reminds us, should help students thrive instead of merely survive.
- We believe that teaching, learning, and curriculum should move us toward social justice and a more equitable society.

- We believe teaching, learning, and curriculum should develop the critical consciousness of learners and asks them to identify, analyze, and deconstruct various forms of oppression that affect their lived realities.
- We believe teaching, learning, and curriculum should be trauma-informed and consider the ways young people are affected by their environments.
- We believe, as bell hooks reminds us, that teachers, like any helping professional, are healers and that curriculum should be a reflection of a healing environment.
- We believe that teaching, learning, and curriculum should be anti-racist and help students identify bias, reduce stereotypes, and develop a sense of social justice.
- We believe that curriculum and instruction should be inclusive, valuing all students as an asset to the learning environment.
- We believe in the importance of continuous professional growth for all educators in order to develop a growth mindset and remain intellectually stimulated.
- We believe in the importance of preparing students for college and careers in the twenty first century.

Statement on Culturally Responsive-Sustaining Education

Through a Culturally Responsive-Sustaining Education (CR-SE) framework for curriculum and instruction, each content area includes inquiry-based, culturally responsive, and student-centered prekindergarten to grade twelve curricula that is designed to meet the needs of all students. In a districtwide effort to establish a culture of equity, *Clarity 2020* calls for a "A Rigorous and Relevant Framework for Curriculum & Instruction" (Priority 2). This means reimagining the landscape of teaching and learning to see diversity and difference as indispensable assets that should be leveraged for student engagement in classrooms with high expectations.

Our curriculum draws on the backgrounds, identities, and experiences of our students to make their connections to learning relevant and meaningful. Understanding the role of culture in the process of education means thinking about the ways identity (race, ethnicity, gender, sexual orientation, language, social class, nationality, ability, and religion) influences teaching and learning, gets reflected in the curriculum, and affects each individual student's educational experience.

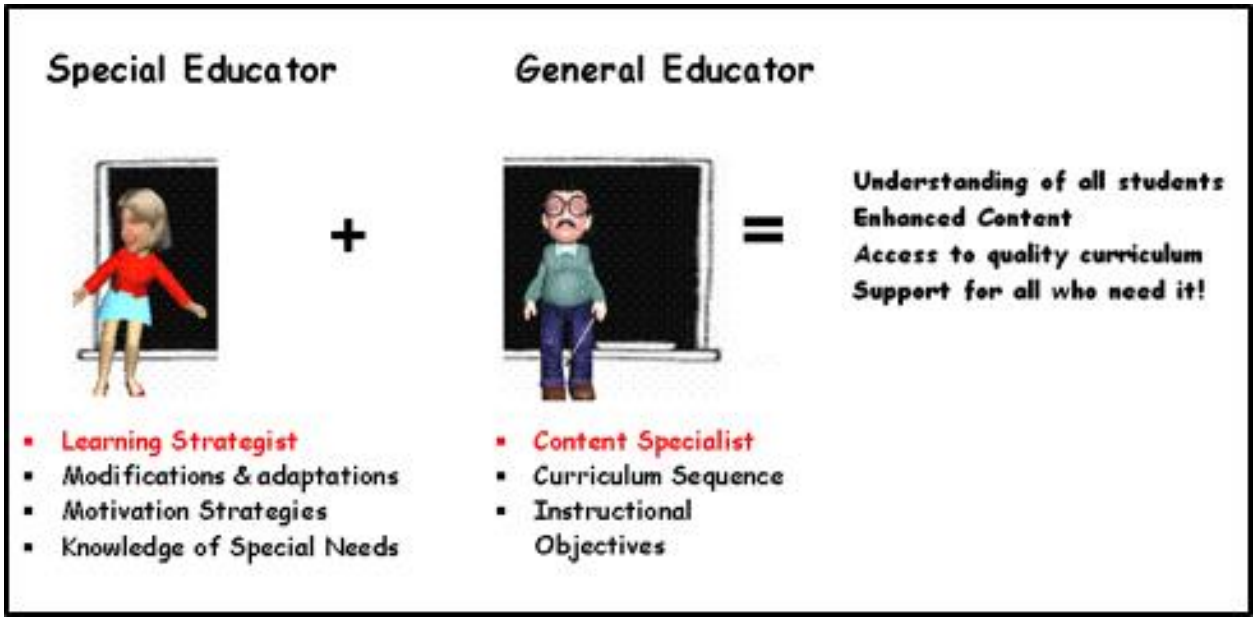
Developing the media literacy, critical consciousness, and civic engagement of students in the twenty first century is a priority that must happen alongside the growth of academic skills. This is an interdisciplinary, democratic, and socially just approach to culturally responsive

teaching that highlights the injustices that have characterized vast inequalities in the education system. A culturally responsive-sustaining approach to teaching necessitates that teachers and students work alongside one another to confront bias and disrupt educational inequities.

Studies across the country have shown that Culturally Responsive-Sustaining Education (CR-SE), "increases student participation, attendance, grade point averages, graduation rates, civic engagement, self-image, and critical thinking skills" (NYC DOE). This approach to teaching and learning requires an inclusive curriculum that integrates support for English Language Learners, students with disabilities, students at risk of school failure, gifted and talented students, and students with 504 plans. It is a framework for teaching that means advocating for students who have been historically marginalized and denied access to an equal education by creating opportunities for these students to be educated alongside their general education peers. It also involves the identification of successful practices that reduce referrals and placements in more restrictive environments.

Through the implementation of a plan to integrate civics, the Amistad Curriculum, and Holocaust/Genocide studies at all grade levels across the district, students will learn about the history of Newark, the contributions of African Americans and other ethnic groups to the city, and how to become civically engaged, democratic citizens in the twenty first century. Further, students will learn about the evils of bias, prejudice and bigotry and how these may lead to a genocide and that the evil period of slavery in the United States exhibited a number of components seen in genocides throughout the centuries. This curricula, project-based and interdisciplinary in nature, spans the content areas and grade levels.

Integrated Accommodations and Modifications for Special Education Students, English Language Learners, Students At Risk of School Failure, Gifted and Talented Students, and Students with 504 Plans



Co-Teaching Handbook

Co-Teaching Models

One Teach, One Observe: One of the advantages in co-teaching is that more detailed observation of students engaged in the learning process can occur. With this approach, for example, co-teachers can decide in advance what types of specific observational information to gather during instruction and can agree on a system for gathering the data. Afterward, the teachers should analyze the information together. The teachers should take turns teaching and gathering data, rather than assuming that the special educator is the only person who should observe.

Station Teaching: In this co-teaching approach, teachers divide content and students. Each teacher then teaches the content to one group and subsequently repeats the instruction for the other group. If appropriate, a third "station" could give students an opportunity to work independently. As co-teachers become comfortable with their partnership, they may add groups or otherwise create variations of this model.

Parallel Teaching: On occasion, students' learning would be greatly facilitated if they just had more supervision by the teacher or more opportunity to respond. In parallel teaching, the teachers are both teaching the same information, but they do so to a divided class group

within the same room. Parallel also may be used to vary learning experiences, for example, by providing manipulatives to one group but not the other or by having the groups read about the same topic but at different levels of difficulty.

Alternative Teaching: In most class groups, occasions arise in which several students need specialized attention. In alternative teaching, one teacher takes responsibility for the large group while the other works with a smaller group. These smaller groups could be used for conferences, remediation, pre-teaching, to help students who have been absent catch up on key instruction, assessment, and so on.

How can the various models and co-partner roles help?

- It increases the Instructional Intensity for students. Instruction is least effective if one teacher is "off" while the other teacher is "on". For example the most common ICS model, "One Teach One Assist" is the least effective if implemented every day. For improved results, both teachers should be engaged with students at the same time.

- The use of various ICS Models promotes and embeds differentiation of instruction, flexible grouping, unique discussion and questioning techniques.

- Be sure to explain to students and parents the benefits of two teachers. Avoid using the term "special education or special education teacher" to describe the environment. Instead, use terms such as Content Specialist and Learning Strategist to define your roles.

- When providing feedback, consider using different pen/ink colors (stay away from red). This reduces confusion when students have a question to ask.

- It helps to establish a more balanced role of authority between co-partners. Students need to experience instruction and directives from both co-partners.

Adaptations

Instructional adaptations for students with disabilities, English Language Learners, students At Risk of School Failure, Gifted and Talented students, and students with 504 plans include, but are not limited to, the below approaches. For students with disabilities, self-determination and interdependence are two core principles of citizenship education that applies directly to their educational needs and interests.

Student Motivation: Expanding student motivation to learn content and acquire skills in English Language Arts can occur through: activity choice, appeal to diverse learning styles, choice to work with others or alone, hands-on activities, and multimodal activities.

Instructional Presentations: The primary purpose of these adaptations is to provide special education students with teacher-initiated and teacher-directed interventions that prepare students for learning and engage students in the learning process (Instructional Preparation); structure and organize information to aid comprehension and recall (Instructional Prompts); and foster understanding of new concepts and processes (Instructional Application) e.g. relating to personal experiences, advance organizers, pre-teaching vocabulary and/or strategies; visual demonstrations, illustrations, mode**ls.**

Instructional Monitoring: Social Studies and English Language Arts instruction should include opportunities for students to engage in goal setting, use of anchor papers, work with rubrics and checklists, reward systems, conferences.

Classroom Organization: The primary purpose of classroom organization adaptations is to maximize student attention, participation, independence, mobility, and comfort; to promote peer and adult communication and interaction; and to provide accessibility to information, materials, and equipment.

Student Response: The primary purpose of student performance responses is to provide students with disabilities a means of demonstrating progress toward the lesson objectives related to reading and writing activities.

SAMPLE DIFFERENTIATION STRATEGIES AND ACTIVITIES TO ENRICH LEARNING FOR ADVANCED STUDENTS

Anchor Activities: Self-directed specified ongoing activities in which students work independently.

Curriculum Compacting: Curriculum Compacting is an instructional technique that is specifically designed to make appropriate curricular adjustments for students in any curricular area and at any grade level. Essentially, the procedure involves (1) defining the goals and outcomes of a particular unit or segment of instruction, (2) determining and documenting which students have already mastered most or all of a specified set of learning outcomes, and (3) providing replacement strategies for material already mastered through the use of instructional options that enable a more challenging and productive use of the student's time.

Flexible Grouping: Flexible grouping is a range of grouping students together for delivering instruction. This can be as a whole class, a small group, or with a partner. Flexible grouping creates temporary groups that can last an hour, a week, or even a month.

Jigsaw Activities: Jigsaw is a strategy that emphasizes cooperative learning by providing students an opportunity to actively help each other build comprehension. Use this technique to assign students to reading groups composed of varying skill levels. Each group member is responsible for becoming an "expert" on one section of the assigned material and then "teaching" it to the other members of the team.

Differentiated Instruction - English Language Learners

English Language Development Standards

ENGLISH LANGUAGE LEARNERS

Instructional Supports:

- Hands-on materials
- bilingual dictionaries
- visual aids
- teacher made adaptations, outlines, study guides
- varied leveled texts of the same content
- assisted technologies

Preparing students for lessons:

1. Building Background Information through brainstorming, semantic webbing, use of visual aids and other comprehension strategies.

2. Simplifying Language for Presentation by using speech that is appropriate to students' language proficiency level. Avoid jargon and idiomatic speech.

3. Developing Content Area Vocabulary through the use of word walls and labeling classroom objects. Students encounter new academic vocabulary in literature, editing conventions, and the study of language arts.

4. Giving Directions - Stated clearly and distinctly and delivered in both written and oral forms to ensure that LEP students understand the task. In addition, students should be provided with/or have access to directional words such as: circle, write, draw, cut, underline, etc.

5. Leveraging assisted technologies.

WIDA Language Proficiency Levels

Performance Definitions for the levels of English language proficiency

At the given level of English language proficiency, English language learners will process, understand, produce, or use:

6 Reaching	• specialized or technical language reflective of the content area at grade level • a variety of sentence lengths of varying linguistic complexity in extended oral or written discourse as required by the specified grade level • oral or written communication in English comparable to proficient English peers
5 Bridging	• the technical language of the content areas; • a variety of sentence lengths of varying linguistic complexity in extended oral or written discourse, including stories, essays, or reports; • oral or written language approaching comparability to that of English proficient peers when presented with grade level material
4 Expanding	• specific and some technical language of the content areas; • a variety of sentence lengths of varying linguistic complexity in oral discourse or multiple, related paragraphs; • oral or written language with minimal phonological, syntactic, or semantic errors that do not impede the overall meaning of the communication when presented with oral or written connected discourse with occasional visual and graphic support
3 Developing	• general and some specific language of the content areas; • expanded sentences in oral interaction or written paragraphs; • oral or written language with phonological, syntactic, or semantic errors that may impede the communication but retain much of its meaning when presented with oral or written, narrative or expository descriptions with occasional visual and graphic support
2 Beginning	• general language related to the content areas; • phrases or short sentences; • oral or written language with phonological, syntactic, or semantic errors that often impede the meaning of the communication when presented with one to multiple-step commands, directions, questions, or a series of statements with visual and graphic support
1 Entering	• pictorial or graphic representation of the language of the content areas; • words, phrases, or chunks of language when presented with one-step commands, directions, WH-questions, or statements with visual and graphic support

The five language proficiency levels outline the progression of language development implied in the acquisition of English as an additional language, from 1, Entering the process, to 6, Reaching the attainment of English language proficiency. The language proficiency levels delineate expected performance and describe what ELLs can do within each domain of the standards. The Performance Definitions define the expectations of students at each proficiency level. The definitions encompass three criteria: linguistic complexity—the amount and quality of speech or writing for a given situation; vocabulary usage—the specificity of words or phrases for a given context; and language control—the comprehensibility of the communication based on the amount and types of errors.

Assessments (including, formative, summative, benchmark, and alternative assessments)

- *NJSLA* (Grades 5, 8, and 11)
- Daily Instructional Tasks
- Culminating Tasks
- Extended Learning Tasks
- Entry Tasks
- Independent Practice
- Observation
- Lab Reports
- Performance tasks
- Exhibitions and demonstrations
- Portfolios
- Journals/Notebooks
- Teacher-created tests
- Rubrics
- Self- and peer-evaluation

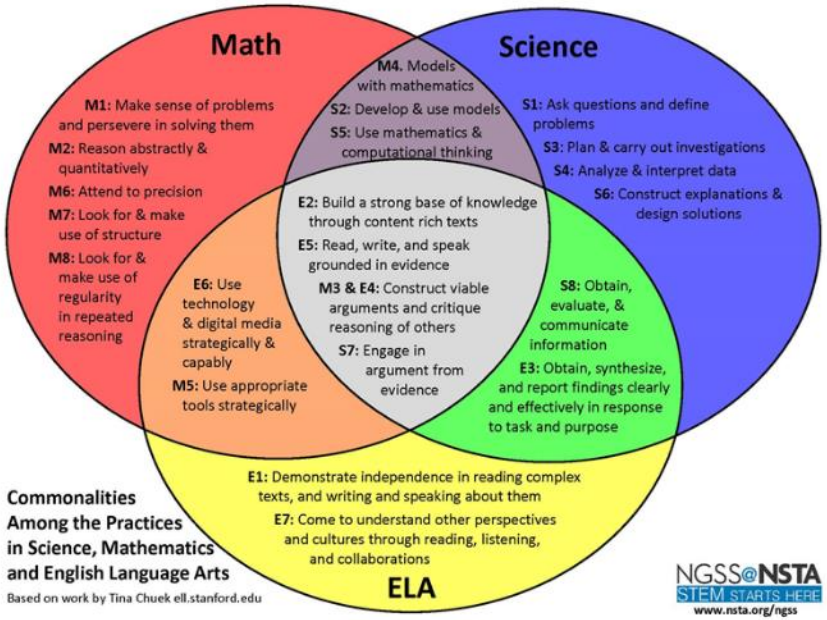
Core Instructional Materials

Inspire Science, McGraw Hill, 2020

Interdisciplinary Connections

Integrating Language Arts Literacy and Mathematics

In order to support student learning, teachers need to emphasize the mutual skill sets that occur in two very important and nicely aligned subject areas. Making explicit connections to ELA and Mathematics will help students see the natural relationships to science. The curricular documents call out math and ELA standards that appear in each unit of study.



Integration of 21st Century Skills

The following standards are addressed within the units:

- 9.1.4.A.1 Explain the difference between a career and a job and identify various jobs in the community and the related earnings.
- 9.1.4.A.2 Identify potential sources of income.
- 9.1.4.A.3 Explain how income affects spending and take-home pay.
- 9.2.4.A.1 Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.
- 9.2.4.A.2 Identify various life roles and civic and work-related activities in the school, home, and community.
- 9.2.4.A.3 Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
- 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

Office of Teaching and Learning
First Grade Science

Course Description

Students in first grade formulate answers to questions such as: “What happens when materials vibrate? What happens when there is no light? What are some ways plants and animals meet their needs so that they can survive and grow? How are parents and their children similar and different? What objects are in the sky and how do they seem to move?” Students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light. Students also develop understandings of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. The understanding is developed that young plants and animals are like, but not exactly the same as, their parents. Students also observe, describe, and predict some patterns of the movement of objects in the sky. The crosscutting concepts of patterns; cause and effect; structure and function; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. First grade students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding.

Curriculum Map

Standards	Sound Energy	Light Energy	Earth and Space	Offspring and Their Parents	Plants and Animals	Use Energy to Communicate
1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	✓					
1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.		✓				
1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.		✓				
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.						✓
1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.			✓			
1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.			✓			

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.					✓	
1-LS1-2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.				✓		
1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.				✓		

Pacing Guide

This guide is based on science being taught every day for 50 minutes

Modules		Standards Areas	Pacing (# of lessons, # of days)
1	Sound Energy	• 1-PS4-1 Waves and their Applications in Technologies for Information Transfer	**2 lessons/20 days**
2	Light Energy	• 1-PS4-2 Waves and their Applications in Technologies for Information Transfer • 1-PS4-3 Waves and their Applications in Technologies for Information Transfer	**3 lessons/26 days**
3	Earth and Space	• 1-ESS1-1 Earth's Place in the Universe • 1-ESS1-2 Earth's Place in the Universe	**4 lessons/36 days**
4	Offspring and Their Parents	• 1-LS1-2 From Molecules to Organisms: Structures and Processes • 1-LS3-1 Heredity: Inheritance and Variation of Traits	**5 lessons/46 days**
5	Plants and Animals	• 1-LS1-1 From Molecules to Organisms: Structures and Processes	**4 lessons/32 days**
6	Use Energy to Communicate	• 1-PS4-4 Waves and their Applications in Technologies for Information Transfer	**2 lessons/19 days**

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 1:
Sound Energy

Stage 1 – Desired Results

ASSESSED FOCUS STANDARDS:

PS4.A: Wave Properties
- Sound can make matter vibrate, and vibrating matter can make sound.

CONTENT 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).
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- 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.

Unit Description

Anchoring Phenomenon:
Statement: Sound can make matter move.
Observation/Demonstration/Experience: Video of a person playing drums.

Driving Question: How is sound made?

Meaning

ENDURING UNDERSTANDINGS:
- Every sound is produced by a vibrating object.

ESSENTIAL QUESTIONS:
- How is sound made?
- How does sound change?

	● When we hear sounds, our eardrums are responding to sound waves—moving air that is set in motion when an object vibrates. ● Sound can be loud or soft. Loud sounds are described as having high volume, while soft sounds are described as having low volume. ● Sounds with high volume have higher energy than those with low volume. ● The faster an object vibrates, the higher its sound, or pitch, is. The more slowly an object vibrates, the lower its pitch.	
	What students will know and be able to do	
	KNOWLEDGE: ● I can explain how sound can make matter vibrate, and that vibrating matter can make sound. (Lesson 1) ● I can explain that sound can change in volume or pitch. (Lesson 2)	**SKILLS:** 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.] Planning and Carrying Out Investigations Cause and Effect

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - Design an Instrument (Lesson 1)
  - Design an Instrument Performance Task Rubric
- Lesson 1- Sound Test
- Performance Task - Sound Energy (Lesson 2)
  - Sound Energy Performance Task Rubric
- Lesson 2- Making Sounds Test
- Module Performance Project- Sound and Matter
  - Sound and Matter Performance Project Rubric
- Sound Energy Module Test
- STEM Gauge #471182
- STEM Gauge #477013

- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe - Sound (Lesson 1)
- Page Keeley Science Probe - Materials and Vibrations (Lesson 2)

Integration of 21st Century Skills	Integration of Technology	Career Education
• **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively. • **9.1.4.A.2:** Evaluate available resources that can assist in solving problems. • **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems. • **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process. • **9.1.4.A.5:** Apply critical thinking • **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking. • **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities. • **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community. • **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. • **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations. • **9.3.4.A.5:** Locate career information using a variety of resources.	• **Inspire Science Videos** ○ Drums ○ Sound Waves • **Inspire Science Files** ○ Sound, Energy & Matter • **Inspire Science Songs** ○ Sound Moves ○ Here Comes the Band • **Inspire Science Readers** ○ Sounds All Around ○ What Sounds Say • **Discovery Education** ○ Investigating Sound- Science Move Along ○ Investigating Sound- Vibration and Sound • **Mystery Science** ○ Mystery #1: How do they make silly sounds in cartoons? ○ Mystery #2: Read Along: Where do sounds come from? • **Generation Genius** ○ Introduction to Sound • **Science Max** ○ Sound	• **Video Game Designer:** ○ Introduce Career Kid Erik, who wants to be a video game designer when he grows up. A video game designer studies the look, sound, and design of each video game he/she plays. • **Sound Engineer** ○ Introduce Career Kid Deven, who wants to be a sound engineer when he grows up. A sound engineer records sounds and creates sound effects.

Stage 3 – Learning Plan

UNIT VOCABULARY		
energy matter	pitch sound	vibrate volume waves

SUMMARY OF KEY LEARNING

Lesson 1: Sound

Lesson 1: Day 1- Sound - Module Opener

- **Learning Intention:** I am learning that sound makes matter vibrate. I am learning about the phenomenon of a person playing the drums.
- **Success Criteria:** I can make initial explanations by watching/observing a video of a person playing the drums.
- **Brief Overview of Lesson:** Students will watch a video of drums being played and make initial explanations. Students will also be introduced to the **Career Connection** of a *Video Game Designer* and answer questions in their notebook.

Lesson 1: Day 2 - Sound - Assess and Engage

Page Keeley Science Probe - Sound, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning how sound is made.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Sound.* This is intended to serve as a pre-assessment and uncover students' basic ideas about sound and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *musical instruments* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Sound Engineer* and answer questions in their notebook.

Lesson 1: Days 3 and 4 - Sound - Explore

Inquiry Activity: Rubber Band Guitar, Science Text- The Low-Energy Band

- **Learning Intention:** I am learning how vibrations relate to sound by performing a hands-on investigation. I am learning how make music without electricity.
- **Success Criteria:** I can explain how vibrations relate to sound by completing a written response and discussing with my partner my findings. I can explain ways to make music using everyday items/objects that do not need electricity.
- **Brief Overview of Lesson:** Students will observe that plucking a rubber band makes it vibrate and causes sound. The sound stops when the rubber band stops vibrating. Thicker rubber bands make a lower sound**.** Students will listen to a fictional read aloud, *The Low-Energy Band* to learn about Sarah's band and how its members have to find ways of making music without electricity.

Lesson 1: Days 5, 6 and 7 - Sound- Explain

Sound, Energy & Matter Science File, Sound Waves Video and Science Text- Sounds All Around

- **Learning Intention:** I am learning about the relationships between sound, energy, and matter.
- **Success Criteria:** I can draw and define the key vocabulary terms: s*ound, energy, matter, vibrate and waves* in my Science Notebook.
- **Brief Overview of Lesson:** Students will be introduced to vocabulary that will help them to understand the lesson content. Teacher will read the vocabulary words aloud while students circle the words they have heard before in their notebooks. Students will listen to a non-fiction text, *Sounds All Around* to practice identifying key vocabulary. Students will watch a short video about sound waves. The teacher will complete a

read-aloud of a short **Science File** about sound, energy and matter, and students will complete an activity in their notebook identifying examples. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what musical instruments they heard and the different sounds they make.

Lesson 1: Day 8 - Sound - Elaborate

Inquiry Activity- Sound Journal

- **Learning Intention:** I am learning about what causes sound.
- **Success Criteria:** I can listen to sound clips and write and/or draw to describe how it sounded and what was the cause of it.
- **Brief Overview of Lesson:** Students will listen to different sound clips to identify/describe various sounds. Students will record in their notebook by writing and/or drawing how it sounded and what caused each sound. Students are encouraged to ask questions as it is a science practice that drives every investigation

Lesson 1: Day 9 - Sound - Evaluate

Performance Task- Design an Instrument

- **Learning Intention:** I am learning that different materials can create musical instruments that will produce a sound.
- **Success Criteria:** I can create a musical instrument that will make sound by performing a hands-on investigation.
- **Brief Overview of Lesson:** Students should design and make instruments that have vibrating parts and make sound. Students will share their instruments with the class and/or partner by telling what materials they used and how they made their instruments. Ask students to demonstrate how their instrument makes sound.

Lesson 1: Day 10 - Assessment Options

- **Learning Intention:** I am learning what causes sound.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How is sound made?
- Lesson 1- Sound Test
- Teacher-created eAssessment
- STEM Gauge #471182
- Mystery #2: Read Along: Where do sounds come from?

Lesson 2: Making Sounds

Lesson 2: Day 1- Making Sounds - Assess and Engage

Assess Lesson Readiness: Page Keeley Science Probe- Materials and Vibrations, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- **Learning Intention:** I am learning that sound changes. I am learning about the phenomenon of elephants and the sounds they make.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Materials and Vibrations.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the relationship between sound and vibrations and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *elephants* by observing a photo and listening to a sound clip. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Sound Engineer* and answer questions in their notebook.

Lesson 2: Day 2- Making Sounds - Explore
Inquiry Activity- Sound Waves

- **Learning Intention:** I am learning about the relationship between how loud a sound is and sound waves.
- **Success Criteria:** I can write and draw in my Science Notebook about what I heard and saw when placing the tuning fork in the water.
- **Brief Overview of Lesson:** Students observe the relationship between how loud a sound is and sound waves by completing the **Inquiry Activity,** *Sound Waves*. Students discover that hitting the tuning fork hard will make a large vibration, resulting in a large sound wave and a loud sound. The smaller the vibration, the smaller the sound wave, and the quieter the sound.

Lesson 2: Days 3, 4 and 5- Making Sounds - Explain
Instruments Simulation, Different Sounds Science File, Science Text- Sounds All Around, Science Song- Sound Moves

- **Learning Intention:** I am learning the difference between volume and pitch.
- **Success Criteria:** I can describe the difference between volume and pitch using newly developed vocabulary. I can decide whether to change or justify my response by revisiting the Page Keeley Science Probe.
- **Brief Overview of Lesson:** Students will be introduced to vocabulary that will help them to understand the lesson content. Teacher will read the vocabulary words aloud while students circle the words they have heard before in their notebooks. Students will listen to a non-fiction text, *Sounds All Around* to practice identifying key vocabulary. Students will participate in a simulation using various musical instruments and volumes to further their understanding about sound waves. The teacher will complete a read-aloud of a short **Science File** about different sounds, and students will complete an activity in their notebook identifying examples. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what the song is about. Encourage students to underline examples of loud sounds and circle examples of high-pitched sounds on the lyrics page.

Lesson 2: Day 6 - Making Sounds - Elaborate
Inquiry Activity- Throat Vibrations

- **Learning Intention:** I am learning that my vocal cords vibrate as they make sound.
- **Success Criteria:** I can identify and describe to a partner whether each sound I produce is loud or soft, high or low or a combination of both.
- **Brief Overview of Lesson:** Students observe how their vocal cords vibrate as they make sounds of different pitch and volume. Students will observe that the louder the sound they make, the bigger or stronger their vocal cords vibrate. The higher the pitch of the sound they make, the faster their vocal cords vibrate. Students will record their findings to the prompts: What are you doing? / What are you feeling? by filling in a table in their notebook.

Lesson 2: Day 7 - Making Sounds - Evaluate
Performance Task- Sound Energy

- **Learning Intention:** I am learning that different vibrations can have high and low sounds.
- **Success Criteria:** I can compare the sound waves for a high pitch and low pitch by completing a hands-on investigation and recording my findings in my Science Notebook.
- **Brief Overview of Lesson:** Students plan an investigation to compare vibrations of low and high sounds. Students will use tuning forks and water in cups or bowls to show that sound waves from a high pitch are faster than the sound waves from a low pitch.

Lesson 2: Days 8 and 9: - Module Wrap-Up

Performance Project- Sound and Matter

- **Learning Intention:** I am learning that an object making sound can affect another object nearby.
- **Success Criteria:** I can explain through writing and drawing, how sounds occur when matter vibrates.
- **Brief Overview of Lesson:** Students will investigate how sound (from music speakers) affects salt on a plastic-wrapped bowl. Students will write out the steps they will use to complete this performance project, as well as write and/or draw their observations.

Lesson 2: Day 10 - Assessment Options

- **Learning Intention:** I am learning that sound changes.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How does sound change?
- Lesson 2- Making Sounds Test
- Sound Energy Module Test
- Teacher-created eAssessment
- STEM Gauge #477013
- Mystery #1: How do they make silly sounds in cartoons?

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Sound Energy"
  ○ Learning about Famous Scientists
  ○ DK findout! Famous Scientists
  ○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers
• Discovery Education:
  ○ News and Current Events Channel
• Try to find examples of an Sound Engineer and Video Game Designer from different cultures
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills
	• Forming positive relationships, working in teams, dealing effectively with conflict
	• SEL Strategies for Virtual Learning
	• SOS Top Ten: Social and Emotional Learning Strategies

Lesson 1: Sound	Sound Energy	Estimated Time: 45 minutes per day

Brief Overview of Lessons:

Lesson 1: Day 1- Sound - Module Opener

- Students will watch a video of drums being played and make initial explanations. Students will also be introduced to the **Career Connection** of a *Video Game Designer* and answer questions in their notebook.

Lesson 1: Day 2 - Sound - Assess and Engage

Page Keeley Science Probe - Sound, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Sound.* This is intended to serve as a pre-assessment and uncover students' basic ideas about sound and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *musical instruments* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Sound Engineer* and answer questions in their notebook.

Lesson 1: Days 3 and 4 - Sound - Explore
Inquiry Activity: Rubber Band Guitar, Science Text- The Low-Energy Band

- Students will observe that plucking a rubber band makes it vibrate and causes sound. The sound stops when the rubber band stops vibrating. Thicker rubber bands make a lower sound**.** Students will listen to a fictional read aloud, *The Low-Energy Band* to learn about Sarah's band and how its members have to find ways of making music without electricity.

Lesson 1: Days 5, 6 and 7 - Sound- Explain
Sound, Energy & Matter Science File, Sound Waves Video and Science Text- Sounds All Around

- Students will be introduced to vocabulary that will help them to understand the lesson content. Teacher will read the vocabulary words aloud while students circle the words they have heard before in their notebooks. Students will listen to a non-fiction text, *Sounds All Around* to practice identifying key vocabulary. Students will watch a short video about sound waves. The teacher will complete a read-aloud of a short **Science File** about sound, energy and matter, and students will complete an activity in their notebook identifying examples. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what musical instruments they heard and the different sounds they make.

Lesson 1: Day 8 - Sound - Elaborate
Inquiry Activity- Sound Journal

- Students will listen to different sound clips to identify/describe various sounds. Students will record in their notebook by writing and/or drawing how it sounded and what caused each sound. Students are encouraged to ask questions as it is a science practice that drives every investigation

Lesson 1: Day 9 - Sound - Evaluate
Performance Task- Design an Instrument

- Students should design and make instruments that have vibrating parts and make sound. Students will share their instruments with the class and/or partner by telling what materials they used and how they made their instruments. Ask students to demonstrate how their instrument makes sound.

Lesson 1: Day 10- Assessment

- Students will show their understanding and what they have learned thus far by completing one of the assessment options provided or teacher-created.

What students should know and be able to do to engage in this lesson:

- When we hear sounds, our eardrums are responding to sound waves—moving air that is set in motion when an object vibrates. Any vibrating object can set off sound waves. Musical instruments such as drums vibrate when they are struck; stringed instruments vibrate when a string is

plucked or bowed. When we speak, our larynx (voice box) vibrates. The vibrations are transmitted from our eardrums to our brain, where they are interpreted as sounds. Every sound is produced by a vibrating object, whether it is a tiny speaker vibrating in a radio or a booming thundercloud in the sky.

LESSON FOUNDATION

Assessed Standards for this lesson	**Important content not included in the standards**
PS4.A: Wave Properties ● Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)	Preschool Standard 5.2.3 Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors). (5.2.P.C.1)

Focus Question for this Lesson

How is sound made?

Learning Intention	**Success Criteria**
Day 1: ● I am learning about the phenomenon of a person playing the drums. **Day 2:** ● I am learning about the phenomenon of making sound using different musical instruments. ● I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 3-4:** ● I am learning how vibrations relate to sound by performing a hands-on investigation. ● I am learning ways to make music without electricity by listening to the read aloud, *The Low-Energy Band*. **Days 5-7:** ● I am learning the key vocabulary words related to sound: *sound, energy, matter, vibrate and waves*. **Day 8:** ● I am learning about what causes sound. **Day 9:**	**Day 1:** ● I can make initial explanations by watching/observing a video of a person playing the drums. **Day 2:** ● I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 3-4:** ● I can explain how vibrations relate to sound by completing a written response and discussing with my partner my findings. I can explain ways to make music using everyday items/objects that do not need electricity. **Days 5-7:** ● I can draw and define the key vocabulary terms: s*ound, energy, matter, vibrate and waves* in my Science Notebook. **Day 8:** ● I can listen to sound clips and write and/or draw to describe how it sounded and what was the cause of it. **Day 9:**

• I am learning that different materials can create musical instruments that will produce a sound.	• I can create a musical instrument that will make sound by performing a hands-on investigation.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Lesson 1 Performance Task: Design an Instrument
- Sound Lesson 1 Test
- STEM Gauge #471182

Feedback (Peer to peer/student to teacher/teacher to student)

- Design an Instrument Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS

Anticipated Student Pre-Conceptions/Misconceptions

- Students may think that sound exists independently of objects.
- Students may also think that sound and hearing are identical concepts or that sound is produced and heard at the same time.
- Students may think that sound is produced in the ears.
- They may also think that sound is a constant property of an object, like color or shape.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 1, Day 1- Module Opener
Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.
Lesson Opening
Review Learning Intention(s) for the day with students: ● I am learning about the phenomenon of a person playing the drums.

Module Opener:

- Introduce the module phenomenon by showing the video of a person playing drums.
- Ask students to think of questions they have relating to drums and sound. Have them record questions in their Science Notebook.
- Use the questions below to elicit student responses.
    - ASK:
        - Why are the drums making sound?
        - Why are the drums loud?

During the Lesson

Introduce Key Vocabulary:

- **Key Vocabulary:** energy, matter, pitch, sound, vibrate, volume, waves
- These words are a selection of important vocabulary that will be used throughout the module. Remind students to listen for these Key Vocabulary words as they complete the module.

STEM Career Kid Connection: Video Game Designer

- Introduce Career Kid Erik, who wants to be a videogame designer when he grows up.
- Explain how he studies the look, sound, and design of each video game he plays.
- Read aloud to students what Erik says in their Science Notebook. Have students complete the question in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *plan an investigation.*
- **I will** *carry out an investigation.*

Have students read the "I will…" statements in their Science Notebook. The "I will . . ." statements for this module reference the science and engineering practices of planning an investigation and carrying out an investigation.

- If this is the first time you are teaching the science and engineering practices of planning an investigation and carrying out an investigation, then help students understand that to plan means to decide on how to do something. A plan may include a sequence of steps that tell the order of what is going to be done. Explain that an investigation is a careful search to find out more about something. Scientists often plan and carry out investigations. For example, scientists may plan and carry out an investigation on different sounds. First, they gather different types of objects. Next, they test the objects to hear what kinds of sounds they make. Then, they may make a table showing their results. Last, they share what they learned.

THE LESSON IN ACTION: Lesson 1, Day 2- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they already know about sound.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of making sound using different musical instruments.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Sound

- Start by asking students to list different types of sounds.
- Ask how they think the sounds are made. Let students share and discuss their initial ideas without acknowledging whether they are right or wrong.
- Introduce the probe. Choose a talk configuration (pair, small group, whole class, or combination) and listen carefully as students share their thinking about which things on the list make sound by vibrating. Use talk moves to help them explain their thinking about how sounds are produced.
- The probe should be revisited after students have had the opportunity to develop the generalization that all sounds are produced by vibrations.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of making sound using different musical instruments.
- Show the photo and ask students what questions they have about the instruments and sound. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- You may also want to demonstrate sound and vibration by tapping on a toy drum or xylophone and having students observe or feel the result. Students can generate questions based on your demonstration.
- ASK:
    - What did you see in the photo?
    - What did you notice about the different instruments?
    - What did you wonder about what you saw in the photo?
    - What interests you about different sounds instruments make?

Help students turn their observations from the photo into questions that they can refer to during the lesson.

STEM Career Kid Connection: Sound Engineer

- Introduce Career Kid Deven, who wants to be a sound engineer when he grows up.
- Explain to students that a sound engineer records sounds and creates sound effects. Read what Deven says in the **Science Notebook** aloud as a class.
- ASK:
    - Why would the children be playing different instruments?
    - Why would a sound engineer want to know about the different sounds that instruments make?
    - Have you ever heard music in the background of your favorite TV show? Who do you think works with the show to make the music loud or soft?

Essential Question: How is sound made?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *carry out an investigation.*

Have students read the "I will . . ." statement in their **Science Notebook**. Throughout the lesson, students will learn about sound. They will conduct an investigation to demonstrate how sound is made.

- If this is the first time you are teaching the Science and Engineering Practice of carrying out investigations, explain that an investigation is a careful examination to get information or learn facts about something. Tell students that sometimes scientists do an investigation over and over to see if they get consistent information, or data.

ASK:

- What is one reason you might conduct an investigation about sound?

THE LESSON IN ACTION: Lesson 1, Days 3 and 4 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students what investigation they would conduct to find out about sound.

Review Learning Intention(s) for the day with students:

- I am learning how vibrations relate to sound by performing a hands-on investigation.
- I am learning ways to make music without electricity by listening to the read aloud, *The Low-Energy Band*.

During the Lesson

The Low-Energy Band Read Aloud

- Read aloud the fiction selection, The Low-Energy Band on pages 4–13 in the Science Paired Read Aloud. Students will learn about Sarah's band and how its members have to find ways of making music without electricity.
- **ASK:**
  - On page 5, why can't the children use electricity to play their instruments?
  - What is the main idea of the paragraph on page 11?
  - Use the Visuals Look at the pictures on pages 12 and 13. What are the children using to make sound?

Inquiry Activity- Rubber Band Guitar:

- Students will observe that plucking a rubber band makes it vibrate and causes sound. The sound stops when the rubber band stops vibrating. Thicker rubber bands make a lower sound.

Safety:

- Students should wear their safety goggles at all times throughout the activity. Remind students that they should only use the rubber bands as directed in the activity.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations. Read the steps of the investigation in the **Science Notebook** together with students.

Carry Out an Investigation:

- Help students stretch the rubber band over the bowl so that it crosses the top of the bowl.
- Have students try to stop the rubber band after they have heard the sound it makes and ask them what happens when the rubber band stops vibrating.

Communicate Information:

- Record Data- Have students complete the table in their Science Notebook. Make sure students record what they see and hear when they pluck the rubber band in the correct column. Help students write their answers, if necessary.
- Test Again, help students stretch the rubber band over the bowl so that it crosses the top of the bowl. Students should then repeat step 2. Check to be sure that all students are still wearing their safety goggles. Have students complete questions in their **Science Notebook**.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations and data with those of their classmates.
    - **ASK**:
        - How do your observations compare to the observations of your classmates?
        - How did the thickness of the rubber band affect the sound?

THE LESSON IN ACTION: Lesson 1, Days 5, 6 and 7 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to recall one way Sarah and her band made music without electricity.

Review Learning Intention(s) for the day with students:

- I am learning the relationships between sound, energy, and matter.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
    - **sound-** a form of energy that comes from objects that vibrate
    - **energy-** a force that makes things work or change

- **vibrate**- to move back and forth quickly
- **matter**- what all things are made of
- **waves**- movement up and down or back and forth

Sound, Energy, and Matter Science File**:**
Have students read the Sound, Energy, and Matter Science File to learn about the relationships between sound, energy, and matter. While reading, students will encounter the vocabulary words: sound, energy, vibrate, waves, and matter.

- **ASK:**
  - What is energy?
  - What are three things that are made of matter?
  - What happens when the guitar strings vibrate?

- Have students complete the question in their **Science Notebook.**

Develop Vocabulary:

- sound Explain that the word sound has its origins in the Latin word sonus, meaning "a noise." Stress that sound, or a noise, cannot be made if something does not vibrate.
- energy Say: She has a lot of energy! Ask students to explain what the word energy means in that sentence. They may respond that having energy means "being active or busy."Explain that scientists use the word energy to describe how much work it takes to do something. For example, it takes more energy to lift a heavy box than a piece of paper.
- waves Explain that synonyms for the word waves as it is used in this lesson include ripples and vibrations. Demonstrate waves by holding a towel and slowly waving it, pointing out how it begins to ripple or form waves.

Visual Kinesthetic Vocabulary:

- Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their Science Notebook.

Sound Waves Video:

- Have students watch the video *Sound Waves*. This video shows the relationships between sound, vibrations, and sound waves.
  - **ASK:**
    - What patterns did the drum and the water make when they were hit or touched?
    - How does sound make matter move?
    - Have students complete questions in their **Science Notebook.**

Sounds All Around Read Aloud**:**

- Read aloud the nonfiction selection Sounds All Around on pages 14–17 in the Science Paired Read Aloud. (Please note that this is only the first part of the Science Paired Read Aloud. Students will learn about how vibration produces sound and how humans and animals use their bodies to make sounds.)
- While reading, students will encounter the vocabulary words: sound, matter, energy, and vibrate.
    - **ASK:**
        - On page 15, where does Career Kid Deven say the sound of your voice starts?
        - What are some ways animals make sound on page 16?
        - What does page 16 say would happen without things that vibrate?
- Have students complete the questions in their **Science Notebook**

Using Science Songs:

- Print the lyrics of the song "Here Comes the Band".
- Pair up students, pass out the lyric page, and play the song "Here Comes the Band."
- Have students turn to their partner and share what the song is about.
    - You should hear the students describing to each other the sounds of different instruments. Encourage students to vocally mimic the sounds that instruments in the song make.

Leveled Readers- Sounds All Around (Optional)

This book defines and gives examples of sound. Use this book in the Explain section of Lesson 1 and in the Elaborate section of Lesson 1 after discussing what sound is and investigating what produces different sounds. Help students understand that sound is a form of energy that results from vibrating matter.

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about sound and vibrations, then have them revisit some activities in this lesson.
- **ASK:**
    - Can sound make objects vibrate? yes
    - Can there be sound without vibrations? no
    - How do sound and vibrations go together? Things that vibrate can make sound, and sound can make things vibrate.

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation.
- **ASK**:
    - **Draw Conclusions:** It is quiet. Suddenly the phone rings. What conclusion can you draw about what happened to make the phone ring? Sample answer: A part of the phone must have started to vibrate to make the phone ring. Complete the graphic organizer as a class. If students were not able to make the connection between sound and vibrations, have them review their data from the Rubber Band Guitar activity.

Reflect and Refine- Sound:

- At this point, students can go back to the Page Keeley Science Probe in their **Science Notebook** to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of sound and vibrations. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- ***I can*** carry out an investigation.

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practice of carrying out investigations.

- **ASK:**
    - What investigation did you carry out to learn about sound and vibrations? Sample answer: I made a guitar using rubber bands and a bowl to discover how sound is made.
    - How did you change the investigation, and what happened? Sample answer: I used a thicker rubber band to make sound. The sound from the thicker rubber band was lower. Both rubber bands made sound by vibrating.

THE LESSON IN ACTION: Lesson 1, Day 8 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Write the word "sound" on a piece of chart paper or white board. Students will draw an example of sound on a post-it to add on to the chart. Encourage students to write words or phrases to describe the drawings.

Review Learning Intention(s) for the day with students:

- I am learning about what causes sound.

During the Lesson

Inquiry Activity- Sound Journal

- Students will record sounds and causes by listening to various sound clips or walking throughout the school.

Ask a Question:

- Read the question aloud to the class. Remind students that asking questions is a science practice that drives every investigation. Have students brainstorm answers as a class. Have students write the answer to the question in their Science Notebook.

Carry Out an Investigation:

- Record Data Students should write what the sound sounded like and what caused it. Have students record their data in their **Science Notebook.**
- Have students complete the question in their **Science Notebook.**

Crosscutting Concepts- Cause and Effect:

- If this is the first time you have taught the Crosscutting Concept of Cause and Effect, help students understand that a cause makes something happen and an effect is what happens.
- **ASK:**
    - What causes a guitar to make sound? vibrations

Have students complete the question in their **Science Notebook.**

Leveled Readers- Sounds All Around (Optional)

This book defines and gives examples of sound. Use this book in the Explain section of Lesson 1 and in the Elaborate section of Lesson 1 after discussing what sound is and investigating what produces different sounds. Help students understand that sound is a form of energy that results from vibrating matter.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss the sounds they heard from the activity Sound Journal.

- **ASK:**
  - What did you hear that vibrated to make sounds? Sample answer: My book vibrated when I closed it.
  - How did the sounds you listed compare to your classmates' sounds? Sample answer: I heard different sounds than my classmates. The sounds we all heard were caused by something that vibrated.

THE LESSON IN ACTION: Lesson 1, Days 9 and 10- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Recall previous day's lesson by asking: What causes a guitar to make sound? vibrations

Review Learning Intention(s) for the day with students:

- I am learning that different materials can create musical instruments that will produce a sound.

During the Lesson

Performance Task - Design an Instrument:

- Students will design and create an instrument that will make sound.

What to Expect:

- Students should design and make instruments that have vibrating parts and make sound.

Safety:

- Students should wear safety goggles at all times.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations. Read the steps of the investigation in their **Science Notebook** together with students.

Carry Out an Investigation:

- Allow students time to explore and choose materials to make their instrument.
- Have students create their instruments with their chosen materials.
- Ask and answer questions of students as they are creating their instruments.

Communicate Information:

- Ask students to share their instruments with the class by telling what materials they used and how they made their instruments.
- Ask students to demonstrate how their instrument makes sound.
- Allow time for classmates to compare their instruments.

Have students complete the questions in their **Science Notebook**. Move around the room and provide help with writing, if necessary.

Talk About It:

- In this activity, students choose their own materials and design and create an instrument that makes sound.
- **ASK:**
    - How did your design compare to your classmates'? Sample answer: Some of my classmates' designs were different. Some of my classmates used different materials in different ways to design and make their instruments.
    - What were the results of your activity? Sample answer: My instrument vibrated. I put rice on top of a can with a lid and used a spoon to hit the can. Both the rice and the can made a sound.
    - How did your results compare to your classmates'? Sample answer: Some of my classmates had similar results, and some did not. Some of my classmates could not get their instruments to make sound. They said they would use a different design next time.
    - How did this activity help you learn more about sound and vibrations? Sample answer: I could feel my instrument vibrate, and I saw the rice bouncing on the can as the can and rice made noise.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: How is sound made?

- Have students refer to the answers you recorded to this question in their Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- ***I did*** carry out an investigation.

Have students refer to the "I will . . ." and "I can . . ." statements in their **Science Notebook.** Read aloud as a class the "I did . . ." statement in the **Science Notebook.**

- **ASK:**
    - How would you rate yourself in your ability to carry out an investigation? Color the number of stars that tell how well you did.

Lesson 1 Resources

Sound Energy PDF Folder
Reading Strategies for Science Folder
Mystery #2: Read Along: Where do sounds come from?
STEM Gauge #471182
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 2: Making Sounds	**Sound Energy**	**Estimated Time: 45 minutes per day**

Brief Overview of Lessons:

Lesson 2: Day 1- Making Sounds - Assess and Engage
Assess Lesson Readiness: Page Keeley Science Probe- Materials and Vibrations, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- Students will complete the **Page Keeley Science Probe -** *Materials and Vibrations.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the relationship between sound and vibrations and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *elephants* by observing a photo and listening to a sound clip. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Sound Engineer* and answer questions in their notebook.

Lesson 2: Day 2- Making Sounds - Explore
Inquiry Activity- Sound Waves

- Students observe the relationship between how loud a sound is and sound waves by completing the **Inquiry Activity,** *Sound Waves*. Students discover that hitting the tuning fork hard will make a large vibration, resulting in a large sound wave and a loud sound. The smaller the vibration, the smaller the sound wave, and the quieter the sound.

Lesson 2: Days 3, 4 and 5- Making Sounds - Explain
Instruments Simulation, Different Sounds Science File, Science Text- Sounds All Around, Science Song- Sound Moves

- Students will be introduced to vocabulary that will help them to understand the lesson content. Teacher will read the vocabulary words aloud while students circle the words they have heard before in their notebooks. Students will listen to a non-fiction text, *Sounds All Around* to practice identifying key vocabulary. Students will participate in a simulation using various musical instruments and volumes to further their understanding about sound waves. The teacher will complete a read-aloud of a short **Science File** about different sounds, and students will complete an activity in their notebook identifying examples. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the

beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what the song is about. Encourage students to underline examples of loud sounds and circle examples of high-pitched sounds on the lyrics page.

Lesson 2: Day 6 - Making Sounds - Elaborate
Inquiry Activity- Throat Vibrations

- Students observe how their vocal cords vibrate as they make sounds of different pitch and volume. Students will observe that the louder the sound they make, the bigger or stronger their vocal cords vibrate. The higher the pitch of the sound they make, the faster their vocal cords vibrate. Students will record their findings to the prompts: What are you doing? / What are you feeling? by filling in a table in their notebook.

Lesson 2: Day 7 - Making Sounds - Evaluate
Performance Task- Sound Energy

- Students plan an investigation to compare vibrations of low and high sounds. Students will use tuning forks and water in cups or bowls to show that sound waves from a high pitch are faster than the sound waves from a low pitch.

Lesson 2: Days 8 and 9: - Module Wrap-Up
Performance Project- Sound and Matter

- Students will investigate how sound (from music speakers) affects salt on a plastic-wrapped bowl. Students will write out the steps they will use to complete this performance project, as well as write and/or draw their observations.

Lesson 2: Day 10- Assessment

- Students will show their understanding and what they have learned thus far by completing one of the assessment options provided or teacher-created.

What students should know and be able to do to engage in this lesson:

- When we hear sounds, our eardrums are responding to sound waves. Any vibrating object can set off sound waves. Sound can be loud or soft. Loud sounds are described as having high volume, while soft sounds are described as having low volume. Sounds with high volume have higher energy than those with low volume. The faster an object vibrates, the higher its sound, or pitch, is. The more slowly an object vibrates, the lower its pitch. Sound waves produced by a flute, for example, vibrate faster than sound waves produced by a bassoon.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
PS4.A: Wave Properties ● Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)	Preschool Standard 5.2.3 Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors). (5.2.P.C.1)
Focus Question for this Lesson	

How does sound change?

Learning Intention	Success Criteria
Day 1: ● I am learning about the phenomenon of elephants and the sounds they make. ● I am learning to ask questions about the phenomenon and what I want to learn about it. **Day 2:** ● I am learning about the relationship between how loud a sound is and sound waves. **Days 3-5 :** ● I am learning the difference between volume and pitch. **Day 6:** ● I am learning that my vocal cords vibrate as they make sound. **Day 7:** ● I am learning about the vibrations of high and low sounds in today's Inquiry Activity, *Sound Energy*. **Days 8-9:** ● I am learning about how an object making sound can affect another object nearby.	**Day 1:** ● I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Day 2:** ● I can write and draw in my Science Notebook about what I heard and saw when placing the tuning fork in the water. **Days 3-5:** ● I can describe the difference between volume and pitch. ● I can decide whether to change or justify my response by revisiting the Page Keeley Science Probe. **Day 6:** ● I can identify and describe to a partner whether each sound I produce is loud or soft, high or low or a combination of both. **Day 7:** ● I can compare the sound waves for a high pitch and low pitch by completing a hands-on investigation and recording my findings in my Science Notebook. **Days 8-9:** ● I can explain through writing and drawing, how sounds occurs when matter vibrates.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Performance Task - Sound Energy
- Lesson 2- Making Sounds Test
- Sound Energy Module Test
- Teacher-created eAssessment
- STEM Gauge #477013

Feedback (Peer to peer/student to teacher/teacher to student)

- Sound Energy Performance Task Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS
Anticipated Student Pre-Conceptions/Misconceptions
● Students may confuse the concept of volume (louder and softer sounds) with the concept of pitch (higher and lower sounds). ● They may think that it is possible to change pitch by altering the volume, and vice versa. ● Students may think that the pitch or volume of certain sounds cannot change, especially if they have only ever heard the sound in one particular way (a school bell ringing or a car horn honking, for example).
Integrated Accommodations & Modifications
English Language Learners/Sociocultural Implications: ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook. ● Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials ● Allow students to use Google Read&Write for speech to text to construct sentences independently. ● Display worksheet/textbook on SmartBoard **Special Needs:** ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook. ● Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions. ● Provide students with only two answer choices for each fill in the blanks question to choose from.

- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 2, Day 1- Assess and Engage
Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.
Lesson Opening
Review Learning Intention(s) for the day with students: ● I am learning about the phenomenon of making sound using different musical instruments. ● I am learning to ask questions about the phenomenon and what I want to learn about it.
During the Lesson
Assess Lesson Readiness: Page Keeley Science Probe - Materials and Vibrations ● This probe is intended to uncover students' basic ideas about the relationship between sound and vibrations. ● This probe can be used as an elicitation prior to introducing the idea that vibrating materials that produce sound can also cause other materials to vibrate. This probe is used in a talk format. It can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations. ● The characters in the probe share their ideas, and students are asked to tell whom they most agree with and why. This format helps students recognize that people have different ideas about science, and it is important to share these ideas. ● Introduce the probe by telling students that three friends are playing musical instruments and talking about sound. They each have a different idea about sound, materials, and vibrations. Point to each character, say the character's name, and read aloud his or her idea. Make sure students understand what each character is saying.

- Students will choose the friend they think has the best idea about sound and materials. Choose a talk configuration (pair, small group, whole class, or combination), and listen carefully as students share their choices and explanations. Use talk moves to help them explain their thinking.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of elephants and the sounds they make.
- Show the photo and play the sounds and ask students what questions they have about the elephants and the sounds. Have students record them on in the Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and heard and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- **ASK:**
    - What did you see in the photo? What did you hear?
    - What did you notice about the elephants and the sounds they make?
    - What did you wonder about what you saw in the photo and heard?
    - What interests you about elephants and the sounds they make?

STEM Career Kid Connection: Sound Engineer

- Reintroduce Career Kid Deven, who wants to be a sound engineer when he grows up.
- Remind students that a sound engineer records sounds and creates sound effects. Read what Deven says aloud as a class.
- ASK:
    - How does sound bring the picture to life? Sample answer: I can hear what the elephant sounds like.
    - How would a sound engineer make different kinds of sounds? Sample answer: They would use different objects to make louder, softer, higher, or lower sounds.

Essential Question: How does sound change?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *plan an investigation.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn about pitch, volume and making different sounds. They will plan an investigation that demonstrates how to change pitch. Review with students the Science and Engineering Practice of planning investigations by reminding them that an investigation is a careful examination that is performed in order to get information or learn facts about something.

- **ASK:**
  - What investigation could you plan to demonstrate how sounds change? Sample answer: I could strike different objects gently and more forcefully to hear what sounds they make.

THE LESSON IN ACTION: Lesson 2, Day 2 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- What does a sound engineer do and how does it relate to sound?

Review Learning Intention(s) for the day with students:

- I am learning about the relationship between how loud a sound is and sound waves.

During the Lesson

Inquiry Activity- Sound Waves:

- Students will observe the relationship between how loud a sound is and sound waves. Students will discover that hitting the tuning fork hard will make a large vibration, resulting in a large sound wave and a loud sound. The smaller the vibration, the smaller the sound wave, and the quieter the sound.

Safety:

- Students should wear their safety goggles at all times throughout the activity.

Advanced Preparation:

- Point out that students just saw and heard elephants. Now they will learn about sound waves and how they are related to loudness. Read the steps of the investigation in the **Science Notebook** together with students.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook.** Then have students explain their predictions based on previous observations.

Carry Out an Investigation:

- The cups or bowls should be 1/3 and 1/2 full with water.
- Help students pour the water into the cups or bowls, if necessary.
- Students should strike the tuning fork gently on the top of their desk or a book. Demonstrate to students how to hold the fork at its end and on its side so that only one of its prongs is being tapped. Tap the prong about one third of the way from the top of the prong.
- Students should immerse their tuning forks only as far as needed in the water to see the ripples. Tell students that the ripples represent sound waves, which are invisible.

Communicate Information:

Record Data- Make sure students are recording data correctly in the table. Help students with their writing, if necessary. Have students complete the work in their **Science Notebook.**

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It

- Have students share their observations and data with those of their classmates.
- **ASK**:
  - What were the results of your activity? Sample answer: The harder I struck the tuning fork, the bigger the ripples, or sound waves, and the louder the sound.
  - How do your observations compare to the observations of your classmates? Sample answer: My classmates made similar observations. Striking the tuning fork gently caused small ripples, or sound waves, and a soft sound. Striking the tuning fork harder caused larger ripples, or sound waves, and a loud sound.

In this discussion, observe your students' ability to articulate the relationship between sound waves and loud and soft sounds.

THE LESSON IN ACTION: Lesson 2, Days 3, 4 and 5 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to recall what happened when they struck the tuning fork.

Review Learning Intention(s) for the day with students:

- I am learning the difference between volume and pitch.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
    - volume-how loud or soft a sound is
    - pitch-the lowness or highness of a sound

Instruments Simulation**:**

- Students hear different instruments at various volumes, and observe how the sound waves radiate from the instruments at each volume. Students will observe that the louder the sound, the bigger the sound waves and the farther the sound waves travel.
- Read the introduction aloud as a class and then click OK. Students should choose an instrument on the left by clicking on it. They should use the slider on the left to change volume, sliding it up to make the sound louder and down to make the sound softer. Students should then click the arrow icon on the right to start the simulation.
- Encourage students to carefully observe the size and amount of the sound waves and the distance the sound waves travel at each volume.
- Students should try all of the instruments and all of the volumes available in order to successfully complete the simulation. After all students have completed the simulation, **ASK:**
    - What do the curved black lines represent? sound waves
    - What happens when you turn the volume up? The instruments sound louder. The sound waves are bigger.
    - How much does the cymbal move when the volume is soft? The cymbals move a little bit at a soft volume.
- Use the Visuals: How does the string on the violin move when the volume is loud? The string moves fast and a lot at a loud volume.
- Have students complete the question in their **Science Notebook.**

Develop Vocabulary:

- volume Explain to students that when scientists refer to the volume of a sound, they are describing how loud or soft a sound is. Explain that a synonym, or word that has a similar meaning, for the word volume is the word loudness.

Different Sounds Science File:

- Have students read the Different Sounds Science File to learn how vibration relates to pitch and volume. While reading, students will encounter the vocabulary words: volume and pitch. **ASK:**
    - What word tells how loud or soft a sound is? volume
    - What size vibrations make loud sounds? big vibrations
    - What is pitch? how high or low a sound is

- What kind of vibrations make low-pitched sounds? slow vibrations
- Use the Visuals What type of pitch does the drum in the picture have? a low pitch
- How can you describe the pitch of a whistle? high

Have students complete the question in their **Science Notebook.**

Develop Vocabulary:
pitch Explain that in sports, pitch means "to throw." A scientist or musician, meanwhile, uses pitch to describe how high or low something sounds.

Sounds All Around Read Aloud**:**

- Read aloud the nonfiction selection Sounds All Around on pages 18-23 in the Science Paired Read Aloud. (Please note that this is the second part of the Science Paired Read Aloud.) Students will learn about volume and pitch and how the vibration of an object affects the volume or pitch of its sound.
- While reading, students will encounter the vocabulary words: *volume and pitch*.
  - **ASK:**
    - What is the main idea of the paragraph on page 18? Sample answer: Sound can make things vibrate.
    - Use the Visuals Look at the picture on the bottom of page 21. How can the sound that this vehicle makes help you? Sample answer: It can help keep me safe.
    - What do pages 22 and 23 say have a low pitch? Sample answers: a man's voice when compared to children's voices, thunder, drums, and a bullfrog

Have students complete the questions in their **Science Notebook.**

Using Science Songs:

- Print the lyrics of the song "Sound Moves".
- Pair up students, pass out the lyric page, and play the song "Sound Moves."
- Have students turn to their partner and share what the song is about.
  - You should hear students explaining what sound is and describing different sounds and their volume and pitch. Encourage students to underline examples of loud sounds and circle examples of high-pitched sounds on the lyrics page.

Leveled Readers- What Sounds Say (Optional)

This book talks about what some sounds tell us. Use this book in the Explain section of Lesson 2 after discussing different sounds and how to make sounds. Help students understand that sounds have different volumes and pitches. Different sounds tell us different things.

Talk About It:
Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding of volume and pitch, then have them revisit some activities in this lesson. **ASK:**

- What causes a loud sound? big vibrations
- What can you do to cause an object to make a soft sound? tap the object gently
- What kind of vibrations cause the loud, high-pitched sound of a siren? big, fast vibrations
- Suppose an object's vibrations were slow and small. What kind of sound would you hear? a quiet, low sound

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK:**
- Infer: Why is the sound from a car horn loud? Sample answer: The car horn makes big vibrations, which makes the sound loud. Complete the graphic organizer as a class. If students were not able to make the connection between a loud sound and big vibrations, have them redo the Instruments simulation.

Reflect and Refine - Materials and Vibrations:

- At this point, students can go back to the Page Keeley Science Probe in their Science Notebook to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of sound and vibrations. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- ***I can*** plan an investigation.

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practice of planning investigations.

- **ASK:**
  - What can you plan to investigate about sound? Sample answer: I can plan to investigate how pitch or volume of sound can change by using different objects and tapping them a little or a lot.

THE LESSON IN ACTION: Lesson 2, Day 6 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Write the word "sound" on a piece of chart paper or white board. Students will draw an example of sound on a post-it to add on to the chart. Encourage students to write words or phrases to describe the drawings.

Review Learning Intention(s) for the day with students:

- I am learning about what causes sound.

During the Lesson

Inquiry Activity- Throat Vibrations

- Students observe how their vocal cords vibrate as they make sounds of different pitch and volume. Students will observe that the louder the sound they make, the bigger or stronger their vocal cords vibrate. The higher the pitch of the sound they make, the faster their vocal cords vibrate.

Materials: your throat

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the **Science Notebook** together with students.

Communicate Information:

- Record Data- Review the table with students. Have students record their data in their **Science Notebook.** Make sure students are recording the correct information in the correct column in the table.

Have students complete the question in their **Science Notebook.**

Crosscutting Concepts: Cause and Effect

- Review the Crosscutting Concept of cause and effect with students. Remind them that a cause makes something happen and an effect is what happens. Students should recognize cause and effect in the activities they have done in this lesson. **ASK:**
    - What is a cause? A cause is what makes something happen.
    - What causes your throat to make sound? vibrations
    - What is the effect of the vibrations? I make sounds.
    - What is the effect of slow vibrations? low pitched sounds
    - What causes loud sounds? big vibrations

Have students complete the question in their **Science Notebook.**

Leveled Readers- Sounds All Around (Optional)

This book defines and gives examples of sound. Use this book in the Explain section of Lesson 1 and in the Elaborate section of Lesson 1 after discussing what sound is and investigating what produces different sounds. Help students understand that sound is a form of energy that results from vibrating matter.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations from the activity Throat Vibrations. **ASK:**
    - How does your throat feel when you make louder sounds? Accept all reasonable answers. Sample answer: I feel stronger or bigger vibrations from the louder sounds I make.
    - How does your throat feel when you make a higher-pitched sound, like a laugh? Sample answer: My throat vibrates faster.
    - How did your results compare to your classmates' results? Sample answer: My classmates had similar results. Some of my classmates could feel small vibrations when they whispered, and some couldn't. Some felt bigger vibrations when they talked or shouted. Some of my classmates had trouble feeling faster vibrations when they laughed.

In this discussion, observe your students' ability to articulate the relationship between types of vibrations in their vocal cords and the different sounds they make.

THE LESSON IN ACTION: Lesson 2, Day 7- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Recall the previous day's lesson by asking: What causes a guitar to make sound? vibrations

Review Learning Intention(s) for the day with students:

- I am learning that different materials can create musical instruments that will produce a sound.

During the Lesson

Performance Task - Sound Energy:

- Students plan an investigation to compare vibrations of low and high sounds.

What to Expect:

- Students will use tuning forks and water in cups or bowls to show that sound waves from a high pitch are faster than the sound waves from a low pitch.

Safety: Students should wear safety goggles at all times.

Ask a Question:

- Read the question aloud to the class. Remind students that asking questions is a science practice that drives every investigation. Have students brainstorm answers as a class. Write their questions on the board. Have students write the answer to the question in their **Science Notebook.**

Carry Out an Investigation:

- You might wish to provide various materials for students to choose from, such as tuning forks, plastic cups or bowls, and water. Help students pour water, if necessary. Have students complete the questions in their Science Notebook. Move around the classroom answering questions and helping with writing as needed.

- Allow students to review or review with the class the steps of the Explore Sound Waves activity in which they tested volume, and discuss as a class how students can test pitch. Then move around the classroom listening to groups plan and discuss the steps of their Performance Task and providing direction or asking questions, as necessary. Have students write the steps of their investigation in their Science Notebook. Help students with writing, as necessary. Then have students follow their steps to conduct their investigation.

Communicate Information:

- **Record Data-** Have students record their data in their **Science Notebook.** Make sure students are recording the correct data in the table columns.
- **Draw Conclusions** As a class, discuss students' answers. Have students complete the question in their **Science Notebook**.

Talk About It:

- Students should have planned an investigation that demonstrated how sound waves travel faster in high-pitched sounds and slower in low-pitched sounds. **ASK:**
    - How did your plan compare to your classmates'? Sample answer: My classmates had a similar plan. We all used tuning forks and water to show how sound waves travel for high and low pitches. Some steps in our procedures were different.
    - How did your results compare to your classmates'? Sample answer: My classmates had similar results. My classmates could see a difference in how fast the ripples moved and hear the differences in sound.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: How does sound change?

- Have students refer to the answers you recorded to this question in their **Science Notebook** and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- ***I did*** plan an investigation.

Have the students refer back to the "I will . . ." and "I can . . ." statements in their Science Notebook. Read together as a class the "I did . . ." statement in their Science Notebook.

- **ASK:**
  - How would you rate yourself in your ability to plan an investigation? Color the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars could mean "average"; and one star could mean "still learning."

THE LESSON IN ACTION: Lesson 2, Days 8, 9 and 10- Module Wrap-Up & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Recall the previous day's lesson by asking: What causes a guitar to make sound? vibrations

Review Learning Intention(s) for the day with students:

- I am learning that different materials can create musical instruments that will produce a sound.

During the Lesson

Performance Project - Sound and Matter:

- Students will investigate how sound affects salt on a plastic-wrapped bowl.

What to Expect:

- Students should observe how an object that is making sound can cause another object that is close to it to vibrate and make sound. Students will conclude that sound occurs when matter vibrates.

Advanced Preparation:

- Gather the materials listed above prior to the beginning of the investigation.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.

Carry Out an Investigation:

- You may wish to brainstorm steps together as a class. Write students' suggestions on the board. Number each step and review the steps, asking students whether they think the steps are in the correct order and reordering them when necessary. Have students write down the steps they will use to design their investigation in their Science Notebook. You may wish to move around the class and provide help to groups as they write their steps. Have students follow their steps to carry out their investigation.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Communicate Information:

- Record Data: Have students write or draw their observations in their Science Notebook. You might wish to have students draw their observations and then write a few words or a short sentence explaining their drawing. Help them with their writing, if necessary. Students will share with a partner their observations and findings.

Administer Sound Energy Module Test

Lesson 2 Resources

Sound Energy PDF Folder
Reading Strategies for Science Folder
Mystery #1: How do they make silly sounds in cartoons?
STEM Gauge #477013
McGraw Hill *Science* Notebook
Inspire Science
Discovery Education Website

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 2:
Light Energy

Stage 1 – Desired Results	
ASSESSED FOCUS STANDARDS: **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) ● 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) **CONTENT 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.	*Unit Description* **Anchoring Phenomenon:** **Statement**: Light is a form of energy that is able to travel. **Observation/Demonstration/Experience:** A photo of light shining through windows.  **Driving Question:** What is light and how does it travel? *Meaning*

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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).
W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
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.

</td>
<td><u>ENDURING UNDERSTANDINGS:</u>

Light is one kind of energy we get from the Sun and one we can detect with our eyes.
Light comes as a mix of colors.
Different materials absorb or reflect light in different ways.
Transparent objects allow light to travel through them.
Translucent objects let only some light through.
Opaque objects block light altogether.
The absence of light coming through these objects forms a shadow, or an area without light.
Some objects are reflective, meaning they bounce a lot of light back.

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<td><u>ESSENTIAL QUESTIONS:</u>

What is light?
How does light travel through different materials?
How can light bounce off objects?

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<td colspan="2">What students will know and be able to do</td>
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<td><u>KNOWLEDGE:</u>

I can explain what light is.
I can explain how light affects shadows.
I can investigate how light travels through different materials.
I can explain the effect of mirrors on the path of light.

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<td><u>SKILLS:</u>
1-PS4-2. Make observations to construct an evidence-based account that objects 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 an investigation 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</td>
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		as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.] Constructing Explanations and Designing Solutions Cause and Effect

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - Lighting the School Play (Lesson 1)
  - Lighting the School Play Performance Task Rubric
- Lesson 1- Light & Shadows Test
- Performance Task - Light and Materials (Lesson 2)
  - Light and Materials Performance Task Rubric
- Lesson 2- Properties of Light Test
- Performance Task - Mirrors (Lesson 3)
  - Mirrors Performance Task Rubric
- Lesson 3- How Light Travels Test
- Module Performance Project- Light Illuminates Objects
  - Light Illuminates Objects Performance Project Rubric
- Light Energy Module Test
- STEM Gauge #471196
- STEM Gauge #471217
- STEM Gauge #499377
- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe - Light and Sight (Lesson 1)
- Page Keeley Science Probe - Properties of Light (Lesson 2)
- Page Keeley Science Probe - Mirrors and Light (Lesson 3)

Integration of 21st Century Skills	Integration of Technology	Career Education
● **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively. ● **9.1.4.A.2:** Evaluate available resources that can assist in solving problems. ● **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems. ● **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process.	● **Inspire Science Videos** ○ Cave Exploration ○ Light ○ A Prism ● **Inspire Science Files** ○ How Does Light Move? ● **Inspire Simulations & Digital Interactives** ○ Find the Cat Simulation ○ How Light and Shadows Interact ○ Types of Materials ● **Inspire Science Songs**	● **Photonics Engineer:** ○ Introduce Career Kid Malik, who wants to be a photonics engineer when he grows up. Malik has always been interested in lasers, especially the types he sees at concerts and sporting events. ● **Carpenter** ○ Introduce Career Kid Chloe, who wants to be a carpenter when she grows up.

• **9.1.4.A.5:** Apply critical thinking • **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking. • **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities. • **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community. • **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. • **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations. • **9.3.4.A.5:** Locate career information using a variety of resources.	○ My Shadow • **Inspire Science Readers** ○ Shadows ○ The Camera's Eye • **Discovery Education** ○ Sticky Songs: Singable Lessons about Physical Science: Light • **Mystery Science** ○ Mystery #3- What if there were no windows? ○ Mystery #4- Read-Along: Can you see in the dark? • **Generation Genius** ○ The Light Song ○ Introduction to Light	Explain to students that carpenters build and repair wooden things or parts of wooden things. Carpenters may build structures such as a building or part of a building or objects such as shelves and furniture.

Stage 3 – Learning Plan

UNIT VOCABULARY

light materials mirror	opaque reflect shadow	translucent transparent

SUMMARY OF KEY LEARNING

Lesson 1: Light and Shadows

Lesson 1: Day 1- Light and Shadows - Module Opener

- **Learning Intention:** I am learning what light is. I am learning about the phenomenon of light shining through windows.
- **Success Criteria:** I can make initial explanations by observing a photo of light shining through windows.
- **Brief Overview of Lesson:** Students will view a photo of light shining through windows and make initial explanations. Students will also be introduced to the **Career Connection** of a *Photonics Engineer* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Light and Shadows - Assess and Engage

Page Keeley Science Probe - Light and Sight, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning that we need light to see things. I am learning about the phenomenon of shadows.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Light and Sight.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the connection between light and sight and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *shadows* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 1: Days 3 and 4 - Light and Shadows - Explore
Inquiry Activity: Shadow Walk, Science Text- A Constant Friend

- **Learning Intention:** I am learning how shadows are created.
- **Success Criteria:** I can investigate and explain how shadows are created with a partner in class.
- **Brief Overview of Lesson:** Students will learn that shadows are created when solid objects block light and that the shape of the shadow is the same shape as the object. Students will listen to a fictional read aloud, *A Constant Friend* to learn about Jeremy's first day at a new school and how he has his shadow buddy with him all the time.

Lesson 1: Days 5, 6 and 7 - Light and Shadows- Explain
How Light and Shadows Interact Digital Interactive, Science Text- Lights and Shadows and My Shadow Science Song

- **Learning Intention:** I am learning that light is a form of energy.
- **Success Criteria:** I can write and draw one source of light that is natural and one that is man-made.
- **Brief Overview of Lesson:** Students will learn that light is a form of energy that allows us to see. Students will also learn that light is both natural and man-made. While reading, students will encounter the vocabulary words: light and shadow. Students will watch a short video about sound waves. The teacher and class will complete a **Digital Interactive** about light and shadows. Students will notice that a shadow forms when light hits an object. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what shadows do when a person jumps, runs, and moves.

Lesson 1: Days 8 and 9 - Light and Shadows - Elaborate
Inquiry Activity- Changing Shadows and Cave Exploration Video

- **Learning Intention:** I am learning how shadows change size during the course of a day.
- **Success Criteria:** I can investigate and draw my findings to show a pattern of shadows changing size during the course of a day.
- **Brief Overview of Lesson:** Students will plan an investigation to show how shadows change size during the course of a day. Students will conduct this activity over the course of one school day. Students' pictures should show a pattern of shadows changing length during the day depending on where the Sun is in the sky. Shadows should be long in the morning, shorter at noon, and longer again in the afternoon. Students will then view the Cave Exploration video to learn about a spelunker (someone who explores caves) and learn how light helps people to see.

Lesson 1: Day 10 - Light and Shadows- Evaluate & Assessment
Performance Task- Lighting the School Play

- **Learning Intention:** I am learning that we need light to see things. I am learning that making a model can help solve a defined problem.
- **Success Criteria:** I can create a model to test and show the best way to light a school play.
- **Brief Overview of Lesson:** Students will make a model and write instructions for lighting a school play.

Lesson 1 Assessment Options

- **Learning Intention:** I am learning that we need light to see things.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What is light?
- Performance Task - Lighting the School Play (Lesson 1)
  - Lighting the School Play Performance Task Rubric
- STEM Gauge #471196
- Mystery #4- Read-Along: Can you see in the dark?
- Teacher-created Assessments

Lesson 2: Properties of Light

Lesson 2: Day 1- Properties of Light - Assess and Engage
Assess Lesson Readiness: Page Keeley Science Probe- Properties of Light, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- **Learning Intention:** I am learning that light travels through different materials. I am learning about the phenomenon of light shining through a leaf.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Properties of Light.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the behavior of light and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *light* by observing a photo of light shining through a leaf. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 2: Day 2- Properties of Light - Explore
Inquiry Activity- Light Passing Through

- **Learning Intention:** I am learning that the amount of light passing through depends on the object.
- **Success Criteria:** I can explore different items and record my findings on the amount of light that was able to pass through.
- **Brief Overview of Lesson:** Students will explore which items let light pass through them and which items partially or totally block light. Students' data should indicate that the clearer an object, the more light passes through it.

Lesson 2: Days 3 and 4 - Properties of Light - Explain

Light Video, Types of Materials Digital Interactive

- **Learning Intention:** I am learning the key vocabulary words: transparent, translucent and opaque to explain the properties of light.
- **Success Criteria:** I can write and draw examples of objects that are transparent, translucent or opaque.
- **Brief Overview of Lesson:** Have students watch the video light. Ask them if they have ever seen anything that is transparent or translucent. Have them point out one transparent object, one translucent object, and one opaque object in the classroom. Write students' answers on the board under the appropriate heading. Students will then demonstrate knowledge of how light travels through transparent, translucent, and opaque objects. Students will drag and drop to match the words with the correct objects.

Lesson 2: Day 5 - Properties of Light - Elaborate
Inquiry Activity- Building Materials

- **Learning Intention:** I am learning that different objects are made of transparent, translucent, or opaque materials.
- **Success Criteria:** I can write and/or draw examples of objects that are transparent, translucent or opaque, as well as explain how the material is used in school and/or classroom.
- **Brief Overview of Lesson:** Students will observe different materials in the school that are transparent, translucent, and opaque. Students will then explain how those materials are being used.

Lesson 2: Day 6 - Properties of Light - Evaluate
Performance Task- Light and Materials

- **Learning Intention:** I am learning about the amount of light that passes through different materials.
- **Success Criteria:** I can investigate different types of materials and explain the amount of light that passes through each.
- **Brief Overview of Lesson:** Students plan an investigation to discover what materials light passes through. Students' data should show that light passes through transparent materials, some light passes through translucent materials, and opaque materials block light.

Lesson 2: Day 7 - Assessment Options

- **Learning Intention:** I am learning that light travels through different materials.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How does light travel through different materials?
- Performance Task - Light and Materials (Lesson 2)
  - Light and Materials Performance Task Rubric
- Lesson 2- Properties of Light Test
- STEM Gauge #471217
- Mystery #3- What if there were no windows?
- Teacher-created Assessment

Lesson 3: How Light Travels

Lesson 3: Day 1- How Light Travels - Assess and Engage
Assess Lesson Readiness: Page Keeley Science Probe- Mirrors and Light, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- **Learning Intention:** I am learning the effect of mirrors on the path of light. I am learning about the phenomenon of a mirrored ball reflecting light.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Mirrors and Light.* This is intended to serve as a pre-assessment and uncover students' basic ideas about mirrors and reflection and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *reflection* by observing a photo of a mirrored ball reflecting light. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 3: Days 2 and 3- How Light Travels - Explore
Find the Cat Simulation, Science Text- Mirror Land

- **Learning Intention:** I am learning how light acts when it hits different objects.
- **Success Criteria:** I can explore ways that light travels before and after it hits different objects and compare my findings with a partner.
- **Brief Overview of Lesson:** Students will explore how light travels before and after it hits different objects. Students will explore different ways to position the flashlight and mirrors so that the light from the flashlight bounces off the mirrors and hits the cat. Students will listen to a fiction text to learn about a boy and his cat Bella, who likes to play with a spot of light. The boy shines the spot of light on a mirror and Bella plays with the light that bounces off the mirror.

Lesson 3: Days 4, 5 and 6 - How Light Travels - Explain & Elaborate
How Does Light Move? Science File, Science Text- Mirrors and Light, A Prism Video

- **Learning Intention:** I am learning the key vocabulary words: mirror and reflect. I am learning that light travels and changes direction.
- **Success Criteria:** I can explain to a partner what I see when I look at myself in a mirror.
- **Brief Overview of Lesson:** Teacher will read "How Does Light Move? **Science File** to learn the path that light travels and why light can
- change direction. While reading, students will encounter the vocabulary words: mirror and reflect. Students will listen to the nonfiction text, *Mirror and Light* to learn that mirrors are reflective objects that bounce light back. They will learn that images in mirrors are reversed. Students will also learn that light that is shined on a mirror at an angle bounces back at an angle as well. The **video**, *A Prism* will help students observe how a prism splits visible white light into many different colors.

Lesson 3: Day 7 - How Light Travels - Evaluate
Performance Task- Mirrors

- **Learning Intention:** I am learning the effect of mirrors on the path of light.
- **Success Criteria:** I can plan and conduct an investigation to discover if light passes through a mirror.
- **Brief Overview of Lesson:** Students plan an investigation to discover if light can pass through a mirror. Students will work with mirrors and flashlights to test their predictions and record their findings.

Lesson 3: Days 8 and 9 - How Light Travels - Module Wrap-Up

Performance Project- Light Illuminates Objects

- **Learning Intention:** I am learning how light illuminates objects.
- **Success Criteria:** I can investigate how light can illuminate an object through observation of light.
- **Brief Overview of Lesson:** Students will observe that objects can only be seen when illuminated, that only the part of the object that light hits is illuminated, and that the illuminated object casts a shadow.

Lesson 3: Day 10 - Assessment Options

- **Learning Intention:** I am learning the effect of mirrors on the path of light.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How can light bounce off objects?
- Lesson 3- How Light Travels Test
- Light Energy Module Test
- STEM Gauge #499377
- Teacher-created Assessment

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Light Energy"
  ○ Learning about Famous Scientists
  ○ DK findout! Famous Scientists
  ○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers
• Discovery Education:
  ○ News and Current Events Channel
• Try to find examples of an Photonics Engineer and Carpenter from different cultures
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills
	• Forming positive relationships, working in teams, dealing effectively with conflict
	• SEL Strategies for Virtual Learning
	• SOS Top Ten: Social and Emotional Learning Strategies

Lesson 1: Light and Shadows	Light Energy	Estimated Time: 45 minutes per day

Brief Overview of Lessons:

Lesson 1: Day 1- Light and Shadows - Module Opener

- Students will view a photo of light shining through windows and make initial explanations. Students will also be introduced to the **Career Connection** of a *Photonics Engineer* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Light and Shadows - Assess and Engage

Page Keeley Science Probe - Light and Sight, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Light and Sight.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the connection between light and sight and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *shadows* by

observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 1: Days 3 and 4 - Light and Shadows - Explore
Inquiry Activity: Shadow Walk, Science Text- A Constant Friend

- Students will learn that shadows are created when solid objects block light and that the shape of the shadow is the same shape as the object. Students will listen to a fictional read aloud, *A Constant Friend* to learn about Jeremy's first day at a new school and how he has his shadow buddy with him all the time.

Lesson 1: Days 5, 6 and 7 - Light and Shadows- Explain
How Light and Shadows Interact Digital Interactive, Science Text- Lights and Shadows and My Shadow Science Song

- Students will learn that light is a form of energy that allows us to see. Students will also learn that light is both natural and man-made. While reading, students will encounter the vocabulary words: light and shadow. Students will watch a short video about sound waves. The teacher and class will complete a **Digital Interactive** about light and shadows. Students will notice that a shadow forms when light hits an object. Students will revisit the **Page Keeley Science Probe** to change or justify their initial responses from the beginning of the lesson. Finally, students will listen to a **Science Song** and describe to a partner what shadows do when a person jumps, runs, and moves.

Lesson 1: Days 8 and 9 - Light and Shadows - Elaborate
Inquiry Activity- Changing Shadows and Cave Exploration Video

- Students will plan an investigation to show how shadows change size during the course of a day. Students will conduct this activity over the course of one school day. Students' pictures should show a pattern of shadows changing length during the day depending on where the Sun is in the sky. Shadows should be long in the morning, shorter at noon, and longer again in the afternoon. Students will then view the Cave Exploration video to learn about a spelunker (someone who explores caves) and learn how light helps people to see.

Lesson 1: Day 10 - Light and Shadows- Evaluate & Assessment
Performance Task- Lighting the School Play

- Students will make a model and write instructions for lighting a school play. Students will show their understanding and what they have learned thus far by completing one of the assessment options provided or teacher-created.

What students should know and be able to do to engage in this lesson:

- Light is one kind of energy we get from the Sun and one we can detect with our eyes. Energy from the Suncomes down to Earth and bounces off objects. The receptors in our eyes and our brain detect the changes and interpret them as shapes and colors. Light comes as a mix of colors. The light bounces off objects in different ways, giving some objects more of one color than another. For instance, a red tomato absorbs much of the light that hits it, but certain waves bounce back. Our eyes see the waves that bounce back and interpret those waves as the color red.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.2.3 Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made

• 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)	by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors). (5.2.P.C.1)

Focus Question for this Lesson

What is light?

Learning Intention	**Success Criteria**
Day 1: • I am learning about the phenomenon of light shining through windows. **Day 2:** • I am learning about the phenomenon of shadows. I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 3-4 :** • I am learning how shadows are created. **Days 5-7:** • I am learning that light is a form of energy. **Days 8-9:** • I am learning how shadows change size during the course of a day. **Day 10:** • I am learning that making a model can help solve a defined problem.	**Day 1:** • I can make initial explanations by observing a photo of light shining through windows. **Day 2:** • I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 3-4:** • I can investigate and explain how shadows are created with a partner in class. **Days 5-7:** • I can write and draw one source of light that is natural and one that is man-made. **Days 8-9:** • I can investigate and draw my findings to show a pattern of shadows changing size during the course of a day. **Day 10:** • I can create a model to test and show the best way to light a school play.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations

- Work Samples
- Performance Task - Lighting the School Play (Lesson 1)
- STEM Gauge #471196
- Mystery #4- Read-Along: Can you see in the dark?

Feedback (Peer to peer/student to teacher/teacher to student)

- Lighting the School Play Performance Task Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS

Anticipated Student Pre-Conceptions/Misconceptions

- Students may think that colors are not related to light, and that all objects retain their color no matter what light shines on them. They may also think that shadows are always the same size as the objects that cast them.
- They may have trouble understanding that a shadow is an area with less light and that it changes depending on the angle and the direction of the light. Students may benefit from a demonstration in which a flashlight is directed at objects from different angles. Students would be able to see how the shadow of the object changes as the angle and location of the flashlight beam shifts.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.

- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 1, Day 1- Module Opener
Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.
Lesson Opening

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of light shining through windows.

Module Opener:

- Introduce the module phenomenon by showing the photo of light shining through windows.
- Ask students to think of questions they have relating to light. Have them record questions in their Science Notebook.
- Use the questions below to elicit student responses.
    - ASK:
        - Why does the light come through the window? Sample answer: The window is clear so light can go through it.
        - Where is the light shining through the window coming from? the Sun

During the Lesson

Introduce Key Vocabulary:

- **Key Vocabulary:** light, materials, mirror, opaque, reflect,shadow, translucent, transparent
- These words are a selection of important vocabulary that will be used throughout the module. Remind students to listen for these Key Vocabulary words as they complete the module.

STEM Career Kid Connection: Photonics Engineer

- Introduce Career Kid Malik, who wants to be a photonics engineer when he grows up.
- Explain how he has always been interested in lasers, especially the types he sees at concerts and sporting events.
- Read aloud to students what Malik says in the Science Notebook. Have students complete the question in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *construct an explanation.*
- **I will** *design a solution.*

Have students read the "I will…" statements in their Science Notebook. The "I will . . ." statements for this module reference the science and engineering practices of constructing an explanation and designing our solution.

- If this is the first time you are teaching the science and engineering practices of constructing an explanation and designing a solution, then help students understand that an explanation is a statement that makes something easier to understand, or more clear. An example of an explanation is: "I wore a coat to school today because it is raining outside." You might also wish to help students understand that a solution is an answer. Scientists design a solution when they figure out an answer to a problem. Scientists may make a drawing of a new kind of airplane to solve the problem of moving faster from place to place.

THE LESSON IN ACTION: Lesson 1, Day 2- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they already know about light.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of shadows.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Light and Sight

- Start by asking students how they think light and sight are connected. Let students share and discuss their initial ideas without acknowledging whether they are right or wrong.
- Introduce the probe. Choose a talk configuration (pair, small group, whole class, or combination) and listen carefully as students share their thinking about which things on the list make sound by vibrating. Use talk moves to help them explain their thinking.
- The probe should be revisited after students have had the opportunity to develop the generalization that all sounds are produced by vibrations.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of the shadow of a tree.
- Show the photo and ask students what questions they have about the shadow. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- ASK:
    - What did you see in the photo?
    - What did you notice about the shadow?
    - What did you wonder about when you saw the photo?
    - What interests you about how shadows are made?

Help students turn their observations from the photo into questions that they can refer to during the lesson.

- You may want to demonstrate light and shadows by turning off the classroom lights and using a flashlight to make shadows of different shapes and sizes using your hands and arms. Students should describe what your shadows look like. Have students compare the shadows to what you were actually doing or making with your hands and arms. Students can generate questions based on your demonstration.

STEM Career Kid Connection: Carpenter

- Introduce Career Kid Chloe, who wants to be a carpenter when she grows up.
- Explain to students that carpenters build and repair wooden things or parts of wooden things. Carpenters may build structures such as a building or part of a building or objects such as shelves and furniture. Read what Chloe says in their **Science Notebook** aloud as a class.
- ASK:
    - How does the shadow of the tree in the picture help Chloe think about light? Sample answer: She can see how the shadows would look if the light hit objects in a certain way.
    - How would this help Chloe plan the set for a play? Sample answer: This may help her plan a set that works well with the lighting and where the actors and props are in the play.

Essential Question: What is light?

- Have students read the Essential Question in their **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *construct an explanation.*
- **I will** *design a solution.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn about how light and shadows are interconnected. They will observe how light causes shadows and how shadows change.

- If this is the first time you are teaching the Science and Engineering Practices of constructing explanations and designing solutions, explain that construct means "to make." Explain that scientists and engineers often construct an explanation based on something they have observed or tested and that when scientists or engineers say they will "design a solution," they mean that they will think of the best solution and write the solution down or make a model of it.

ASK:

- What explanation might you construct to describe what shadows look like? Sample answer: I might explain that shadows look like the object that is making the shadow.

THE LESSON IN ACTION: Lesson 1, Days 3 and 4 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students what they know about shadows.

Review Learning Intention(s) for the day with students:

- I am learning how shadows are created.

During the Lesson

A Constant Friend Read Aloud

- Read aloud the fiction selection, A Constant Friend on pages 4–13 in the Science Paired Read Aloud. Students will learn about about Jeremy's first day at a new school and how he has his shadow buddy with him all the time.
- **ASK:**
    - Why didn't Jeremy want to go to school? On page 5 it says that he didn't know anyone. All of his friends were back in Michigan.
    - Use the Visuals: What is happening in the picture on pages 6 and 7? Children and adults are walking, and they all have shadows
    - What did Jeremy's shadow do when Jeremy nodded while walking home with his mother? On page 13 it says that his shadow nodded with him.

Inquiry Activity- Shadow Walk:

- Students will learn that shadows are created when solid objects block light and that the shape of the shadow is the same shape as the object.

Safety:

- Students should wear their safety goggles at all times throughout the activity. Remind students that they should only use the rubber bands as directed in the activity.

What to Expect:

- Students should recognize different shadows, including their own, and that shadows will move if the object moves.

Advanced Preparation:

- Students just saw a photo of a shadow of a tree. Now they will explore different shadows. This activity should be done on a sunny day. Safety Instruct students to stay within the school grounds and within sight of you at all times.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class, and write students' predictions on the board to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations. Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Students should explore as many parts of the schoolyard as possible and as many different objects as possible. Have students complete the questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations and data with those of their classmates.
- **ASK:**
  - What were the results of your activity? Sample answer: Some shadows were small, and some were big. Some objects didn't make shadows. My shadow was the same shape as I am and moved when I moved.
  - How do your observations compare to the observations of your classmates? Sample answer: My classmates made similar observations. Some of my classmates did not find as many shadows as others.
- In this discussion, observe your students' ability to articulate the relationship between light and shadows.
- **ASK**:
  - What made the light around the shadows? the Sun

THE LESSON IN ACTION: Lesson 1, Days 5, 6 and 7 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to recall what made the light around the shadows.

Review Learning Intention(s) for the day with students:

- I am learning that light is a form of energy.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
  - **light** a form of energy that lets you see
  - **shadow** a dark shape that is created when a source of light is blocked

Lights and Shadows Read Aloud:

- Read aloud the nonfiction selection, Lights and Shadows on pages 14–23 in the Science Paired Read Aloud. Students will learn that light is a form of energy that allows us to see. Students will also learn that light is both natural and man-made.

- **ASK:**
  - What is light? On page 14 it says that light is the form of energy that lets us see.
  - How does light help us see objects? On page 14 it says that light bounces off of objects and enters our eyes. Our brains interpret the light so we can see.
  - How can light help us both indoors and at night? On page 15, I read that indoor light helps us see something clearly and light at night helps us see things.
  - What objects give off light? On page 16, I read that the Sun, lamps, car headlights, and flashlights are sources of light.
  - Why does your body make a shadow? On page 22, I read that my body blocks the light so when a light shines on it, a shadow appears on the other side of my body.
- Have students complete the questions in their Science Notebook.

Visual Kinesthetic Vocabulary:

- Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their Science Notebook.

How Light and Shadows Interact Digital Interactive**:**

Have students complete the How Light and Shadows Interact digital interactive. Students should notice that a shadow forms when light hits an object, and that the shadow changes size and shape depending on where the light is when it is hitting the object. Direct students' attention to where the shadow forms in relation to where the sunlight hits the tree in the picture.

  - **ASK:**
    - What does the tree's shadow look like when the Sun is low in the sky? Sample answer: The shadow is long.
    - What does the shape of the shadow of the tree look like? Sample answer: It looks like the tree.
    - What does the tree's shadow look like when the Sun is directly over the tree? Sample answer: The shadow is very small and just around the bottom of the trunk of the tree.
- Have students complete the question in their **Science Notebook.**

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about the relationship between light and shadows, then have them revisit some activities in this lesson.
- **ASK:**
  - What is a shadow? Sample answer: a dark shape that is created when a source of light is blocked
  - Light hits one side of an object. Where does the shadow of the object appear? Sample answer: on the other side of the object from where the light is hitting it
  - Can we see objects if there is no light? no
  - What is one form of natural light? the Sun

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation.
- **ASK**:
    - **Draw Conclusions:** Why can you see the shadow of an umbrella in the Sun but not see shadows of anything under the umbrella? Sample answer: The umbrella is hit by the sunlight, making a shadow. Anything under the umbrella is not being hit by light and does not make a shadow.
- Complete the graphic organizer as a class. If students were not able to make the connection between a light and shadows, have them redo the How Light and Shadows Interact digital interactive.

Reflect and Refine- Sound:

- At this point, students can go back to the Page Keeley Science Probe in their **Science Notebook** to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of the connection between light and sight. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Using Science Songs:

- Print the lyrics of the song "My Shadow".
- Pair up students, pass out the lyric page, and play the song "My Shadow."
- Have students turn to their partner and share what the song is about.
    - You should hear the students explaining to each other what shadows look like, what shadows do if an object moves, and why and how shadows change during the day.
    - Encourage students to underline what shadows do when a person jumps, runs, and moves.

Leveled Readers- Shadows (Optional)

This book examines shadows and how they change throughout the day. Use this book in the Explain section of Lesson 1 after discussing light and shadows. This book serves as an introduction to light and shadows. Help students understand that shadows are dark areas that are created when the path of light is blocked.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I can** *construct an explanation.*
- **I can** *design a solution.*

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practices of constructing explanations and designing solutions.

- **ASK:**
  - What have you explained about shadows so far in the lesson? Sample answer: I explained what causes shadows.
  - What solution can you suggest to show how your shadow can change shape? Sample answer: I would suggest standing in the light and putting my arms out, squatting down, and turning to the side to see how my shadow changes shape when I do.

THE LESSON IN ACTION: Lesson 1, Days 8 and 9 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Invite students to describe how shadows and light are connected by having them explain why some objects cast shadows and other objects don't.

Review Learning Intention(s) for the day with students:

- I am learning how shadows change size during the course of a day.

During the Lesson

Inquiry Activity- Changing Shadows

- Students will plan an investigation to show how shadows change size during the course of a day.

What to Expect:

- Students' pictures should show a pattern of shadows changing length during the day depending on where the Sun is in the sky. Shadows should be long in the morning, shorter at noon, and longer again in the afternoon. Students will conduct this activity over the course of one day.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class and write students' predictions on the board. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the **Science Notebook** together with students.

Carry Out an Investigation:

- If students are not observing a stationary object such as a tree, bushes, fence, and so on, the object they are observing should be placed in the same spot to observe at each time of day. Placement of non-stationary objects, such as students' own shadows, should be marked with a book or other object so students can return to the same spot to check their shadows throughout the day.
- Discuss with the class best times to view different shadows and decide when to observe shadows as a class. Encourage children to view shadows in the morning, at noon, and in the afternoon.

Communicate Information:

- **Record Data-** Have students record their data in the table in their Science Notebook. Remind students that they should show both the object and its shadow in their tables. Students should draw their pictures immediately after they have observed the object and its shadow. Help students record the time of day, if necessary. Have students complete the question in their Science Notebook.
- **Math Connection-** You may want to have students use a meter stick to measure the length of each shadow and order the shadows by length, starting with the shortest shadow. Have students compare the lengths of the middle-of the-day and afternoon shadows to the morning shadow.

Cave Exploration Video:

- Have students watch the video Cave Exploration. Ask students if they know what a spelunker is. Explain that a spelunker is someone who explores caves. Students have learned that people need light to see. Have them discuss how people can see when they explore a cave.
- **ASK**:
    - Why is there no light in a cave? because sunshine cannot reach deep into a cave
    - How can you get light in a cave? Sample answer: You can use a flashlight.
    - What can you see in the cave without light from a flashlight? Sample answer: It is difficult to see anything.
    - What things might the flashlight help you see in the cave? Sample answers: pointy stalactites from the cave ceiling and stalagmites from the cave floor, fish, bats, plants
    - Does the flashlight let you see everything in the cave at one time? Sample answer: No, you can see only what the light from the flashlight is shining on.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss the sounds they heard from the activity *Changing Shadows*.
- **ASK:**
    - Why did you go outside to look for shadows? Sample answer: to use the Sun as a source of light
    - Did the shadow change during the day? If so, how? Sample answer: Yes, the shadow changed. In the morning, the shadow was long and thin; in the middle of the day it was shorter and rounder; in the afternoon, it was getting and longer again.
    - How did your results compare to your classmates'? Sample answer: My classmates had similar results. In the morning, the shadow was long, it was shorter in the middle of the day, and in the afternoon, it was longer again.

THE LESSON IN ACTION: Lesson 1, Day 10- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Recall the previous day's lesson by having students participate in a discussion, observe your students' ability to articulate the relationship between shadows, light from the Sun, and where the Sun is in the sky.
- **ASK**:
  - How was the shadow in the morning different from the shadow in the afternoon? Sample answer: They pointed in opposite directions.
  - Do you think you can see a shadow at night? Why or why not? Sample answer: No, because there is no Sun at night.

Review Learning Intention(s) for the day with students:

- I am learning that making a model can help solve a defined problem.

During the Lesson

Performance Task - Lighting the School Play:

- Students will make a model and write instructions for lighting a school play.

What to Expect:

- Students will indicate the best ways to use lighting during a play.

Define a Problem:

- Help students define the problem that they will solve by carrying out the design process. Remind them that defining the problem is an engineering practice that drives every solution. Some students may have never seen a play and don't know what they need to consider. Explain that a play is "a live performance on a stage." People go to and watch a live play in the same way people go to see a movie on a screen. Many people work to put a play together. One person who works on a play does the lighting. This person lights up certain parts of the stage. The lighting person has to consider many different things when lighting a play. Brainstorm different ideas on what a person who does lighting has to consider and write students' suggestions on the board. Read the steps of the investigation in the **Science Notebook** together with students.

Make a Model:

- Provide help to students as needed.
- **Test-** Testing should be done at one time when all models have been completed.

Communicate Information:

- **Communicate-** Read aloud together as a class, having students volunteer answers to each question. Write their answers on the board. Then model for students how to write a set of instructions, using their answers to the questions. You may wish to write the first step on the board, and then have volunteers tell you the next steps as you write them.

Have students complete the questions in their **Science Notebook**. Move around the room and provide help with writing, if necessary.

Talk About It:

- In this activity, students should have made a model, planned lighting, and observed how their lighting affected the ability to see props, actors, and shadows on stage.
- **ASK:**
    - What were the results of your activity? Sample answer: I had to keep moving my flashlight or redoing my lighting to make sure that all of the props and actors were able to be seen in my model. Some of my props were in shadows, so I had to change where the light was coming from.
    - How did your plan compare to your classmates'? Sample answer: Our plans were very different because our models were different. Some of my classmates wanted to use shadows and shone their flashlights in different directions than I did.
    - How did this activity help you learn more about light and shadows? Sample answer: I learned that I did not shine the flashlight where I did not want the model to be lit or have shadows, and that I had to shine the flashlight directly on the model to see all parts of the model the best.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: What is light?

- Have students refer to the answers you recorded to this question in the Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *construct an explanation.*
- **I did** *design a solution.*

Have the students refer to the "I will . . ." and "I can . . ." statements in the **Science Notebook**. Read together as a class the "I did . . ." statements in the **Science Notebook**.

ASK:

- How would you rate yourself in your ability to construct an explanation and design a solution? Color in the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars could mean "average"; and one star could mean "still learning."

Lesson 1 Resources

Light Energy PDF Folder
Reading Strategies for Science Folder
STEM Gauge #471196
Mystery #4- Read-Along: Can you see in the dark?
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 2: Properties of Light	**Light Energy**	**Estimated Time: 45 minutes per day**

Brief Overview of Lessons:

Lesson 2: Day 1- Properties of Light - Assess and Engage
Assess Lesson Readiness: Page Keeley Science Probe- Properties of Light, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- Students will complete the **Page Keeley Science Probe -** *Properties of Light.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the behavior of light and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *light* by observing a photo of light shining through a leaf. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 2: Day 2- Properties of Light - Explore
Inquiry Activity- Light Passing Through

- Students will explore which items let light pass through them and which items partially or totally block light. Students' data should indicate that the clearer an object, the more light passes through it.

Lesson 2: Days 3 and 4 - Properties of Light - Explain
Light Video, Types of Materials Digital Interactive

- Students will watch the video *Light*. Ask them if they have ever seen anything that is transparent or translucent. Have them point out one transparent object, one translucent object, and one opaque object in the classroom. Write students' answers on the board under the appropriate heading. Students will then demonstrate knowledge of how light travels through transparent, translucent, and opaque objects. Students will drag and drop to match the words with the correct objects.

Lesson 2: Day 5 - Properties of Light - Elaborate
Inquiry Activity- Building Materials

- Students will observe different materials in the school that are transparent, translucent, and opaque. Students will then explain how those materials are being used.

Lesson 2: Day 6 - Properties of Light - Evaluate
Performance Task- Light and Materials

- Students plan an investigation to discover what materials light passes through. Students' data should show that light passes through transparent materials, some light passes through translucent materials, and opaque materials block light.

Lesson 2: Day 7- Assessment

- Students will show their understanding and what they have learned thus far by completing one of the assessment options provided or teacher-created.

What students should know and be able to do to engage in this lesson:

- Different materials absorb or reflect light in different ways. Our eyes receive the waves that bounce off objects and interpret the changes as shapes and colors. Transparent objects allow light to travel through them without much light bouncing back. Windows are an example of transparent objects. Translucent objects let only some light through. An example is frosted glass; such as might be used in a home's front door. Some light is let through, but most is reflected back. Opaque objects block light altogether. The absence of light coming through these objects forms a shadow, or an area without light. Some objects are reflective, meaning they bounce a lot of light back. Objects made from materials that are transparent, translucent, opaque, or reflective can serve different purposes.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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) • 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)	Preschool Standard 5.2.3 Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors). (5.2.P.C.1)

Focus Question for this Lesson	
How does light travel through different materials?	
Learning Intention	**Success Criteria**
<u>Day 1:</u> ● I am learning about the phenomenon of light shining through a leaf. ● I am learning to ask questions about the phenomenon and what I want to learn about it. **<u>Day 2:</u>** ● I am learning that the amount of light passing through depends on the object. **<u>Days 3-4:</u>** ● I am learning the key vocabulary words: transparent, translucent and opaque. **<u>Day 5:</u>** ● I am learning that different materials are used in different objects. **<u>Day 6:</u>** ● I am learning about the amount of light that passes through different materials. **<u>Day 7:</u> Assessment**	**<u>Day 1:</u>** ● I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **<u>Day 2:</u>** ● I can explore different items and record my findings on the amount of light that was able to pass through. **<u>Days 3-4:</u>** ● I can write and draw examples of objects that are transparent, translucent or opaque. **<u>Day 5:</u>** ● I can write and/or draw examples of objects that are transparent, translucent or opaque, as well as explain how the material is used in school and/or classroom. **<u>Day 6:</u>** ● I can investigate different types of materials and explain the amount of light that passes through each. **<u>Day 7:</u>** ● I can discuss and share my claim with evidence based on the EQ: How does light travel through different materials?
Assessment(s)	
● Self-Assessment ● Peer Assessment ● Teacher Observations ● Work Samples ● Performance Task - Light and Materials (Lesson 2) ● Lesson 2- Properties of Light Test ● STEM Gauge #471217 ● Mystery #3- What if there were no windows? ● Teacher-created eAssessment	
Feedback (Peer to peer/student to teacher/teacher to student)	

- Light and Materials Performance Task Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS
Anticipated Student Pre-Conceptions/Misconceptions
● Students may have the misconception that we see objects because they absorb light. They may have trouble understanding that light bounces off items, and our eyes receive that light and interpret it. They may think that only shiny objects reflect light. ● Students may think that light passes through only objects that are perfectly clear and not objects that have color or are translucent. ● They may think that light must be entirely absorbed or entirely reflected and that partial reflection (as in the case of translucent materials) is not possible.
Integrated Accommodations & Modifications
English Language Learners/Sociocultural Implications: ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook. ● Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials ● Allow students to use Google Read&Write for speech to text to construct sentences independently. ● Display worksheet/textbook on SmartBoard **Special Needs:** ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook.

- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 2, Day 1- Assess and Engage
Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.
Lesson Opening
Review Learning Intention(s) for the day with students: ● I am learning about the phenomenon of light shining through a leaf. ● I am learning to ask questions about the phenomenon and what I want to learn about it.
During the Lesson
Assess Lesson Readiness: Page Keeley Science Probe - Properties of Light ● This probe is intended to uncover students' basic ideas about the behavior of light. ● This probe can be used as an elicitation prior to introducing a lesson on how light interacts with materials. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations. ● The characters in the probe share their ideas, and students are asked to tell whom they most agree with and why. This format helps students recognize that people have different ideas about science, and it is important to share these ideas. ● Introduce the probe by telling students that three friends are talking about light. They each have different ideas about what happens to light when it comes in contact with different materials. Point to each character in the probe, say the character's name, and read their claim. Make sure students understand what each character is saying.

- Students will choose the friend they think has the best idea about how light passes through different materials. Choose a talk configuration (pair, small group, whole class, or combination), and listen carefully as students share their choices and explanations. Use talk moves to help them explain their thinking.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of light shining through a leaf.
- Show the photo and ask students what questions they have about the leaf and the light. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- **ASK:**
    - What did you see in the photo?
    - What did you notice about the leaf and the light?
    - What did you wonder about when you saw the photo?
    - What interests you about light and why it travels through the leaf?
- Help students turn their observations from the photo into questions that they can refer to during the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.

STEM Career Kid Connection: Carpenter

- Reintroduce Career Kid Chloe, who wants to be a carpenter when she grows up.
- Remind students that carpenters build and repair wooden things or parts of wooden things. Read what Chloe says aloud as a class.
- ASK:
    - Why might the photo of the leaf in the light be interesting to Chloe? Sample answer: She can see that the leaf lets some light through but not all light.
    - What might Chloe wonder about different kinds of objects and light? Sample answer: She might wonder how much light different kinds of objects let through.
    - Why would a carpenter need to know about how much light different kinds of objects let through? Sample answer: A carpenter would need to know what objects and materials to use to let a lot, a little, or no light into different parts of a building.

Essential Question: How does light travel through different materials?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.

- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *plan an investigation.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn how much light different materials let through. If this is the first time you are teaching the Science and Engineering Practice of planning investigations, explain that an investigation is a careful examination to get information or learn facts about something.

- **ASK:**
  - What kind of investigation could you plan to show how much light different materials let through? Sample answer: I could hold different materials up to a window to see how well I can see through them.

THE LESSON IN ACTION: Lesson 2, Day 2 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Make a list of materials you can test to see how much light is let through.

Review Learning Intention(s) for the day with students:

- I am learning that the amount of light passing through depends on the object.

During the Lesson

Inquiry Activity- Light Passing Through:

- Students will explore which items let light pass through them and which items partially or totally block light.

What to Expect:

- Students' data should indicate that the clearer an object, the more light passes through it.

Advanced Preparation:

- Cut enough 4 inch × 4 inch squares of each type of material so that each group has its own set of materials. Point out that students just saw a photo of light shining through a leaf. Now they will explore how light travels through other objects. Safety Explain to students that they should wear their safety goggles throughout the activity. Point out that rubber bands should only be stretched enough to cover the end of the cardboard tube. Remind students that rubber bands should never be aimed toward another person or object.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook.** Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the **Science Notebook** together with students.

Carry Out an Investigation:

- Help students place the rubber band around the cardboard tube, if necessary. Each student in a group should have a chance to look through the cardboard tube.

Communicate Information:

- **Record Data-** Review the table with students before they fill it in. Instruct students to record their data after testing each item. Have students complete the table in their **Science Notebook**.
- Have students complete the questions in their **Science Notebook**.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

Have students share their observations and data with those of their classmates.

- **ASK:**
  - What were the results of your activity? Sample answer: I could see a lot of light through plastic wrap. I could see a little light through wax paper. I couldn't see any light through aluminum foil.
  - How do your observations compare to the observations of your classmates? Sample answer: My classmates had the same results. Plastic wrap let a lot of light in and aluminum foil didn't let any light in.
  - A pattern is something that happens over and over again. Did you see a pattern in your data? If so, what pattern did you see? Yes, I saw a pattern. The more clear the item that covered the tube, the more light was let through, and the more I could see through it.

THE LESSON IN ACTION: Lesson 2, Days 3 and 4 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- In this discussion, observe your students' ability to differentiate among the varying amounts of light that can pass through different materials.
  ASK:

- Why could you see the light through some items? They didn't block the light or only blocked the light a little.

Review Learning Intention(s) for the day with students:

- I am learning the key vocabulary words: transparent, translucent and opaque.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
  - materials-anything used for making and building things
  - transparent-when light can pass through
  - opaque-when light cannot pass through
  - translucent-when some light can pass through

Light Video**:**

- Have students watch the video Light. Ask them if they have ever seen anything that is transparent or translucent. Have them point out one transparent object, one translucent object, and one opaque object in the classroom. Write students' answers on the board under the appropriate heading. **ASK:**
  - Why can't you see something behind an opaque object? Light does not pass through an opaque object.
  - Why can you see things behind a transparent object? Light passes through a transparent object.
  - What is one reason you might want to make something out of a translucent material? Sample answer: You don't want the light totally passing through the object but you don't want the light totally blocked either.
- Have students complete the questions in the **Science Notebook**.

Visual Kinesthetic Vocabulary:
Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in the **Science Notebook**. Invite students to name different common objects made of transparent, translucent, or opaque materials, or a combination of the materials.

Develop Vocabulary:

- materials-Tell students that there are many different kinds of materials including stone, wood, plastic, cloth, rubber, paper, steel, wire, and other kinds of metal. Objects made of different combinations of these materials are also called materials.

Types of Materials Digital Interactive:

- Have students complete the Types of Materials Digital Interactive**.** Students demonstrate knowledge of how light travels through transparent, translucent, and opaque objects. Students will drag and drop to match the words with the correct objects. **ASK:**

- What is a transparent material like? A transparent material allows light to pass through it. You can see objects behind a transparent object.
- What is a translucent material like? A translucent material allows some light to pass through it. You can somewhat see objects behind a translucent object.
- What is an opaque material like? An opaque material blocks all the light and does not allow any light to pass through it. You cannot see objects behind an opaque object.

- Have students complete questions in their **Science Notebook.**

Crosscutting Concepts- Cause and Effect:

- Review the Crosscutting Concept of Cause and Effect with students. Remind them that a cause makes something happen and an effect is what happens. Students should recognize cause and effect in the activities they have done in this lesson. For example, in the Types of Materials digital interactive, students should recognize that an opaque object blocks light. The opaque object is the cause; the light being blocked is the effect. **ASK:**
  - Suppose someone wears glasses. What causes the person to be able to see through the glass in glasses? Sample answer: The glass in glasses is transparent so people can see through it.
- Have students complete the question in their **Science Notebook.**

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about opaque, transparent, and translucent materials, then have them revisit some activities in this lesson. **ASK:**
  - What is the difference between a transparent and translucent material? A transparent material lets all light pass through it. A translucent material only lets some light pass through it.
  - Is your chair made from transparent, translucent, or opaque materials? Why do you think so? Sample answer: My chair is made from an opaque material. An opaque material does not let light pass through it. My chair does not let light pass through it.

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK:**
  - Infer- A person is building a house and wants to make sure that each room is bright with lots of sunlight. What is one kind of material the person can use to be sure to get bright, sunny rooms? Sample answer: Each room can have a lot of transparent glass windows. Complete the graphic organizer as a class. If students were not able to infer that transparent objects such as windows will let in a lot of light and make the rooms bright and sunny, have them review their data from the **Light Passing Through activity** and rewatch the Light video.

Reflect and Refine - Materials and Vibrations:

- At this point, students can go back to the Page Keeley Science Probe in their **Science Notebook** to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of how light behaves when it contacts different kinds of materials. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I can** *plan an investigation.*

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practice of planning investigations.

- **ASK:**
  - What investigation did you do to learn about light and different kinds of materials? Sample answer: I put different kinds of materials at the end of a cardboard tube to see how well I could see through each material.
  - What did you learn from your investigation? Sample answer: I can see better through some materials than others because some materials let more light through. Some materials I can't see through at all because they don't let any light through.

THE LESSON IN ACTION: Lesson 2, Day 5 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Is your desk made from transparent, translucent, or opaque materials? Why do you think so?

Review Learning Intention(s) for the day with students:

- I am learning that different materials are used in different objects.

During the Lesson

Inquiry Activity- Building Materials

- Students observe that all objects are made of transparent, translucent, or opaque materials, or a combination of them, and how the materials are used. Students' data should indicate that different materials are used in different objects.

Carry Out an Investigation:

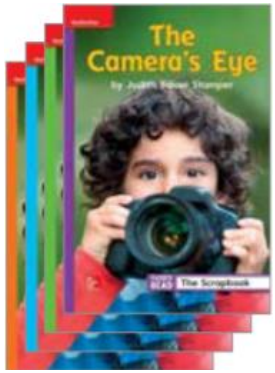
- Allow students to shine the light from a flashlight on objects they are uncertain of.

Communicate Information:

- Have students fill in the tables in their **Science Notebook**. As a class, review students' completed tables. Have students self-correct their tables.
- Students will then respond to the question in their **Science Notebook**.

Leveled Readers- The Camera's Eye (Optional)

This book examines how the human eye and cameras take in light to receive and record images. Use this book in the Elaborate section of Lesson 2 after discussing the properties of light and how light passes through certain materials. Help students understand that light is interpreted by both the human eye and a camera to produce images.



Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations from the activity Building Materials.
  - **ASK:**
    - How did you see a translucent material being used? Sample answer: The fish tank in our classroom is made out of glass. We can see the fish swimming inside the tank.
    - How did your results compare to your classmates'? Sample answer: Our results varied. Some materials and how they were used that I listed were different from my classmates'. All of us showed how different materials are used around the school.

THE LESSON IN ACTION: Lesson 2, Days 6 and 7- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Recall the previous day's lesson by asking: What causes a guitar to make sound? vibrations

Review Learning Intention(s) for the day with students:

- I am learning about the amount of light that passes through different materials.

During the Lesson

Performance Task - Light and Materials:

- Students plan an investigation to discover what materials light passes through.

What to Expect:

- Students' data should show that light passes through transparent materials, some light passes through translucent materials, and opaque materials block light.

Advanced Preparation:

- Provide different materials for students to test. Materials may include cloth, white paper, tissue paper, construction paper, plastic can cover, plastic cups, and a clear piece of plastic. Have students answer the first question in their **Science Notebook**. Allow students to choose the materials you provide. They may also want to test other materials. If possible, provide those materials for students.

Make a Prediction:

- Read the questions aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.

Carry Out an Investigation:

- Help students write their steps in their Science Notebook, if necessary. Have students carry out their investigation. All students in a group should be given a chance to test the materials.

Communicate Information:

- **Record Data-** Have students fill in the table in their **Science Notebook**. Explain that the "Observations" section should tell how well the material lets light pass through. Have students record data in their **Science Notebook.**

Talk About It:

- In this activity, students should have planned an investigation that demonstrated how light passes through different materials.
- **ASK:**
    - What were the results of your activity? Sample answer: Darker materials often didn't let light through. Thicker materials either block light or only let some light through.
    - How did your plan compare to your classmates'? Sample answer: My classmates had a similar plan. We all used cardboard tubes and different materials. Most of the steps in our investigations were the same too.
    - How did your results compare to your classmates'? Sample answer: My classmates had similar results. My classmates could see how darker, thicker materials don't let light through and how thinner, lighter materials let light through.
    - How did this activity help you learn more about different materials and light? Sample answer: I saw that different materials let different amounts of light pass through them.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: How does light travel through different materials?

- Have students refer to the answers you recorded to this question in their **Science Notebook** and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *plan an investigation.*

Have the students refer back to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read together as a class the "I did . . ." statement on in the Science Notebook.

- **ASK:**
  - How would you rate yourself in your ability to plan an investigation? Color the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars could mean "average"; and one star could mean "still learning."

Lesson 2 Resources

Light Energy PDF Folder
Reading Strategies for Science Folder
STEM Gauge #471217
Mystery #3- What if there were no windows?
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 3: How Light Travels	**Light Energy**	**Estimated Time: 45 minutes per day**

Brief Overview of Lessons:

Lesson 3: Day 1- How Light Travels - Assess and Engage
Assess Lesson Readiness: Page Keeley Science Probe- Mirrors and Light, Science in My World: Lesson Phenomenon, STEM Career Kid Connection

- Students will complete the **Page Keeley Science Probe -** *Mirrors and Light.* This is intended to serve as a pre-assessment and uncover students' basic ideas about mirrors and reflection and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *reflection* by observing a photo of a mirrored ball reflecting light. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Carpenter* and answer questions in their notebook.

Lesson 3: Days 2 and 3- How Light Travels - Explore
Find the Cat Simulation, Science Text- Mirror Land

- Students will explore how light travels before and after it hits different objects. Students will explore different ways to position the flashlight and mirrors so that the light from the flashlight bounces off the mirrors and hits the cat. Students will listen to a fiction text to learn about a boy and his cat Bella, who likes to play with a spot of light. The boy shines the spot of light on a mirror and Bella plays with the light that bounces off the mirror.

Lesson 3: Days 4, 5 and 6 - How Light Travels - Explain & Elaborate
How Does Light Move? Science File, Science Text- Mirrors and Light, A Prism Video

- Students will listen to How Does Light Move? **Science File** to learn the path that light travels and why light can change direction. While reading, students will encounter the vocabulary words: mirror and reflect. Students will listen to the nonfiction text, *Mirror and Light* to learn that mirrors are reflective objects that bounce light back. They will learn that images in mirrors are reversed. Students will also learn that light that is shined on a mirror at an angle bounces back at an angle as well. The **video**, *A Prism* will help students observe how a prism splits visible white light into many different colors.

Lesson 3: Day 7 - How Light Travels - Evaluate
Performance Task- Mirrors

- Students plan an investigation to discover if light can pass through a mirror. Students will work with mirrors and flashlights to test their predictions and record their findings

Lesson 3: Days 8 and 9 - How Light Travels - Module Wrap-Up
Performance Project- Light Illuminates Objects

- Students will observe that objects can only be seen when illuminated, that only the part of the object that light hits is illuminated, and that the illuminated object casts a shadow.

What students should know and be able to do to engage in this lesson:

- Light travels in waves. The waves hit an object and either travel straight through or bounce off, depending on the material the object is made of. Colored objects appear to have color because they absorb all light waves except those of the color we see. So, a green ball absorbs all light waves except green ones, which bounce back to our eyes. Our brain then interprets the ball as being green. Using a triangular glass prism to test how light travels gives a surprising result. The prism causes light to bend once it enters the prism. Light is made up of different colors that each have their own wavelength. These waves bend at different angles. As each wave hits the prism, it bends and is separated from the others. This causes each color in light to separate and appear in its own band on the other side of the prism. So, as light travels through a prism, it is separated into different colors and appears as a rainbow on the other side of the prism.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.2.3 Investigate sound, heat, and light energy through one or more of the senses (e.g., comparing the pitch and volume of sounds made

• 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)	by commercially made and homemade instruments, recording how shadows change during the course of a day or over time, using flashlights or lamp light to make shadows indoors). (5.2.P.C.1)

Focus Question for this Lesson

How does light bounce off objects?

Learning Intention	Success Criteria
Day 1: • I am learning about the phenomenon of a mirrored ball reflecting light. • I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 2-3:** • I am learning how light acts when it hits different objects. **Days 4-6:** • I am learning the key vocabulary words: mirror and reflect. • I am learning how light travels and changes direction. **Day 7:** • I am learning if light passes through a mirror. **Days 8-9:** • I am learning how light illuminates objects. **Day 10: Assessment**	**Day 1:** • I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 2-3:** • I can explore ways that light travels before and after it hits different objects and compare my findings with a partner. **Days 4-6:** • I can explain to a partner what I see when I look at myself in a mirror. **Day 7:** • I can plan and conduct an investigation to discover if light passes through a mirror. **Days 8-9:** • I can investigate how light can illuminate an object through observation of light.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Performance Task - Mirrors (Lesson 3)
- Lesson 3- How Light Travels Test

- Module Performance Project- Light Illuminates Objects
- Light Energy Module Test
- STEM Gauge #499377

Feedback (Peer to peer/student to teacher/teacher to student)

- Mirrors Performance Task Rubric
- Light Illuminates Objects Performance Project Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS

Anticipated Student Pre-Conceptions/Misconceptions

- Students may think that light bounces off only highly reflective objects, such as mirrors.
- They may think that color is not related to light, and may not understand that color is the result of light waves reflecting off an object.
- They may think that light is made up of single colors and not understand that white light can be refracted into all colors of the rainbow with the use of a prism.
- Students may think that light is an object and not understand that light has wavelike properties that result in the colors we see.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions

- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 3, Day 1- Assess and Engage
Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.
Lesson Opening
Review Learning Intention(s) for the day with students: ● I am learning about the phenomenon of a mirrored ball reflecting light. ● I am learning to ask questions about the phenomenon and what I want to learn about it.
During the Lesson
Assess Lesson Readiness: Page Keeley Science Probe - Mirrors and Light ● This probe is intended to uncover students' basic ideas about mirrors and reflection. ● This probe can be used as an elicitation prior to introducing a lesson on how light reflects from a mirror. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations. ● Introduce the probe by showing the students a mirror and light from a flashlight. Point to each answer choice and read it to the students. Make sure students understand each answer choice.

- Students will choose which answer best matches their prediction about what will happen to the light when it shines on the mirrors. Choose a talk configuration (pair, small group, whole class, or combination), and listen carefully as students share their choices and explanations. Use talk moves to help them explain their thinking.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of a mirrored ball reflecting light.
- Show the photo and ask students what questions they have about the light bouncing off the mirrors on the ball. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- **ASK:**
    - What did you see in the photo?
    - What did you notice about the mirrors on the ball and the light?
    - What did you wonder about when you saw the photo?
    - What interests you about what happens when light hits mirrors?
- Help students turn their observations from the photo into questions that they can refer to during the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.

STEM Career Kid Connection: Carpenter

- Reintroduce Career Kid Chloe, who wants to be a carpenter when she grows up.
- Ask a volunteer to remind the class what a carpenter does. (Carpenters build and repair wooden things or parts of wooden things.) Read what Chloe says aloud as a class in the Science Notebook.
- **ASK**:
    - How does the photo show what can happen to light when it hits a mirror? Sample answer: There are sparkly lights all over the ball, so it looks like the light is bouncing off and shining from the mirrors in the ball.
    - Why might a carpenter want to know about light and mirrors? Sample answer: A carpenter might want to build something that includes a mirror.

Essential Question: How can light bounce off objects?

- Have students read the Essential Question in their **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.

- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *carry out an investigation.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn how light travels when it hits different objects, including a mirror. Review with students the Science and Engineering Practice of carrying out investigations by reminding them that an investigation is a careful examination to get information or learn facts about something.

- **ASK:**
  - What investigation might you carry out that will show what happens to light when it hits different objects? Sample answer: I might shine the light from a flashlight on different objects and see what happens to the light.

THE LESSON IN ACTION: Lesson 3, Days 2 and 3 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Think of an object that you can shine a light on like a mirror.

Review Learning Intention(s) for the day with students:

- I am learning that the amount of light passing through depends on the object.

During the Lesson

Inquiry Activity- Find the Cat:

Find the Cat Simulation

- Students will explore which items let light travels before and after it hits different objects.

What to Expect:

- Students should position the flashlight and mirrors so that the light from the flashlight bounces off the mirrors and hits the cat.

Advanced Preparation:

- Point out that students just saw light reflecting off a mirrored ball. Now they will learn how light acts when it hits different objects.

How to Use the Simulation:

- Students should press the upper right button to shine the light and the lower right button to change the room configuration. Demonstrate how to work the simulation. Explain each item in the room.
- **ASK:**
  - How does the light travel before it hits the mirror? in a straight line
  - What happened when you shined the light on solid objects other than the mirror? The light did not bounce. The light was blocked, and it stopped.

- Students have not learned the concept of light being absorbed yet, but should express understanding that the light did not bounce off of some objects and seemed to stop traveling. Have students complete the questions in their **Science Notebook**.

Mirror Land Read Aloud:

- Read aloud the nonfiction selection, Mirror Land on pages 4–13 in the Science Paired Read Aloud. Students will learn about a boy and his cat Bella, who likes to play with a spot of light. The boy shines the spot of light on a mirror and Bella plays with the light that bounces off the mirror.
- **ASK:**
  - Page 7 tells why Bella runs to the mirror, runs away, and then runs back to the mirror. Why is Bella doing this? Bella sees the light that bounces, or reflects off the mirror.
  - What happens when the boy moves the light side to side in front of a mirror on page 12? The light bounces back in different directions.
  - What does the boy call the game he describes on page 13 where he shines a light in the mirror and Bella chases the light that bounces back?
- Have students complete the questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations and data with those of their classmates.
- **ASK:**
  - What were the results of your activity? Sample answer: I could see a lot of light through plastic wrap. I could see a little light through wax paper. I couldn't see any light through aluminum foil.
  - How do your observations compare to the observations of your classmates? Sample answer: My classmates had the same results. Plastic wrap let a lot of light in and aluminum foil didn't let any light in.
  - A pattern is something that happens over and over again. Did you see a pattern in your data? If so, what pattern did you see? Yes, I saw a pattern. The more clear the item that covered the tube, the more light was let through, and the more I could see through it.

THE LESSON IN ACTION: Lesson 3, Days 4, 5 and 6 - Explain & Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- In this discussion, observe your students' ability to differentiate among the varying amounts of light that can pass through different materials. **ASK:**
  - Why could you see the light through some items? They didn't block the light or only blocked the light a little.

Review Learning Intention(s) for the day with students:

- I am learning the key vocabulary words: mirror and reflect.
- I am learning how light travels and changes direction.

During the Lesson

Obtain and Communicate Information- Vocabulary:

Have students read the vocabulary words listed in their Science Notebook. Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson.

- mirror- a smooth piece of glass that reflects what is in front of it
- reflect - to give back an image

- If students need to review the words *light, shadow, opaque, translucent, and transparent*, have them look up these words in the Science Text- *Lights and Shadows*. Make sure students understand what these words mean before continuing in the lesson.

How Does Light Move? Science File**:**

- Have students read the How Does Light Move? Science File to learn the path that light travels and why light can change direction. While reading, students will encounter the vocabulary words: *mirror and reflect*. **ASK:**
  - What happens when a mirror reflects light? The direction the light is moving, or traveling, changes.
  - What happens after a light is reflected and changes direction? It travels in a straight line again.
  - Use the Visuals: What does the mirror in the bottom picture show? the boy and some of the things in his room.
- Have students complete the questions in the **Science Notebook**.

Visual Kinesthetic Vocabulary:

Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their **Science Notebook**. Use the words for this lesson only. Have students identify reflective objects in the classroom (for example, windows, shiny pens, chair legs, and so on) and places in the school where there are mirrors.

Mirrors and Light Read Aloud:

- Read aloud the nonfiction selection, Mirrors and Light on pages 14–23 in the Science Paired Read Aloud. Students will learn that mirrors are reflective objects that bounce light back. They will learn that images in mirrors are reversed. Students will also learn that light that is shined on a mirror at an angle bounces back at an angle as well. While reading, students will encounter the vocabulary words: mirror and reflect.
- **ASK:**
    - Look at the words and picture on page 14. What does a mirror reflect? the image of what is in front of it
    - What does page 17 tell you about the image you see of yourself in a mirror? The image in the mirror is the same but reversed. What looks like my right leg in the mirror is really my left leg.
    - As explained on page 21, how are mirrors used in science? Scientists use microscopes that have mirrors
- Have students complete the question in their Science Notebook.

A Prism Video:

- Students will learn that a prism splits visible white light into many different colors. Have students watch the video *A Prism*. Ask students if they have ever seen a prism in real life and if so, where. **ASK**:
    - What is a prism? a glass tool that is used to separate visible white light into colors
    - What colors does a prism split white light into? red, orange, yellow, green, blue, indigo, and violet
    - We learned that a prism splits light into colors. What else happens to light as it travels through a prism? It bends.
    - You may want to replay the video and stop it at 36 seconds if students have difficulty answering the last question.
- Have students complete page 68 in the Science Notebook.

Crosscutting Concepts- Cause and Effect:

- Review with students the Crosscutting Concept of Cause and Effect by reminding them that a cause makes something happen and an effect is what happens. Students should recognize cause and effect in the Science Texts they have read in this lesson, *Mirror Land & Mirrors and Light*. **ASK:**
    - What causes light to bounce? a mirror
    - What is the effect of shining a light toward a mirror? The light reflects back to you.
- Have students complete the question in their **Science Notebook.**

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about light and how it can reflect off mirrors, then have them revisit some activities in this lesson. **ASK:**
    - How does light travel? in a straight line
    - How can mirrors be used to change the way light travels? Mirrors can be used to reflect light, or change the direction light travels.
    - Suppose light hits a mirror and changes direction. How does the light travel to the next object it hits? in a straight line

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK:**
    - Infer- Why might you turn on a light in a dark room before you look in a mirror? Sample answer: So the light will reflect off of the mirror and I can see myself clearly. Complete the graphic organizer as a class. If students were not able to make the connection between reflected light and mirrors, have them redo the ***Find the Cat*** simulation and reread the ***Mirrors and Light*** Science Text Read Aloud.

Reflect and Refine - Materials and Vibrations:

- At this point, students can go back to the Page Keeley Science Probe in their Science Notebook to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of mirrors and reflection of light. Revisiting the probe here will reveal whether students are still holding onto a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I can** *carry out an investigation.*

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practice of carrying out investigations.

- **ASK:**
    - What investigation did you carry out that shows how light bounces off objects? Sample answer: I did the Find the Cat simulation and saw how light bounces off mirrors.
    - How did you decide or plan where to put the flashlight so the light hit the cat? Sample answer: I learned which way the light would bounce, so I put the flashlight where it would be in the right place for the light to hit the mirror, bounce off it, and hit the cat.

THE LESSON IN ACTION: Lesson 3, Day 7- Evaluate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- What colors does a prism split white light into? red, orange, yellow, green, blue, indigo, and violet

Review Learning Intention(s) for the day with students:

- I am learning about the amount of light that passes through different materials.

During the Lesson

Performance Task - Light and Materials:

- Students will plan and conduct an investigation to discover if light passes through a mirror.

What to Expect:

- Investigations will show that light does not pass through a mirror, it reflects off of the mirror.

Advanced Preparation:

- Have mirrors and flashlights available for students to use. Provide any other materials students may suggest, if possible.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.

Carry Out an Investigation:

- Have students write their materials in their **Science Notebook**. Help students with writing and spelling, if necessary. Have students write the steps for their investigation in their **Science Notebook**. You may want to review with students how to write the steps to an investigation by referring them back to other science activities they have done. Guide students as they design their experiments. A good experimental setup will position the light in front of the mirror and include some way of checking behind the mirror for light coming through. You may want to question students how they might more clearly see whether light passes through the mirror and guide them to realize that black construction paper may clearly demonstrate whether this happens or not. Have students carry out their investigations. Instruct students to not look directly into beams of light. Explain to them that doing this can damage their eyes.

Talk About It:

- In this activity, students' planning and results should have demonstrated that light does not pass through a mirror; it reflects off a mirror.
- **ASK:**
    - How did your plan compare to your classmates'? Sample answer: My classmates had very similar plans. We all used mirrors and flashlights to show how light travels. Some of my classmates used black construction paper to demonstrate how light does not travel through a mirror. Some of my classmates did not use black construction paper. They went to a darker part of the classroom to check their results.
    - What were the results of your activity? Sample answer: The mirrors reflected light; they did not let light pass through.
    - How did your results compare to your classmates'? Sample answer: My classmates had the same results. My classmates' mirrors did not allow light to pass through them either. We all concluded that mirrors are not transparent, so they do not let light pass through.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: How can light bounce off objects?

- Have students refer to the answers you recorded to this question in their **Science Notebook** and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *carry out an investigation.*

Have the students refer back to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read together as a class the "I did . . ." statement.

- **ASK:**
  - How would you rate yourself in your ability to plan an investigation? Color the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars could mean "average"; and one star could mean "still learning."

THE LESSON IN ACTION: Lesson 3, Days 8, 9 and 10- Module Wrap-Up & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- How did the activity, *Mirrors* help you learn more about how light travels? Sample answer: I demonstrated that light does not travel through a mirror. Mirrors are not transparent or translucent. In this discussion, observe your students' ability to articulate their understanding of the relationship between light and mirrors and that mirrors are not translucent or transparent, and therefore light cannot pass through them.

Review Learning Intention(s) for the day with students:

- I am learning that different materials can create musical instruments that will produce a sound.

During the Lesson

Performance Project - Light Illuminates Objects:

- Students will investigate how light can illuminate an object.

Materials: shoebox or other small box, flashlight, small objects, scissors, pin or nail

What to Expect:

- Students will observe that objects can only be seen when illuminated, that only the part of the object that light hits is illuminated, and that the illuminated object casts a shadow.

Advanced Preparation:

- Collect all materials needed prior to the day of the performance project. You might want to ask students or adults to bring in small boxes or shoeboxes from home.
- Explain to students that illuminate means "to light up, fill with light, or give light to something." For example, someone illuminates a room when they turn on the lights in the room.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations. Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Provide students with a dull pencil to make their pinhole. Remind students to be careful when making a hole in the box. You may wish to assist students when making the pinholes or create the pinholes yourself. Demonstrate for students where pinholes should be made: in the middle of the short and long sides of the boxes. Check to make sure students make holes in both a short and long side of the box.
- Explain to students that they should place the cover back on the box or close the box after they have placed an object in it. Have students complete questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Explore More in My World:

Have students look back at the questions they generated in their Science Notebook. Ask them if there are any questions they still have about light. If students still have unanswered questions, help them develop a plan to research their question in more detail and use science and engineering practices to explore answers to them.

Administer Light Energy Module Test

Lesson 3 Resources

Light Energy PDF Folder
Reading Strategies for Science Folder
STEM Gauge #499377
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 3:
Earth and Space

Stage 1 – Desired Results	
ASSESSED FOCUS STANDARDS: **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) **CONTENT 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). ● W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. **Mathematics** ● MP.2 Reason abstractly and quantitatively. ● MP.5 Use appropriate tools strategically.	*Unit Description* **Anchoring Phenomenon:** **Statement**: Patterns in space can be observed from Earth. **Observation/Demonstration/Experience:** A photo of the night sky, including stars and the moon.  **Driving Question:** What causes the pattern of day and night? The seasons? *Meaning*

	ENDURING UNDERSTANDINGS ● Day and night form a regular pattern that can be observed. Earth rotates, or spins on its axis once every 24 hours. ● Earth's orbit and the tilt of Earth on its axis cause the seasons. As Earth travels in a path around the Sun, the angle of sunlight that meets Earth's surface changes throughout the year. ● The Northern and Southern hemispheres have opposite seasons. When the Northern Hemisphere is tilted toward the Sun summer occurs. When the Southern Hemisphere is tilted away from the Sun, winter occurs. ● The phases of the Moon occur over a period of about 29.5 days. ● The side of the Moon facing the Sun is lit up. It is the lit part of the Moon that appears to change as the Moon goes through its phases. ● As the Moon orbits Earth, different amounts of light from the Sun are reflected from its surface. Changes in the amount of reflected light result in the Moon's phases. ● Stars are hot, glowing balls of gas, made up of mostly hydrogen and helium. ● Stars produce energy and give off both heat and light. The color of a star depends on its temperature. ● The Sun is the star at the center of our solar system. It is a medium-sized yellow star. ● It appears larger than the other stars because it is much closer.	**ESSENTIAL QUESTIONS** ● What causes the pattern of day and night? ● What causes the seasons? ● Why does the Moon seem to change? ● How can you describe the Sun and stars?
	What students will know and be able to do	

	KNOWLEDGE ● I can explain what causes the pattern of day and night. ● I can observe, describe and predict seasonal patterns of sunrise and sunset. ● I can describe patterns of the motion of the Moon. ● I can use observations to describe the Sun and stars.	**SKILLS** 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.] Analyzing and Interpreting Data Patterns 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.] Planning and Carrying Out Investigations Patterns

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - The Sun During the Day (Lesson 1)
  - The Sun During the Day Performance Task Rubric
- Lesson 1- Day and Night Test
- Performance Task - How Some Trees Change (Lesson 2)
  - How Some Trees Change Performance Task Rubric
- Lesson 2- Seasonal Patterns Test
- Performance Task - Phases of the Moon (Lesson 3)
  - Phases of the Moon Performance Task Rubric
- Lesson 3- The Moon Test
- Performance Task - Observe the Night Sky (Lesson 4)
  - Observe the Night Sky Performance Task Rubric
- Lesson 4- The Sun and Stars Test

- Earth and Space Module Test
- Module Performance Project- Observing the Moon
  - Observing the Moon Rubric
- STEM Gauge #466689
- STEM Gauge #496990
- STEM Gauge #496991
- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe: Day and Night (Lesson 1)
- Page Keeley Science Probe: Daylight Hours (Lesson 2)
- Page Keeley Science Probe: Moon Patterns (Lesson 3)
- Page Keeley Science Probe: Seeing Stars (Lesson 4)

Integration of 21st Century Skills	Integration of Technology	Career Education

• **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively.
• **9.1.4.A.2:** Evaluate available resources that can assist in solving problems.
• **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems.
• **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process.
• **9.1.4.A.5:** Apply critical thinking
• **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.
• **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience.
• **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities.
• **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community.
	• **Inspire Science Videos**
	  ○ Day and Night
	  ○ Trees
	  ○ Seasons Change
	  ○ The Moon
	  ○ The Sun and Stars
	• **Inspire Science Files**
	  ○ How Does Light Move?
	• **Inspire Simulations & Digital Interactives**
	  ○ How Earth Moves
	  ○ Sunlight
	  ○ The Sun in the Sky
	• **Inspire Science Songs**
	  ○ Day Sky and Night Sky
	  ○ What Do You See
	  ○ A Big Chill
	  ○ A Sun for All Seasons
	  ○ Long, Hot Days
	• **Inspire Science Readers**
	  ○ The Four Seasons
	  ○ What Goes Around?
	• **Discovery Education**
	  ○ Day, Night, and the Changing Seasons
	  ○ What are Stars?
	• **Mystery Science**
		• **Aerospace Engineer**
		  ○ Introduce Career Kid Emily, aerospace engineers study how things work in the universe. They study space and the objects found in space. Some design spaceships and other vehicles that help people explore our solar system.
		• **Meteorologist**
		  ○ Introduce Career Kid Hugo, who wants to be a meteorologist when he grows up. Explain that meteorologists are experts in predicting the weather. They help people know whether the day will be sunny, cloudy, windy, or stormy. Hugo is excited about watching the sky and learning how scientists predict the weather.
		• **Astronomer**
		  ○ Introduce Career Kid Haley, who wants to be an astronomer when she grows up. Explain that an astronomer studies

● **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. ● **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations. ● **9.3.4.A.5:** Locate career information using a variety of resources.	○ Mystery #1: Could a statue's shadow move? (Lesson 1) ○ Mystery #2- Read-Along: What does your shadow do when you're not looking? (Lesson 1) ○ Mystery #3: How can the Sun help you if you're lost? (Lesson 1) ○ Mystery #4- Read-Along: Why do you have to go to bed early in the summer? (Lesson 2) ○ Mystery #5: Why do the stars come out at night? (Lesson 4) ○ Mystery #6- Read-Along: How can stars help you if you get lost? (Lesson 4) ● **Generation Genius** ○ Patterns in the Sky ○ Four Seasons and Day Length	objects in the sky, including planets, the Sun, the Moon, and stars.

Stage 3 – Learning Plan

UNIT VOCABULARY

daytime Moon nighttime	phases planet position	rotate season star Sun

SUMMARY OF KEY LEARNING

Lesson 1: Day and Night

Lesson 1: Day 1 - Day and Night - Module Opener

- **Learning Intention:** I am learning what causes the patterns of day and night. I am learning about the phenomenon of the night sky.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it. I can make initial explanations by observing a photo of the night sky including stars and the moon.
- **Brief Overview of Lesson:** Students will view a photo of the night sky and make initial explanations. Students will also be introduced to the **Career Connection** of an Aerospace *Engineer* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Day and Night - Assess and Engage
Page Keeley Science Probe - Day and Night, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of the Sun and the sky. I am learning why we have day and night.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it.

I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*

- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Day and Night.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the day-night cycle and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *the Sun and the sky* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Meteorologist* and answer questions in their notebook.

Lesson 1: Day 3 - Day and Night - Explore
Inquiry Activity- Shadows, Science Text- Deedee's Day

- **Learning Intention:** I am learning that shadows can have different lengths based on the angle the light.
- **Success Criteria:** I can explore and draw how light shining toward an object from different angles affects the length and direction of the object's shadow.
- **Brief Overview of Lesson:** Students explore how light shining toward an object from different angles affects the length and direction of the shadow cast by the object. Students will learn about the activities Deedee does during the day and night.

Lesson 1: Days 4, 5, and 6 - Day and Night - Explain
Day and Night Video, Inquiry Activity- The Sun and Earth, Science Text- Earth's Sky Changes

- **Learning Intention:** I am learning what causes day and night.
- **Success Criteria:** I can investigate and explain to a partner how Earth's rotation causes day and night.
- **Brief Overview of Lesson:** Students identify whether where they live has daytime or nighttime and why, and whether it is daytime or nighttime on the other side of Earth and why. Students will watch the video *Day and Night* which demonstrates and explains what causes day and night, Earth's rotation, and Earth's relationship to the Sun. Students learn how planet Earth moves in space, rotating and revolving around the Sun, and that Earth's rotation causes day and night while listening to the read aloud, *Earth's Sky Changes.*

Lesson 1: Day 7 - Day and Night - Elaborate
Inquiry Activity- Measuring Your Shadow

- **Learning Intention:** I am learning how my shadow changes during the day.
- **Success Criteria:** I can investigate the length and direction of my shadow.
- **Brief Overview of Lesson:** Students investigate how the length and direction of their shadow changes during the day. Students will measure their shadows morning, afternoon and midday and record their findings in a table.

Lesson 1: Day 8 - Day and Night - Evaluate
Performance Task- The Sun During the Day

- **Learning Intention:** I am learning that the Sun is at different places in the sky at different times of day.
- **Success Criteria:** I can observe the Sun throughout the day and explain that it is in a different place in the sky at different times of the day.
- **Brief Overview of Lesson:** Students will observe the Sun several times throughout the day and learn that it is at different places in the sky at different times of day.

Lesson 1: Day 9 - Assessment Options

- **Learning Intention:** I am learning what causes the patterns of day and night
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What causes the pattern of day and night?
- Performance Task - The Sun During the Day (Lesson 1)
    - The Sun During the Day Performance Task Rubric
- Lesson 1- Day and Night Test
- STEM Gauge #466689
- Mystery #1: Could a statue's shadow move?
- Mystery #2- Read-Along: What does your shadow do when you're not looking?
- Mystery #3: How can the Sun help you if you're lost?
- Teacher-created Assessment

Lesson 2: Seasonal Patterns

Lesson 2: Day 1 - Seasonal Patterns - Assess and Engage
Page Keeley Science Probe - Daylight Hours, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning the seasonal patterns of sunrise and sunset**.** I am learning about the phenomenon of leaves changing colors.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Day and Night.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the seasonal patterns of night and day and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *leaves changing colors and falling from trees* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Meteorologist* and answer questions in their notebook.

Lesson 2: Days 2 and 3 - Seasonal Patterns - Explore
Inquiry Activity- Sunlight Simulation, Science Text- The Other Half of the World

- **Learning Intention**: I am learning that sunrise, sunset and weather change in different places of the world.
- **Success Criteria:** I can investigate seasonal weather differences and changes, including temperature, hours of daylight, and where the Sun is in the sky in different places around the world.
- **Brief Overview of Lesson:** Students will conduct a simulation to investigate seasonal changes to sunrise, sunset, and weather in different places around the world. Students will fill in a table with their findings and answer questions related to their investigation. Students will listen to a read aloud of the Science Text- *The Other Half of the World* to learn about a family taking a trip in January from North America to New Zealand. They learn that it is summer in New Zealand while it is winter in North America.

Lesson 2: Days 4 and 5 - Seasonal Patterns - Explain

Seasons Change Video, Science Text- The Four Seasons

- **Learning Intention:** I am learning why Earth has seasons.
- **Success Criteria:** I can describe each season to a partner and write and/or draw one interesting fact for each in my notebook.
- **Brief Overview of Lesson:** Students will watch the video, *Seasons Change* to learn what happens during each season. Students will listen to a read aloud of the Science Text- *The Four Seasons* to understand why Earth has seasons and what each season is like. The vocabulary words *season, summer, spring, fall and winter* will be encountered within the text.

Lesson 2: Day 6 - Seasonal Patterns - Elaborate
How Earth Moves Digital Interactive

- **Learning Intention:** I am learning why Earth has seasons.
- **Success Criteria:** I can answer questions about the seasons through exploration of the Digital Interactive, *How Earth Moves.*
- **Brief Overview of Lesson:** Students will understand that Earth revolves around the Sun. That, in addition to Earth's tilt, causes the seasons. Have students complete the How Earth Moves digital interactive

Lesson 2: Day 7 - Seasonal Patterns - Evaluate
Performance Task- How Some Trees Change

- **Learning Intention:** I am learning that some trees change throughout the seasons.
- **Success Criteria:** I can create a model of the same tree for each season and show how the tree changes throughout the seasons.
- **Brief Overview of Lesson:** Students will use what they have learned to show how some trees change at different times of the year.

Lesson 2: Day 8 - Assessment Options

- **Learning Intention:** I am learning the seasonal patterns of sunrise and sunset**.**
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What causes the seasons?
- Performance Task - How Some Trees Change (Lesson 2)
  - How Some Trees Change Performance Task Rubric
- Lesson 2- Seasonal Patterns Test
- Mystery #4- Read-Along: Why do you have to go to bed early in the summer?
- Teacher-created Assessment

Lesson 3: The Moon

Lesson 3: Day 1 - The Moon - Assess and Engage
Page Keeley Science Probe - Moon Patterns, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of the Moon. I am learning the patterns of the motion of the Moon.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Moon Patterns.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the pattern on Moon phases and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the

phenomenon of *the Moon* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of an *Astronomer* and answer questions in their notebook.

Lesson 3: Day 2 - The Moon - Explore
Inquiry Activity- How the Moon Looks

- **Learning Intention:** I am learning the patterns of the motion of the Moon.
- **Success Criteria:** I can draw a picture of what the Moon looks like in the night sky.
- **Brief Overview of Lesson:** Students will predict what shape the Moon will be in the night sky. Assign the activity on a clear night when the Moon is plainly visible. Point out that students just saw a photo of the Moon. Now they will observe the Moon to see what it looks like in the night sky and draw a picture of it.

Lesson 3: Days 3 and 4 - The Moon - Explain
The Moon Video, Inquiry Activity- Made a Model

- **Learning Intention:** I am learning about the pattern of how the Moon appears to change.
- **Success Criteria:** I can make a model to show the phases of the Moon in order, showing a pattern.
- **Brief Overview of Lesson:** Students will watch and discuss the video, *The Moon.* Students will then make a model to show the pattern of how the Moon appears to change.

Lesson 3: Day 5 - The Moon - Elaborate
Inquiry Activity- Moon Observations

- **Learning Intention:** I am learning that the Moon's changes during a month.
- **Success Criteria:** I can investigate how the Moon changes during the month and draw a picture of my observations each night.
- **Brief Overview of Lesson:** Students will record their observations of the Moon for one week by drawing a picture for each night. Teacher can also find the current month's Moon observations by using sites such as www.moongiant.com.

Lesson 3: Day 6 - The Moon - Evaluate
Performance Task- Phases of the Moon

- **Learning Intention:** I am learning about the phases of the Moon.
- **Success Criteria:** I can identify the phases of the Moon in my model and list/show them in correct order.
- **Brief Overview of Lesson:** Students will make a model to show all eight phases of the Moon as shown in *The Moon* video. Show the video again for reference when drawing, labeling, and drawing arrows. Encourage students to make a circular diagram.

Lesson 3: Day 7 - Assessment Options

- **Learning Intention:** I am learning the patterns of the motion of the Moon.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: Why does the Moon seem to change?
- Performance Task - Phases of the Moon (Lesson 3)
    - Phases of the Moon Performance Task Rubric
- Lesson 3- The Moon Test

- STEM Gauge #496990
- Teacher-created Assessment

Lesson 4: The Sun and Stars

Lesson 4: Day 1 - The Sun and Stars - Assess and Engage
Page Keeley Science Probe - Seeing Stars, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of the night sky. I am learning the patterns of the motion of the sun and stars.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it.
  I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Seeing Stars.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the Sun and stars and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *the night sky* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of an *Astronomer* and answer questions in their notebook.

Lesson 4: Days 2 and 3 - The Sun and Stars - Explore
Inquiry Activity- Record Data, Science Text- Another Sun

- **Learning Intention:** I am learning that the Sun affects the temperatures on Earth.
- **Success Criteria:** I can gather and record data about how the position of the Sun and the temperature change during the day.
- **Brief Overview of Lesson:** Students will gather and record data for three sunny days to show a pattern. Students should find the pattern, where the temperature increases as the Sun moves across the sky, then decreases and the Sun begins to set. Students will learn about two astronomers, in the read aloud of the Science Text, *Another Sun*, who travel into space to observe a newly discovered star, and are surprised to find it is an orange yellow star like our Sun and that it has planets.

Lesson 4: Days 4, 5, 6 and 7 - The Sun and Stars - Explain
The Sun and Stars Video, Science Text- Lights in the Sky, Sun in the Sky Digital Interactive

- **Learning Intention:** I am learning that stars are alike and different.
- **Success Criteria:** I can explain in writing one way the Sun is like other stars and one way it is different from other stars in my notebook.
- **Brief Overview of Lesson:** After watching the video, *The Sun and Stars*, students learn that the Sun is a star, that stars make their own light, and that planets orbit a star. Students will learn how stars are alike and different in the read aloud of the Science Text, *Lights in the Sky*. Students will learn that the Sun is a star that we can see during the daytime, and about other stars that we can only see at night. Completion of the Digital Interactive, *The Sun in the Sky* will provide students with a visual on how the Sun appears to move across the sky during the day.

Lesson 4: Day 8 - The Sun and Stars - Elaborate
Inquiry Activity- Near and Far

- **Learning Intention:** I am learning that objects look different when they are near or far.

- **Success Criteria:** I can work with a partner to investigate the placement of ourselves near and far from an object. I can create a model of a picture to show and compare the appearance of the size of my partner and the object I observed when both near and far.
- **Brief Overview of Lesson:** Students will work in partners to observe how the size of an object appears different with distance. Students' drawings should show that, compared to a stationary object, their partner seems smaller when far away.

Lesson 4: Day 9 - The Sun and Stars - Evaluate
Performance Task- Observe the Night Sky

- **Learning Intention:** I am learning about the objects in the night sky.
- **Success Criteria:** I can observe and draw objects that I see in the night sky.
- **Brief Overview of Lesson:** Students will observe the night sky outside on a clear night with an adult and/or teacher can find a video showing the night sky. Students will draw a picture of what they see to record their observations.

Lesson 4: Days 10 and 11 - The Sun and Stars - Module Wrap-Up & Assessment
Performance Project- Observing the Moon

- **Learning Intention:** I am learning about the position of the Moon at night.
- **Success Criteria:** I can observe the position of the Moon during the night and record my observations.
- **Brief Overview of Lesson:** Students will make an observation every 30 minutes for 2 hours at home on a clear night with an adult. Students will make a table to organize and draw their observations.

Lesson 4 Assessment Options:

- **Learning Intention:** I am learning the patterns of the motion of the sun and stars.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How can you describe the Sun and stars?
- Performance Task - Observe the Night Sky (Lesson 4)
  - Observe the Night Sky Performance Task Rubric
- Lesson 4 - The Sun and Stars Test
- Earth and Space Module Test
- Module Performance Project- Observing the Moon
  - Observing the Moon Rubric
- STEM Gauge #496991
- Mystery #5: Why do the stars come out at night?
- Mystery #6- Read-Along: How can stars help you if you get lost?

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Space"
  ○ Discovery Education: Aerospace Engineers
  ○ Discovery Education: How Mae Jemison Diversified Space
  ○ DK findout! Famous Scientists
  ○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills
	• Forming positive relationships, working in teams, dealing effectively with conflict
	• SEL Strategies for Virtual Learning

• Discovery Education: ○ News and Current Events Channel • Try to find examples of an Aerospace Engineer and Meteorologist from different cultures	• SOS Top Ten: Social and Emotional Learning Strategies

Lesson 1: Day and Night	Earth and Space	Estimated Time: 45 minutes per day

Lesson 1: Day 1 - Day and Night - Module Opener

- Students will view a photo of the night sky and make initial explanations. Students will also be introduced to the **Career Connection** of an Aerospace *Engineer* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Day and Night - Assess and Engage
Page Keeley Science Probe - Day and Night, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Day and Night.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the day-night cycle and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *the Sun and the sky* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Meteorologist* and answer questions in their notebook.

Lesson 1: Day 3 - Day and Night - Explore
Inquiry Activity- Shadows, Science Text- Deedee's Day

- Students explore how light shining toward an object from different angles affects the length and direction of the shadow cast by the object. Students will learn about the activities Deedee does during the day and night.

Lesson 1: Days 4, 5, and 6 - Day and Night - Explain
Day and Night Video, Inquiry Activity- The Sun and Earth, Science Text- Earth's Sky Changes

- Students identify whether where they live has daytime or nighttime and why, and whether it is daytime or nighttime on the other side of Earth and why. Students will watch the video *Day and Night* which demonstrates and explains what causes day and night, Earth's rotation, and Earth's relationship to the Sun. Students learn how planet Earth moves in space, rotating and revolving around the Sun, and that Earth's rotation causes day and night while listening to the read aloud, *Earth's Sky Changes.*

Lesson 1: Day 7 - Day and Night - Elaborate
Inquiry Activity- Measuring Your Shadow

- Students investigate how the length and direction of their shadow changes during the day. Students will measure their shadows morning, afternoon and midday and record their findings in a table.

Lesson 1: Day 8 - Day and Night - Evaluate

Performance Task- The Sun During the Day

- Students will observe the Sun several times through the day and learn that it is at different places in the sky at different times of day.

Lesson 1: Day 9 - Assessment

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What causes the pattern of day and night?

What students should know and be able to do to engage in this lesson:

- Day and night form a regular pattern that can be observed. Earth rotates, or spins on its axis, once every 24 hours. As Earth rotates, the side facing the Sun receives light, while the side facing away is dark. Earth's axis runs from the North Pole to the South Pole through the center of the planet. Because Earth rotates from west to east, the Sun appears to rise in the east and set in the west.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.4.2 Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun's light is blocked by objects). (5.4.P.E.1)
Focus Question for this Lesson	
What causes the pattern of day and night?	
Learning Intention	**Success Criteria**
I am learning … **Day 1:** • I am learning about the phenomenon of the night sky. • I am learning to ask questions about the phenomenon and what I want to learn about it. **Day 2:** • I am learning about the phenomenon of the Sun and the sky. • I am learning to ask questions about the phenomenon and what I want to learn about it. **Day 3:**	*I can …* **Day 1:** • • I can make initial explanations by observing a photo of the night sky including stars and the moon. **Day 2:** • I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Day 3:**

● I am learning that shadows can have different lengths based on the angle of the light. **Days 4 - 6:** ● I am learning what causes day and night. **Day 7:** ● I am learning how my shadow changes during the day. **Day 8:** ● I am learning if the Sun stays in the same spot all day or if there is a pattern.	● I can explore and draw how light shining toward an object from different angles affects the length and direction of the object's shadow. **Days 4 - 6:** ● I can investigate and explain to a partner how Earth's rotation causes day and night. **Day 7:** ● I can investigate the length and direction of my shadow. **Day 8:** ● I can observe the Sun throughout the day and explain that it is in a different place in the sky at different times of the day.
Assessment(s)	
● Self-Assessment ● Peer Assessment ● Teacher Observations ● Work Samples ● Performance Task - The Sun During the Day (Lesson 1) ● Lesson 1- Day and Night Test ● STEM Gauge #466689 ● Mystery #1: Could a statue's shadow move? ● Mystery #2- Read-Along: What does your shadow do when you're not looking? ● Mystery #3: How can the Sun help you if you're lost?	
Feedback (Peer to peer/student to teacher/teacher to student)	
● The Sun During the Day Performance Task Rubric ● CER Evidence Based Writing Rubric ● Peer to peer ● Self-monitoring	

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS
Anticipated Student Pre-Conceptions/Misconceptions
● Students might think that day and night are caused by the Sun revolving, or traveling in a path around Earth, or by Earth revolving around the Sun. ● Other students may think that night happens when clouds cover the Sun.
Integrated Accommodations & Modifications
English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.

- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 1, Day 1- Module Opener

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of the night sky.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

Module Opener:

- Introduce the module phenomenon by showing the photo of the night sky.
- Ask students to think of questions they have relating to the night sky, including stars and the Moon. Have them record questions in their Science Notebook.
- Use the questions below to elicit student responses.
    - ASK:
        - What objects do you notice in the night sky? Sample answer: the Moon and stars
        - How is the night sky different from the day sky? Sample answer: Usually during the day, you cannot see the Moon or stars.
        - What pattern can you predict about the night sky? Sample answer: night comes after day; the Moon is usually visible, stars move across the sky

During the Lesson

Introduce Key Vocabulary:

- **Key Vocabulary:** daytime, Moon, nighttime, phases, planet, position, rotate, season, star, Sun
- These words are a selection of important vocabulary that will be used throughout the module. Remind students to listen for these Key Vocabulary words as they complete the module.

STEM Career Kid Connection: Aerospace Engineer

- Introduce Career Kid Emily, who wants to be an aerospace engineer when she grows up.
- Explain that aerospace engineers study how things work in the universe. They study space and the objects found in space. Some design spaceships and other vehicles that help people explore our solar system.
- Read aloud to students what Emily says in the Science Notebook. Have students complete the question in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *analyze data.*
- **I will** *interpret data.*

Have students read the "I will…" statements in their Science Notebook. The "I will . . ." statements for this module reference the science and engineering practices of analyzing and interpreting data.

- If this is the first time you are teaching the Science and Engineering Practices of analyzing and interpreting data, help students understand that they can analyze and interpret data by looking at the data to see if they can identify any patterns or answers to questions they have. To analyze and interpret data, students will have to think about what the data shows. Ask students for other ideas they have about analyzing and interpreting data.

THE LESSON IN ACTION: Lesson 1, Day 2- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they already know about day and night.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of the Sun and the sky.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Day and Night

- This probe is intended to uncover students' basic ideas about the day-night cycle.
- This probe can be used as an elicitation prior to introducing a lesson on how light reflects from a mirror. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations.
- Introduce the probe by asking children to describe the difference between day and night. Tell them that the four friends in the picture have different ideas about why we have daytime and nighttime. Point to each character, say the character's name, and read what is in their talk bubble to the students. Make sure students understand what each character is saying.
- Students will choose the friend they think has the best idea about why we have daytime and nighttime. Choose a talk configuration (pair, small group, whole class, or combination), and listen carefully as students share their choices and explanations. Use talk moves to help them explain their thinking.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of the Sun and the sky.
- Show the photo and ask students what questions they have about the Sun and the sky. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking

about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.

- ASK:
    - What did you see in the photo?
    - What did you notice about the Sun and the sky?
    - What did you wonder about what you saw in the photo?
    - What interests you about the Sun and the sky?

Help students turn their observations from the photo into questions that they can refer to during the lesson.

STEM Career Kid Connection: Meteorologist

- Introduce Career Kid Hugo, who wants to be a meteorologist when he grows up.
- Explain to students that meteorologists are experts in predicting the weather. They help people know whether the day will be sunny, cloudy, windy, or stormy. Hugo is excited about watching the sky and learning how scientists predict the weather. Read what Hugo says in the **Science Notebook** aloud as a class.
- ASK:
    - Why might Hugo want to know why the Sun is in different places in the sky during the day? Sample answer: Where the Sun is in the sky might affect what the weather is like, whether it is light or dark outside, or whether it is day or night.
    - Why would it be important for a meteorologist to know about the pattern of day and night? Sample answer: Nights usually have a cooler temperature than days, and this could affect the weather predictions that a meteorologist makes.

Essential Question: What causes the pattern of day and night?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *analyze data.*
- **I will** *interpret data.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn about and analyze and interpret data on the position of the Sun in the sky, and what causes shadows and day and night.

- If this is the first time you are teaching the Science and Engineering Practices of analyzing and interpreting data, explain that analyze means "to study different details about something." Point out that interpret means "to explain or draw a conclusion." Scientists and engineers often analyze and interpret data when doing an investigation or finding the answer to a problem.
- **ASK**:
    - Analyze and interpret the data in the photo you saw of the Sun in the sky. What time of day does the photo show? Why do you think so? Sample answer: It is late in the afternoon or early evening because the Sun is low in the sky.

THE LESSON IN ACTION: Lesson 1, Day 3 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students what they know about shadows.

Review Learning Intention(s) for the day with students:

- I am learning that shadows can have different lengths based on the angle the light.

During the Lesson

Deedee's Day Read Aloud

- Read aloud the fiction selection, Deedee's Day on pages 4–13 in the Science Paired Read Aloud. Students will learn about the activities Deedee does during the day and night.
- **ASK:**
    - Use the Visuals What time of day is shown on pages 4 and 5? How do you know? the morning because the Sun is shining in the sky and Deedee is still in bed
    - How does Deedee describe the day on page 8? warm and sunny
    - What does Deedee notice about the Sun as her family eats dinner? It is lower in the sky.
    - What are Deedee and her family going to do tonight? watch the sunset
    - Why does Deedee want her mother to pull the curtains closed on page 13? The Sun shines bright in the morning.

Inquiry Activity- Shadows:

- Students explore how light shining toward an object from different angles affects the length and direction of the shadow cast by the object.

Safety:

- Have students wash their hands thoroughly with soap and warm water after handling clay.

What to Expect:

- Students' drawings should show that a light shone toward an object from overhead casts a short shadow, while light shone toward the side of the object casts a longer shadow in the direction opposite the light source. Advanced Preparation If time is short, set up the activity ahead for students. Point out that students just saw a photo of the Sun and the sky. Now they will investigate how a shadow's shape changes depending on the position of a light source.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. You may want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Remind them that a prediction is a statement of what they expect to observe in the future. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations. Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Students in a group can take turns shining the light on the craft stick. If students need help tracing the shadows, gently hold the student's hand and guide the tracing.

Communicate Information:

- Record Data Students should draw their setup and results. Have students fill in the table in their **Science Notebook** as they create each shadow. Have students complete the given questions in their **Science Notebook.**

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their observations and data with those of their classmates.
- **ASK:**
    - How do your results compare to those of your classmates? Sample answer: Most of us observed that the shadow was longer when the flashlight was shone from the side toward the stick. The shadow was always on the side of the stick opposite where the light was coming from.

- Do you see any patterns in the class's data? If so, what patterns do you see? Sample answer: Yes. The higher the light on the stick, the shorter the shadow. The lower the light on the side of the stick, the longer the shadow. If the light was shining down from directly above the stick, the shadow was very small around the stick

- In this discussion, observe your students' ability to communicate the relationship between the position of the light and the length and direction of the shadow.
- **ASK**:
  - Which position caused the shortest shadow? Sample answer: Shining the light toward the stick from straight overhead caused the shortest shadow or no shadow.
  - Which position caused the longest shadow? Sample answer: Shining the light straight from the side toward the stick caused the longest shadow.

THE LESSON IN ACTION: Lesson 1, Days 4, 5 and 6 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to recall what they remember about the positions they used to cast shadows.

Review Learning Intention(s) for the day with students:

- I am learning what causes day and night.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
  - Sun - the star closest to Earth
  - daytime - the time between when the Sun rises and sets
  - nighttime - the time between when the Sun sets in the evening and rises in the morning
  - rotate - to spin
  - planet - a very large object that moves around the Sun

Day and Night Video**:**

- Have students watch the video *Day and Night*. The video demonstrates and explains what causes day and night, Earth's rotation, and Earth's relationship to the Sun.

- **ASK:**
  - When does your home have daytime? nighttime? when it is facing the Sun; when it is facing away from the Sun
  - What causes day and night? Earth's rotation
- Have students complete questions in their **Science Notebook.**

Visual Kinesthetic Vocabulary:

- Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their Science Notebook.

Inquiry Activity- The Sun and Earth:

- Students investigate how Earth's rotation causes day and night.

Safety:

- Students should only shine the light from the flashlight on the globe. They should be careful not to shine the flashlight in their or their classmates' eyes.

What to Expect:

- Students identify whether where they live has daytime or nighttime and why, and whether it is daytime or nighttime on the other side of Earth and why.

Advanced Preparation:

- Be prepared to pinpoint students' location on the globe. If time is short, pre-place a sticker or sticky paper on the area where students live. Point out that students just saw the Sun in the sky. Now they will learn how the Sun and Earth's rotation cause day and night.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations. Read together with students the steps of the investigation in the Science Notebook.

Carry Out an Investigation:

- You may wish to gather the class around a globe and discuss what a globe is and how it might be used. Then discuss where students live. Help them locate and put the sticky paper on the area of the globe where they live. One member of the group should hold the flashlight and shine the light. Remind students that the light from the flashlight is a model for the Sun's light shining on Earth.

Communicate Information:

- Check for students' understanding that the sticker signifies where they live. Have students answer the questions in their **Science Notebook**.

Talk About It:

- Have students share their observations with their classmates.
- **ASK:**
    - How do your results compare to the results of your classmates? Sample answer: Everyone had the same results. If the globe stopped when light was shining on the side that had the sticker, it was daytime where we live.
    - What patterns do you notice from the results? Sample answers: While the globe was spinning, the paper moved from daytime to nighttime and then nighttime to daytime over and over. The flashlight lit up only half the globe.

Earth's Sky Changes Read Aloud:

- Read aloud the nonfiction selection, Earth's Sky Changes on pages 14–23 in the Science Text Read Aloud. Students will learn how planet Earth moves in space, rotating and revolving around the Sun, and that Earth's rotation causes day and night. While reading, students will encounter the vocabulary words: *planet, Sun, rotate, daytime, and nighttime*
- **ASK:**
    - What planet do we live on? Earth
    - Why does it look like the Sun's position in the sky moves up in the morning and down at night? Earth is rotating, or moving.
    - Use the Visuals What does the arrow in the picture on page 20 mean? that Earth is rotating
- Have students complete the questions in their Science Notebook.

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about the relationship between light and shadows, then have them revisit some activities in this lesson.
- **ASK:**
    - What is a shadow? Sample answer: a dark shape that is created when a source of light is blocked
    - Light hits one side of an object. Where does the shadow of the object appear? Sample answer: on the other side of the object from where the light is hitting it
    - Can we see objects if there is no light? no
    - What is one form of natural light? the Sun

Reflect and Refine- Day and Night:

- At this point, students can go back to the Page Keeley Science Probe in their Science Notebook to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of the day-night cycle. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Crosscutting Concepts Patterns:

- If this is the first time you have taught the Crosscutting Concept of Patterns, help students understand that a pattern is the repeated way in which something happens. Explain that patterns occur in the natural and human-made world. Point out that the natural world includes plants, animals, soil, rocks, and water, and that human-made objects include anything that is made by people, such as roads, buildings, and bridges.
- **ASK**:
    - Daytime followed by nighttime is a pattern. Is the Sun seeming to rise in the morning and set in the evening a pattern? Explain your answer. Sample answer: Yes. What looks like sunrise and sunset is a pattern because it repeats every day.
- Have students answer the question in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding of shadows, day and night and the Sun and Earth's rotation, then have them revisit some activities in this lesson. **ASK:**
    - How does Earth move? It spins, or rotates, and moves around the Sun.
    - Why do we have day? Our side of Earth is facing the Sun.
    - Why do we have night? Our side of Earth is facing away from the Sun.
    - What causes day and night? Earth's rotation, or spinning
    - Why do you have a shadow when you are standing outside in the Sun? I am blocking the light from the Sun. This causes a shadow of me to form.

Science and Engineering Practices:

- **I can** *analyze data.*
- **I can** *interpret data.*

Have students complete the "I can . . ." statement in the Science Notebook. The "I can . . ." statement for this lesson references the Science and Engineering Practices of analyzing and interpreting data.

- **ASK:**
    - Have you analyzed data in any of the activities you have done so far? If so, when and what did you analyze? Sample answer: Yes. In the Shadows activity, I analyzed how I made long or short shadows. In The Sun and Earth activity, I analyzed whether a sticker showing where I live was in daytime or nighttime after spinning a globe.

- Have you interpreted data? If so, when and what did you interpret? Sample answer: Yes. In the Shadows activity, I interpreted data and explained what caused shadows to change shape. In The Sun and Earth activity, I interpreted data and explained why the sticker was in daytime or nighttime. If the light was shining on it, it was daytime. If not, it was nighttime.

THE LESSON IN ACTION: Lesson 1, Day 7 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation.
- **ASK**:
  - **Cause and Effect:** Why do day and night repeat in a pattern? Sample answer: Earth always spins, or rotates, so places on Earth move from being in the Sun's light during the day to being in the dark at night. This is always happening, so the pattern of day and night repeats.
- Complete the graphic organizer as a class. If students were not able to identify the cause of day and night as the rotation of Earth, have them revisit The Sun and Earth inquiry using the globe and flashlight, or review pages 17–21 in Earth's Sky Changes Read Aloud.

Review Learning Intention(s) for the day with students:

- I am learning how shadows change size during the course of a day.

During the Lesson

Inquiry Activity- Measuring Your Shadow

- Students investigate how the length and direction of their shadow changes during the day.

What to Expect:

- Students' data should show shadows being longer in the morning and afternoon and shorter at midday. Students should relate this to the position of the Sun in the sky. Observations should show that their shadow always falls on the side of their body that is opposite the Sun.

Advanced Preparation:

- Arrange time outdoors on a sunny day, on a surface where shadows can be marked with chalk at three intervals: morning, noon, and afternoon. Prior to the activity, you may want to review with students their data from the Shadows activity in the Engage section at the beginning of the lesson.

Safety:

- Caution students to never look directly at the Sun. Make a Prediction Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions as a class and write students' predictions on the board. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the **Science Notebook** together with the class.

Carry Out an Investigation:

- Choose, or have students help you choose, a sunny place outside for students to measure their shadows. Explain and demonstrate how to use the meter stick to measure length in centimeters. Make sure students stand in the same place each time to measure their shadows. Partners should use the chalk to mark the beginning and end of shadows. Students should measure their shadows to the nearest centimeter using the meter stick.
- Allow students to record their measurements immediately after taking them in the table in their Science Notebook.
- Allow students to draw the Sun in the sky in their tables at the same time they record the length of their shadows.
- Have students answer the questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss and share their observations from the activity, *Measuring Your Shadows.*
- **ASK:**
    - What did you notice when you analyzed your data? Sample answer: My shadow went from long to short to long again. The Sun came from one side, or lower, in the morning, from overhead at noon and from lower again in the afternoon.
    - How does where the Sun is affect the length of your shadow? Sample answer: The higher the Sun, the shorter the shadow; the lower the Sun, the longer the shadow.
    - How did your results compare to your classmates'? Sample answer: Our results were similar. Most groups recorded longer shadows in the morning, shorter shadows at noon, and longer shadows again in the afternoon.

THE LESSON IN ACTION: Lesson 1, Days 8 and 9- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Share one interesting fact you have learned about day and night with a partner.

Review Learning Intention(s) for the day with students:

- I am learning if the Sun stays in the same spot all day or if there is a pattern.

During the Lesson

Performance Task - The Sun During the Day:

- Students will observe that the Sun is at different places in the sky at different times of day

What to Expect:

- Students should communicate that the Sun appears to move across the sky, and that this is a pattern.

Advanced Preparation:

- Plan this activity for a sunny day.

Safety:

- Remind students to take caution and never look directly at the Sun.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their **Science Notebook**. Then have students explain their predictions based on previous observations.
- Read with students the steps of the investigation in the Science Notebook.

Make a Model:

- Models should be drawn on drawing paper. Help students follow the instructions in their Science Notebook. Show them how to fold their paper into three equal vertical sections, and then use a ruler to draw a straight line down each fold.
- Check that students include some objects on Earth in each drawing to show the relative position of the Sun. Ensure that students are not looking directly into the Sun. Students should draw their pictures, or models, immediately after their observations. Make sure students are drawing their data in the correct column in their tables.
- Take students to the same spot outdoors as in step 2 to make their drawings.
- Have students complete their work in their **Science Notebook.**

Talk About It:

- In this activity, students drew models to show the placement of the Sun in the sky at different times of the day.
- **ASK:**
    - How did your observations compare to your classmates' observations? Sample answer: Our observations were similar. The Sun was at different places in the sky during the day. It looked like it was moving across the sky.

- Is it possible to predict the pattern of the Sun's movement in the sky during the day? Why or why not? Sample answer: Yes, the Sun followed the same pattern in this activity and a previous activity. We can expect the same pattern every day.
- How did you and your classmates explain why it looks like the Sun is moving across the sky? Is the Sun really moving? Sample answer: Some students said it looks like the Sun is moving but it is not. It only appears to move because Earth is rotating.

- In this discussion, observe students' ability to articulate an understanding that our view of the Sun follows a pattern that can be predicted, and that Earth's rotation causes the seeming movement of the Sun across the sky.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: What causes the pattern of day and night?

- Have students refer to the answers you recorded to this question in their Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *analyze data.*
- **I did** *interpret data.*

Have the students refer to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read the "I did . . ." statement in the Science Notebook together as a class. **ASK**:

- How would you rate yourself in your ability to analyze and interpret data? Color in the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars colored in could mean "average"; one star colored in could mean "still learning."

Assessment Options

- Performance Task - The Sun During the Day (Lesson 1)
  - The Sun During the Day Performance Task Rubric
- Lesson 1- Day and Night Test
- STEM Gauge #466689
- Mystery #1: Could a statue's shadow move?
- Mystery #2- Read-Along: What does your shadow do when you're not looking?
- Mystery #3: How can the Sun help you if you're lost?
- Teacher-created Assessment

Lesson 1 Resources

Earth and Space PDF Folder
Reading Strategies for Science Folder
STEM Gauge #466689
Mystery #1: Could a statue's shadow move?
Mystery #2- Read-Along: What does your shadow do when you're not looking?
Mystery #3: How can the Sun help you if you're lost?
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 2: Seasonal Patterns	**Earth and Space**	**Estimated Time: 45 minutes per day**

Lesson 2: Day 1 - Seasonal Patterns - Assess and Engage
Page Keeley Science Probe - Daylight Hours, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Day and Night.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the seasonal patterns of night and day and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *leaves changing colors and falling from trees* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Meteorologist* and answer questions in their notebook.

Lesson 2: Days 2 and 3 - Seasonal Patterns - Explore
Inquiry Activity- Sunlight Simulation, Science Text- The Other Half of the World

- Students will conduct a simulation to investigate seasonal changes to sunrise, sunset, and weather in different places around the world. Students will fill in a table with their findings and answer questions related to their investigation. Students will listen to a read aloud of the Science Text- *The Other Half of the World* to learn about a family taking a trip in January from North America to New Zealand. They learn that it is summer in New Zealand while it is winter in North America.

Lesson 2: Days 4 and 5 - Seasonal Patterns - Explain
Seasons Change Video, Science Text- The Four Seasons

- Students will watch the video, *Seasons Change* to learn what happens during each season. Students will listen a read aloud of the Science Text- *The Four Seasons* to understand why Earth has seasons and what each season is like. The vocabulary words *season, summer, spring, fall and winter* will be encountered within the text.

Lesson 2: Day 6 - Seasonal Patterns - Elaborate
How Earth Moves Digital Interactive

- Students will understand that Earth revolves around the Sun. That, in addition to Earth's tilt, causes the seasons. Have students complete the How Earth Moves digital interactive

Lesson 2: Day 7 - Seasonal Patterns - Evaluate
Performance Task- How Some Trees Change

- Students will use what they have learned to show how some trees change at different times of the year.

Lesson 2: Day 8 - Assessment

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What causes the seasons?

What students should know and be able to do to engage in this lesson:

- Earth's orbit and the tilt of Earth on its axis cause the seasons. As Earth travels in a path around the Sun, the angle of sunlight that meets Earth's surface changes throughout the year. During summer in the Northern Hemisphere, Earth's North Pole is tilted toward the Sun, resulting in longer hours of daylight in the Northern Hemisphere. The Sun is positioned high in the sky. In winter, the opposite happens. Earth's North Pole is tilted away from the Sun, resulting in shorter hours of daylight in the Northern Hemisphere. The Sun is positioned lower in the sky. The Northern and Southern hemispheres have opposite seasons. When the Northern Hemisphere is tilted toward the Sun summer occurs. When the Southern Hemisphere is tilted away from the Sun, winter occurs.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.4.2 Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun's light is blocked by objects). (5.4.P.E.1)
Focus Question for this Lesson	
What causes the seasons?	
Learning Intention	**Success Criteria**
I am learning … **Day 1:** • I am learning about the phenomenon of leaves changing colors.	*I can …* **Day 1:**

● I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 2 -3:** ● I am learning about how sunrise, sunset and weather change in different places of the world. **Days 4 - 5:** ● I am learning why Earth has seasons. **Day 6:** ● I am learning another cause for Earth's seasons. **Day 7:** ● I am learning that some trees change throughout the seasons. **Day 8 - Assessment**	● I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 2 -3:** ● I can investigate seasonal weather differences and changes, including temperature, hours of daylight, and where the Sun is in the sky in different places around the world. **Days 4 - 5:** ● I can describe each season to a partner and write and/or draw one interesting fact for each in my notebook. **Day 6:** ● I can answer questions about the seasons through exploration of the Digital Interactive, *How Earth Moves.* **Day 7:** ● I can draw the same tree for each season and show how the tree changes throughout the seasons.
Assessment(s)	
● Self-Assessment ● Peer Assessment ● Teacher Observations ● Work Samples ● Performance Task - How Some Trees Change (Lesson 2) ● Lesson 2- Seasonal Patterns Test ● Mystery #4- Read-Along: Why do you have to go to bed early in the summer? ● Teacher-created Assessment	
Feedback (Peer to peer/student to teacher/teacher to student)	
● How Some Trees Change Performance Task Rubric ● CER Evidence Based Writing Rubric ● Peer to peer ● Self-monitoring	

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS
Anticipated Student Pre-Conceptions/Misconceptions
● Students might think that the changes in the seasons are because Earth is closer to the Sun in the summer than in the winter.

- Students may also think that the tilt of Earth's axis changes and this results in the changing seasons.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

Lesson 2: Seasonal Patterns	Earth and Space	Estimated Time: 45 minutes per day

Lesson 2: Day 1 - Seasonal Patterns - Assess and Engage
Page Keeley Science Probe - Daylight Hours, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Day and Night.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the seasonal patterns of night and day and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *leaves changing colors and falling from trees* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Meteorologist* and answer questions in their notebook.

Lesson 2: Days 2 and 3 - Seasonal Patterns - Explore
Inquiry Activity- Sunlight Simulation, Science Text- The Other Half of the World

- Students will conduct a simulation to investigate seasonal changes to sunrise, sunset, and weather in different places around the world. Students will fill in a table with their findings and answer questions related to their investigation. Students will listen to a read aloud of the Science Text- *The Other Half of the World* to learn about a family taking a trip in January from North America to New Zealand. They learn that it is summer in New Zealand while it is winter in North America.

Lesson 2: Days 4 and 5 - Seasonal Patterns - Explain
Seasons Change Video, Science Text- The Four Seasons

- Students will watch the video, *Seasons Change* to learn what happens during each season. Students will listen a read aloud of the Science Text- *The Four Seasons* to understand why Earth has seasons and what each season is like. The vocabulary words *season, summer, spring, fall and winter* will be encountered within the text.

Lesson 2: Day 6 - Seasonal Patterns - Elaborate
How Earth Moves Digital Interactive

- Students will understand that Earth revolves around the Sun. That, in addition to Earth's tilt, causes the seasons. Have students complete the How Earth Moves digital interactive

Lesson 2: Day 7 - Seasonal Patterns - Evaluate

Performance Task- How Some Trees Change

- Students will use what they have learned to show how some trees change at different times of the year.

Lesson 2: Day 8 - Assessment

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: What causes the seasons?

What students should know and be able to do to engage in this lesson:

- Earth's orbit and the tilt of Earth on its axis cause the seasons. As Earth travels in a path around the Sun, the angle of sunlight that meets Earth's surface changes throughout the year. During summer in the Northern Hemisphere, Earth's North Pole is tilted toward the Sun, resulting in longer hours of daylight in the Northern Hemisphere. The Sun is positioned high in the sky. In winter, the opposite happens. Earth's North Pole is tilted away from the Sun, resulting in shorter hours of daylight in the Northern Hemisphere. The Sun is positioned lower in the sky. The Northern and Southern hemispheres have opposite seasons. When the Northern Hemisphere is tilted toward the Sun summer occurs. When the Southern Hemisphere is tilted away from the Sun, winter occurs.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.4.2 Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun's light is blocked by objects). (5.4.P.E.1)
Focus Question for this Lesson	
What causes the seasons?	
Learning Intention	**Success Criteria**
I am learning … **Day 1:** • I am learning about the phenomenon of leaves changing colors. • I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 2 -3:** • I am learning about how sunrise, sunset and weather change in different places of the world.	*I can …* **Day 1:** • I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 2 -3:** • I can investigate seasonal weather differences and changes, including temperature, hours of daylight, and where the Sun is in the sky in different places around the world.

Days 4 - 5: ● I am learning why Earth has seasons. **Day 6:** ● I am learning another cause for Earth's seasons. **Day 7:** ● I am learning that some trees change throughout the seasons. **Day 8 - Assessment**	**Days 4 - 5:** ● I can describe each season to a partner and write and/or draw one interesting fact for each in my notebook. **Day 6:** ● I can answer questions about the seasons through exploration of the Digital Interactive, *How Earth Moves.* **Day 7:** ● I can draw the same tree for each season and show how the tree changes throughout the seasons.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Performance Task - How Some Trees Change (Lesson 2)
- Lesson 2- Seasonal Patterns Test
- Mystery #4- Read-Along: Why do you have to go to bed early in the summer?
- Teacher-created Assessment

Feedback (Peer to peer/student to teacher/teacher to student)

- How Some Trees Change Performance Task Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS

Anticipated Student Pre-Conceptions/Misconceptions

- Students might think that the changes in the seasons are because Earth is closer to the Sun in the summer than in the winter.
- Students may also think that the tilt of Earth's axis changes and this results in the changing seasons.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.

- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 2, Day 1- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they already know about the seasons.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of leaves changing colors.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Daylight Hours

- This probe is intended to uncover students' basic ideas about the seasonal patterns of night and day.
- This probe can be used as an elicitation prior to introducing a lesson on the seasonal pattern of sunrise to sunset, resulting in the length of daylight hours. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations.
- Introduce the probe by asking children to describe how the Sun appears to move across the sky during the day. Ask them to name the four seasons. Ask if they think there is a seasonal difference in the Sun's observable path.
- Tell students that the four friends in the picture have different ideas about which season has the longest daylight hours. Point to each character, say the character's name, and read what he or she is saying to the students. Make sure students understand what each character is saying.
- Students will choose the friend they think has the best idea about daylight during different seasons. Choose a talk configuration (pair, small group, whole class, or combination), and listen carefully as students share their choices and explanations. Use talk moves to help them explain their thinking.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of leaves changing color and falling from trees.
- Show the video and ask students what questions they have about the trees and what is happening to their leaves. Have students record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.
- ASK:
    - What did you see in the video?
    - What did you notice about the trees and their leaves?

- What did you wonder about what you saw in the video?
- What interests you about what happens to leaves on some trees?

Help students turn their observations from the video into questions that they can refer to during the lesson.

STEM Career Kid Connection: Meteorologist

- Reintroduce Career Kid Hugo, who wants to be a meteorologist when he grows up.
- Remind students that a meteorologist studies and predicts weather. Meteorologists study how the weather changes during the day and during different seasons. Read what Hugo says in the **Science Notebook** aloud as a class.
- ASK:
  - Why might Hugo be interested in how the weather changes during the year? Sample answer: Hugo might want to know what different weather is like, and if the weather changes the same way at the same time everywhere.
  - How might a meteorologist explain why the leaves on the trees in the video are changing color and falling off? Sample answer: The weather is changing, and the change in weather is affecting the trees and their leaves.

Essential Question: What causes the seasons?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *plan an investigation.*
- **I will** *carry out an investigation.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will learn about the seasons and seasonal patterns. They will use this information to plan and carry out an investigation.

- If this is the first time you are teaching the Science and Engineering Practices of planning and carrying out an investigation, explain that an investigation is a careful search to find the answer to a question. Often, an investigation includes a set of steps scientists and engineers follow to get information or learn facts about something in order to answer their question.

- **ASK**:
  - What might you do to investigate how the weather changes throughout the year where you live? Sample answer: I could listen to weather reports and look up weather reports online for each month in the last year.

THE LESSON IN ACTION: Lesson 2, Days 2 and 3 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students what they know about weather in other parts of the world.

Review Learning Intention(s) for the day with students:

- I am learning about how sunrise, sunset and weather change in different places of the world.

During the Lesson

The Other Half of the World Read Aloud:

- Read aloud the fiction selection, The Other Half of the World on pages 4–13 in the Science Text Read Aloud. Students learn about a family taking a trip in January from North America to New Zealand. They learn that it is summer in New Zealand while it is winter in North America.
- **ASK:**
  - Where is Ethan's family going? to New Zealand
  - Use the Visuals Look at the picture on pages 8 and 9. What is the weather like in Chicago where Ethan lives? snowy and cold ‣What month is it? January ‣What time of year is it in Chicago? winter
  - What time of year is it in New Zealand? summer
  - What does Ethan pack to vacation in New Zealand in January as explained on page 13? shorts, sandals, swim trunks

Inquiry Activity- Sunlight

- Students will investigate how sunrise, sunset, and weather in different places around the world change.

What to Expect:

- Students will identify seasonal weather differences and changes, including temperature, hours of daylight, and where the Sun is in the sky in different places around the world.

Advanced Preparation:

- You might want to familiarize yourself with the simulation before having the students conduct the activity. Point out that students just saw a video of trees whose leaves turned colors and fell from the trees. Now they will explore how temperatures and daylight hours change from season to season in different parts of the world.

How to Use the Simulation:

- Have students read the introductory information and click OK. Have students look at the globe image. Explain that the four dots are four places in the world. These four places are named in the boxes. Have students click on a place name to see how the dot on the globe lights up when that place is chosen. Point out the slider bar on the far right. Have students move the triangle to different months of the year. Point out the thermometer on the left that shows the temperature. Have students notice how the temperature changes as they move the slider. Then have them notice the season label at the top right of the scene. Have them click through the months to see which months are in each season. Finally, have students click on the "Play" button near the lower left. This starts an animation of the Sun's path. It shows the times the Sun "rises" and "sets" and the path it takes at different times of year in different places. A 24-hour cycle repeats until the student selects another place or month, or clicks on the pause or reset button. Help students notice how the time of "sunrise" and "sunset" changes in different places. Allow students time to conduct the simulation.
- Students will fill in each section of the table in their **Science Notebook** as they conduct the simulation.
- Have students complete the questions in their Science Notebook. Allow students time to revisit the simulation to answer the questions, as necessary.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

Have students share their observations and data with those of their classmates.

- **ASK:**
  - What were some things you and your classmates observed about seasons in the simulation? Sample answer: We observed that the temperatures shown on the thermometer were warmer in the summer, and then went down every month. Temperatures were coldest in winter. We could see the Sun for more hours during the summer.
  - What were some seasonal differences between the places shown on the globe? Sample answer: Alaska has colder temperatures than Brazil.
  - How did your results compare to your classmates'? Sample answer: We all had the same results.
  - How did you and your classmates discover how the temperature is different in different places during the same month? Sample answer: We set the month and then changed the city to see how the temperature is different in each city during that month.

THE LESSON IN ACTION: Lesson 2, Days 4 and 5 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to recall what they remember about the positions they used to cast shadows.

Review Learning Intention(s) for the day with students:

- I am learning why Earth has seasons.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.
    - season -a time of year
    - spring -the season after winter
    - summer -the season after spring
    - fall -the season after summer
    - winter -the season after fall

Seasons Change Video**:**

- Have students watch the video *Seasons Change*. Students will learn what happens during each season.
- **ASK:**
    - Use the Visuals What are some things that you can see in spring? Sample answer: trees with blooms, rainy weather, a mother bird feeding her babies, flowers blooming
    - Use the Visuals What are some things people do in the fall? Sample answer: get pumpkins, rake leaves
    - Use the Visuals What is winter like in some places? Sample answer: snowy
- Have students complete the questions in their **Science Notebook.**

Visual Kinesthetic Vocabulary:

- Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their Science Notebook.

The Four Seasons Read Aloud:

- Read aloud the nonfiction selection, *The Four Seasons* on pages 14–23 in the Science Text Read Aloud. Students will learn why Earth has seasons and what each season is like. While reading, students will encounter the vocabulary words: *season, summer, spring, fall, and winter*.

- **ASK:**
    - What is one thing that happens as Earth revolves, or moves around the Sun? Sample answer: The amount of daylight changes.
    - How long does it take Earth to revolve, or move around the Sun? about one year
    - Which season has the most hours of sunlight? summer
    - What part of Earth is tilting toward the Sun in fall and spring as explained on page 20? no part

Crosscutting Concepts- Patterns:

- Review the Crosscutting Concept of Patterns. Ask volunteers to identify patterns from the simulation, readings, and video, such as the repeating cycle of the seasons, the changing pattern of daylight hours during the seasons, and the rising and falling temperature pattern during the year.
  ASK:
    - In what order, or pattern, do the seasons always occur? Accept all reasonable answers, but look for students' understanding of the correct cycle of seasons. Sample answer: spring, summer, fall, winter.
- Have students complete the question in their Be Scientist Notebook.

Reflect and Refine- Daylight Hours:

- At this point, students can go back to the Page Keeley Science Probe in their **Science Notebook** to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of seasonal patterns, including the number of daylight hours. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Use the Talk About It questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding of seasonal patterns, then have them revisit some activities in this lesson.
- **ASK:**
    - What are the four seasons? spring, summer, fall, winter
    - What are two seasonal patterns? Sample answer: Seasons always happen in the same order, and the amount of daylight hours changes in each season.
    - How does the amount of daylight hours in each season change? Sample answer: Summer has the most hours of daylight. Fall has about the same amount of hours of daylight and night. Winter has the fewest hours of daylight, spring has more hours of daylight than winter, and about the same amount of hours of daylight and night.

Science and Engineering Practices:

- **I can** *plan an investigation.*
- **I can** *carry out an investigation.*

The "I can . . ." statements for this lesson reference the Science and Engineering Practices of planning and carrying out an investigation.

- **ASK:**
  - Have you carried out an investigation? If so, what did you do? Sample answer: I did a simulation on hours of sunlight.

THE LESSON IN ACTION: Lesson 2, Day 6 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK**:
  - **Cause and Effect:** Why do the seasons change in the same pattern every year? Sample answer: Earth revolves around the Sun. Earth tilts. Earth's tilt causes a different amount of sunlight to reach different parts of Earth, which changes over the course of the year. Earth's pattern of revolving around the Sun once a year and its tilt cause the seasons to change in the same pattern every year.
- Complete the graphic organizer as a class. If students were not able to describe what causes the seasons, then have them revisit pages 18–20 in *The Four Seasons* in the Science Text Read Aloud.

Review Learning Intention(s) for the day with students:

- I am learning another cause for Earth's seasons.

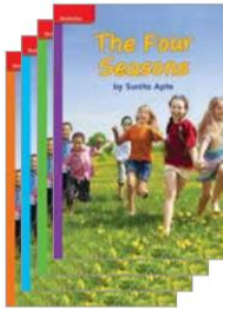
During the Lesson

How Earth Moves Digital Interactive:

- Students will understand that Earth revolves around the Sun. That, in addition to Earth's tilt, causes the seasons.
- Have students complete the How Earth Moves digital interactive. **ASK:**
  - Use the Visuals What do the arrows in the image mean? Sample answer: Earth is revolving, or moving around the Sun.
  - Which way is North America tilted when it is summer in North America? toward the Sun
  - What happens when Earth is tilted away from the Sun? Sample answer: North America

Look at the Facts:

- Review the tables with students, explaining that the Sun doesn't actually rise and set but we use the terms "sunrise" and "sunset" to refer to when the Sun seems to come up in the morning and go down at night. Point out that each row in the chart shows sunrise and sunset information, each chart shows this information for three different days, and that each chart shows information for a different season. Have students use the table to complete the questions in their Science Notebook.



Leveled Readers- The Four Seasons (Optional)

This book gives a brief overview of the four seasons and the typical weather each brings. This book will aid in the explanations of each of the four seasons. It describes the weather patterns and other changes that occur.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss and share their data from, *Look at the Facts.*
- **ASK:**
  - How did your results compare with those of your classmates? Sample answer: All of my classmates observed that Table B showed longer hours of daylight, so those times must be for a warmer season than the times shown on Table A.
- In this discussion, observe students' ability to articulate how to interpret the data tables, using appropriate terms in their own words, including inferring that longer days relate to summer and shorter days to winter.

THE LESSON IN ACTION: Lesson 2, Days 7 and 8- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Discuss with a partner your opinion to this question: Do all trees stay the same throughout the seasons?

Review Learning Intention(s) for the day with students:

- I am learning that some trees change throughout the seasons.

During the Lesson

Performance Task - How Some Trees Change:

- Students will use what they have learned to show how some trees change at different times of the year.

What to Expect:

- Students' drawings show a tree that is starting to get green leaves and/or blossoms in spring, the tree covered in green leaves and perhaps fruit in summer, the tree with different colored leaves and some leaves on the ground in fall, and the tree with no leaves in winter.

Advanced Preparation:

- Prior to the activity, review seasonal changes with students, if necessary. Encourage students to show a deciduous tree whose leaves change color and drop. Assist students as needed in identifying how the tree looks different in each season. Emphasize that they are drawing the same tree each time, they are only changing how the tree is different in each season.
- You might want to remind students that seasons and seasonal changes happen in a pattern. Point out that the same changes usually happen every year during the same season.

Have students complete the questions in their **Science Notebook.**

Talk About It:

- In this activity, students drew the seasonal changes that happen to some trees.
- **ASK:**
    - How did your drawings compare with those of your classmates? Sample answer: All of the drawings showed that in spring, some trees grow small leaves; in summer, the trees are covered with leaves; in fall, the leaves change color and fall from the trees; and in winter, the same trees have no leaves.
    - How did you and your classmates predict that the trees will look next spring? Sample answer: Most of us said that the trees will look like they do in our drawings for spring, although they might be bigger next spring.
- In this discussion, observe students' ability to communicate an understanding of the pattern and the typical changes in some trees for each season.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: What causes the seasons?

- Have students refer to the answers you recorded to this question in their Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *plan an investigation.*
- **I did** *carry out an investigation.*

Have the students refer to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read the "I did . . ." statement in the Science Notebook together as a class. **ASK**:

- How would you rate yourself in your ability to plan and carry out an investigation? Color in the number of stars that tells how well you did. Sample answer: Three stars colored in could mean "very good"; two stars colored in could mean "average"; one star colored in could mean "still learning."

Assessment Options

- Performance Task - How Some Trees Change (Lesson 2)
  - How Some Trees Change Performance Task Rubric
- Lesson 2- Seasonal Patterns Test
- Mystery #4- Read-Along: Why do you have to go to bed early in the summer?
- Teacher-created Assessment

Lesson 2 Resources

Earth and Space PDF Folder
Reading Strategies for Science Folder
Mystery #4- Read-Along: Why do you have to go to bed early in the summer?
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 3: The Moon	Earth and Space	Estimated Time: 45 minutes per day

Lesson 3: Day 1 - The Moon - Assess and Engage
Page Keeley Science Probe - Moon Patterns, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- Students will complete the **Page Keeley Science Probe -** *Moon Patterns.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the pattern on Moon phases and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *the Moon* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of an *Astronomer* and answer questions in their notebook.

Lesson 3: Day 2 - The Moon - Explore
Inquiry Activity- How the Moon Looks

- Students will predict what shape the Moon will be in the night sky. Assign the activity on a clear night when the Moon is plainly visible. Point out that students just saw a photo of the Moon. Now they will observe the Moon to see what it looks like in the night sky and draw a picture of it.

Lesson 3: Days 3 and 4 - The Moon - Explain
The Moon Video, Inquiry Activity- Made a Model

- Students will watch and discuss the video, *The Moon.* Students will then make a model to show the pattern of how the Moon appears to change.

Lesson 3: Day 5 - The Moon - Elaborate
Inquiry Activity- Moon Observations

- Students will record their observations of the Moon for one week by drawing a picture for each night. Teacher can also find the current month's Moon observations by using sites such as www.moongiant.com.

Lesson 3: Day 6 - The Moon - Evaluate
Performance Task- Phases of the Moon

- Students will make a model to show all eight phases of the Moon as shown in *The Moon* video. Show the video again for reference when drawing, labeling, and drawing arrows. Encourage students to make a circular diagram.

Lesson 3: Day 7 - Assessment Options

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: Why does the Moon seem to change?

What students should know and be able to do to engage in this lesson:

- The phases of the Moon occur over a period of about 29.5 days. The side of the Moon facing the Sun is lit up. It is the lit part of the Moon that appears to change as the Moon goes through its phases. As the Moon orbits Earth, different amounts of light from the Sun are reflected from its surface. Changes in the amount of reflected light result in the Moon's phases. The phases of the Moon begin with the new moon. The new moon is followed by these phases: waxing crescent, first quarter (commonly referred to as a half-moon), waxing gibbous (or three-quarter moon), and full moon. After the full moon, the appearance begins to wane with the waning gibbous (three-quarter), last quarter (half-moon), and waning crescent.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.4.2 Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun's light is blocked by objects). (5.4.P.E.1)

Focus Question for this Lesson

Why does the Moon seem to change?

Learning Intention	Success Criteria
I am learning … **Day 1:** ● I am learning about the phenomenon of the Moon. ● I am learning to ask questions about the phenomenon and what I want to learn about it. **Day 2:** ● I am learning about the Moon and how it looks in the night sky. **Days 3 - 4:** ● I am learning about the pattern of how the Moon appears to change. **Day 5:** ● I am learning about the Moon's changes during a month. **Day 6:** ● I am learning about the phases of the Moon.	*I can …* **Day 1:** ● I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Day 2:** ● I can draw a picture of what the Moon looks like in the night sky. **Days 3 - 4:** ● I can make a model to show the phases of the Moon in order, showing a pattern. **Day 5:** ● I can investigate how the Moon changes during the month and draw a picture of my observations each night. **Day 6:** ● I can identify the phases of the Moon in my model and list/show them in correct order.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Performance Task - Phases of the Moon
- Lesson 3- The Moon Test
- STEM Gauge #496990

Feedback (Peer to peer/student to teacher/teacher to student)

- Phases of the Moon Performance Task Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS
Anticipated Student Pre-Conceptions/Misconceptions
● Students may think that the Moon gives off its own light. ● Students might believe that the Earth's shadow causes the Moon phases.
Integrated Accommodations & Modifications
English Language Learners/Sociocultural Implications: ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook. ● Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials ● Allow students to use Google Read&Write for speech to text to construct sentences independently. ● Display worksheet/textbook on SmartBoard **Special Needs:** ● Create a vocabulary anchor chart ● Create an anchor chart the class can utilize/reference throughout the module ● Use partnering strategy to allow students to work in teams. ● Provide students with pictures to cut and paste or use as a visual reference when answering questions ● Utilize scaffolding strategies ● Provide prompting and support ● Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box. ● Provide students with images they can cut and paste into their notebook. ● Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions. ● Provide students with only two answer choices for each fill in the blanks question to choose from. ● Provide students with tangible manipulatives to complete sorting tasks ● Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort ● Use highlighter to guide students answering questions

- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard
- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 3, Day 1- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they already know about the Moon.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of the Moon.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Moon Patterns

- This probe is intended to uncover students' basic ideas about the pattern of Moon phases (a lunar month).
- This probe can be used as an elicitation prior to introducing a lesson on the pattern of Moon phases. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations.
- Introduce the probe by asking children to describe how the Moon looks at different times.
- Show them the picture of Moon phases and have them explain the differences in the amount of the Moon they see. Ask students how long they think it takes the Moon to go through all these changes. Have students share their predictions and their reasoning.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of the Moon.

- Show the photo and ask students what questions they have about the Moon and have them record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson.
- ASK:
    - What did you see in the photo?
    - What did you notice about the Moon?
    - What did you wonder about what you saw in the photo?
    - What interests you about the Moon?
- Help students turn their observations from the photo into questions that they can refer to during the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.

STEM Career Kid Connection: Astronomer

- Introduce Career Kid Haley, who wants to be an astronomer when she grows up.
- Explain that an astronomer studies objects in the sky, including planets, the Sun, the Moon, and stars. As a class, read aloud what Haley says in the Science Notebook.
- ASK:
    - Why do you think Haley would be interested in finding out about the Moon? Sample answer: She may want to know what the Moon is like, and why it looks different at different times.
    - Why would an astronomer study the Moon? Sample answer: The Moon is in the sky, and astronomers study objects in the sky.

Essential Question: Why does the Moon seem to change?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *analyze data.*
- **I will** *interpret data.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will analyze and interpret data about how the Moon seems to change.

- Review with students the Science and Engineering Practices of analyzing and interpreting data. Remind them that analyze means "to carefully look at all the parts of something," and that interpret means "to explain the meaning of something." Scientists and engineers often analyze and interpret data in their investigations.
- **ASK**:
    - How would you analyze and interpret what the weather is like today? Sample answer: I would look outside and see that the sky is blue and it is sunny. I would analyze what I see and interpret that it will be a bright, sunny day.

THE LESSON IN ACTION: Lesson 3, Day 2 - Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students what they know about weather in other parts of the world.

Review Learning Intention(s) for the day with students:

- I am learning about the Moon and how it looks in the night sky.

During the Lesson

Inquiry Activity- How the Moon Looks

- Students will draw to show what the Moon looks like in the night sky.

What to Expect:

- Students' drawings should show the shape of the Moon on the particular night when they did the activity.

Advanced Preparation:

- Assign the activity on a clear night when the Moon is plainly visible. Point out that students just saw a photo of the Moon. Now they will observe the Moon to see what it looks like in the night sky.

Safety:

- Students should follow all of their adult's directions. They should observe the Moon from a place suggested by the adult, and stay with their adult during their observation.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Emphasize that students should only go outside when an adult is with them.
- Have students draw their pictures in their Science Notebook.
- Allow volunteers to share their pictures at the front of the class.
- Have students complete the questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

Have students share their observations and data with those of their classmates.

- **ASK:**
  - What does your Moon look like? Sample answer: It looks like a half circle.
  - Why did you have to wait until night to observe the Moon? Sample answer: Often, we can see the Moon best at night because it is dark.
  - Are your classmates' drawings different from yours? Sample answer: No. Our drawings are all alike.

THE LESSON IN ACTION: Lesson 3, Days 3 and 4 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Where did you observe the Moon? Sample answers: in my backyard, on the sidewalk, at the park

Review Learning Intention(s) for the day with students:

- I am learning about the pattern of how the Moon appears to change.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students open to page 260 in the **Science Notebook.** Read the vocabulary words listed aloud. Have students circle vocabulary words that they have heard before. Using the teacher presentation slide, display the words and their definitions. You might want to have students add the words to a word wall so they can reference them as they move through the lesson. Explain to students that they will see the words used in the content that they will be learning.

- Moon -a ball of rock that moves around Earth
- phases -the different Moon shapes we see each month
- position -the place where something is located

The Moon Video**:**

- Have students watch the video *The Moon*. Students will learn how the Moon moves, the different phases of the Moon and why we see different phases.
- **ASK:**
  - How often does the Moon circle Earth? every 29 1/2 days
  - What part of the Moon can we see? the part that is lit up by the Sun
  - Why do we see the Moon in its phases? because it circles around the Sun
- Have students complete questions in their **Science Notebook.**

Visual Kinesthetic Vocabulary:

- Have students cut out and fill in the Dinah Zike Visual Kinesthetic Vocabulary in their Science Notebook.

Inquiry Activity - **Make a Model**:

- Students will make a model to show the pattern of how the Moon appears to change.

What to Expect:

- Students' models should show the phases of the Moon in order, showing a pattern.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You may wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation on in the Science Notebook together with students.
- Students will glue their model in the designated area in their **Science Notebook**.

Communicate Information:

- **Draw Conclusions:** You might want to stop the video *The Moon* starting at 1:01 and continuing through the phases for students to create their drawing.
- Have students complete the questions in their Science Notebook.

Crosscutting Concepts- Patterns:

- Review the Crosscutting Concept of Patterns. Help students understand that patterns help scientists make predictions. Draw a pattern of repeating shapes or use classroom objects to create patterns, and encourage students to make predictions about what comes next. Then help them transfer this understanding to Moon phases. **ASK:**
    - How can you use patterns to predict what the Moon will look like? Sample answer: Phases of the Moon repeat in a pattern, or always in the same order. If I know what phase the Moon is in, I can predict the next phase.
- Have students complete the question in their Science Notebook.

Reflect and Refine- Moon Patterns:

- At this point, students can go back to the Page Keeley Science Probe in their Science Notebook to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of the Moon's phases. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students share their models with their classmates.
- **ASK:**
    - Why did you need to use arrows in your model? Sample answer: to show the order of the Moon phases
    - How does your model compare to your classmates'? Sample answer: Our models were similar. We all drew the next three phases, labeled them, and connected them using arrows.

Science and Engineering Practices:

- **I can** *analyze data.*
- **I can** *interpret data.*

Have students complete the "I can . . ." statements in the Science Notebook. The "I can . . ." statements for this lesson reference the Science and Engineering Practices of analyzing and interpreting data.

- **ASK:**
    - What data did you analyze about the Moon? Sample answer: I analyzed how much of the Moon we see at night.
    - What did your interpretation of the data tell you? Sample answer: I interpreted what phase the Moon was in. My interpretation of my data helped me predict the next phase of the Moon.

THE LESSON IN ACTION: Lesson 3, Day 5 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK**:
  - **Sequence:** How does the Moon change shape in the sky? Sample answer: Starting with a full Moon, it seems to get smaller and smaller until the new Moon, where there is no Moon visible, then it seems to get bigger and bigger and returns to a full Moon.
- Complete the graphic organizer as a class. If students were not able to recognize the patterns in the changing shape of the Moon, have them rewatch the video *The Moon*.

Review Learning Intention(s) for the day with students:

- I am learning about the Moon's changes during a month.

During the Lesson

Inquiry Activity - Moon Observations:

- Students will observe how the Moon changes during the month.

What to Expect:

- Students' data should show a pattern in how the shape of the Moon seems to change over a month.

Safety:

- Point out to students that they should be in the company of an adult at all times during their observations.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. You might wish to brainstorm predictions together as a class and write them on the board for students to copy. Remind them that a prediction is a statement of what they expect to observe in the future. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Encourage students to observe the Moon at the same time each night.
- There are many ways that students can create a book. They can use the paper you provide. Students who enjoy working with technology may even want to create a digital book.

Communicate Information:

- **Record Data:** Explain that the table is the same as a calendar. Record the dates in the table as a class. Encourage students to draw a picture of the Moon in the correct box every night.
- Have students complete questions in their Science Notebook.

Leveled Readers- What Goes Around? (Optional)
This book discusses the movements of Earth and the Moon. This book shows the relationship between the Earth and the Moon. It describes the movement of each.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss and share their observations from the activity, *Moon Observations.*
- **ASK:**
  - How did your results compare to your classmates'? Sample answer: They were the same.
  - How did the Moon change? Sample answer: It gets bigger until it is a full Moon. Then it gets smaller.
  - Did you see a pattern? Sample answer: Yes. The Moon appears to change a little bit every night until it is large and bright. Then it appears to change a little every night until I can't see it. Then it appears to get a little bigger every night until it is big and bright again.
- In this discussion, observe students' ability to articulate how to interpret the data tables, using appropriate terms in their own words, including inferring that longer days relate to summer and shorter days to winter.

THE LESSON IN ACTION: Lesson 3, Days 6 and 7- Evaluate & Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Discuss with a partner one interesting fact you have learned about the Moon.

Review Learning Intention(s) for the day with students:

- I am learning about the phases of the moon.

During the Lesson

Performance Task - Phases of the Moon:

- Students will make a model to show the phases of the Moon.

What to Expect:

- Students' models should order, label and indicate the pattern of the Moon's phases with arrows.
- Read the steps of the investigation in the Science Notebook together with students.

Make a Model:

- Students should draw all eight phases of the Moon as shown in The Moon video. Show the video again for reference when drawing, labeling, and drawing arrows.
- Encourage students to make a circular diagram.

Have students complete the questions in their **Science Notebook.**

Talk About It:

- In the activity, students created a model of the Moon's phases.
- **ASK:**
    - How does your model compare to your classmates'? Sample answer: They looked similar. Some of my classmates drew their phases in a circle. Some drew them next to each other. We all labeled and drew arrows on our models.
    - How does your model show what you learned about the Moon? Sample answer: My model shows Moon phases that look like the Moon we see in the sky.
- In this discussion, observe students' understanding of the predictability of the pattern of the phases of the Moon. **ASK**:
    - Why can you predict the phases of the Moon? Sample answer: I can predict the phases of the Moon because they happen in a pattern.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: Why does the moon seem to change?
Have students refer to the answers you recorded to this question in the Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *analyze data.*
- **I did** *interpret data.*

Have the students refer to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read the "I did . . ." statement in the Science Notebook together as a class. **ASK**:

- How would you rate yourself in your ability to analyze and interpret data? Color in the number of stars that tell how well you did. Sample answer: Three stars colored in could mean "very good"; two stars colored in could mean "average"; one star colored in could mean "still learning."

Assessment Options

- Performance Task - Phases of the Moon
  - Phases of the Moon Performance Task Rubric
- Lesson 3- The Moon Test
- STEM Gauge #496990
- Teacher-created Assessment

Lesson 3 Resources

Earth and Space PDF Folder
Reading Strategies for Science Folder
STEM Gauge #496990
McGraw Hill *Be a Scientist* Notebook
Inspire Science
Discovery Education Website

Lesson 4: The Sun and Stars	Earth and Space	Estimated Time: 45 minutes per day

Lesson 4: Day 1 - The Sun and Stars - Assess and Engage
Page Keeley Science Probe - Seeing Stars, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of the night sky. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Seeing Stars.* This is intended to serve as a pre-assessment and uncover students' basic ideas about the Sun and stars and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *the night sky*

by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of an *Astronomer* and answer questions in their notebook.

Lesson 4: Days 2 and 3 - The Sun and Stars - Explore
Inquiry Activity- Record Data, Science Text- Another Sun

- **Learning Intention:** I am learning about how the Sun affects the temperatures on Earth.
- **Success Criteria:** I can gather and record data about how the position of the Sun and the temperature change during the day.
- **Brief Overview of Lesson:** Students will gather and record data for three sunny days to show a pattern. Students should find the pattern, where the temperature increases as the Sun moves across the sky, then decreases and the Sun begins to set. Students will learn about two astronomers, in the read aloud of the Science Text, *Another Sun*, who travel into space to observe a newly discovered star, and are surprised to find it is an orange yellow star like our Sun and that it has planets.

Lesson 4: Days 4, 5, 6 and 7 - The Sun and Stars - Explain
The Sun and Stars Video, Science Text- Lights in the Sky, Sun in the Sky Digital Interactive

- **Learning Intention:** I am learning how stars are alike and different.
- **Success Criteria:** I can explain in writing one way the Sun is like other stars and one way it is different from other stars in my notebook.
- **Brief Overview of Lesson:** After watching the video, *The Sun and Stars,* students learn that the Sun is a star, that stars make their own light, and that planets orbit a star. Students will learn how stars are alike and different in the read aloud of the Science Text, *Lights in the Sky*. Students will learn that the Sun is a star that we can see during the daytime, and about other stars that we can only see at night. Completion of the Digital Interactive, *The Sun in the Sky* will provide students with a visual on how the Sun appears to move across the sky during the day.

Lesson 4: Day 8 - The Sun and Stars - Elaborate
Inquiry Activity- Near and Far

- **Learning Intention:** I am learning how objects look different when they are near or far.
- **Success Criteria:** I can work with a partner to investigate the placement of ourselves near and far from an object. I can draw a picture to show and compare the appearance of the size of my partner and the object I observed when both near and far.
- **Brief Overview of Lesson:** Students will work in partners to observe how the size of an object appears different with distance. Students' drawings should show that, compared to a stationary object, their partner seems smaller when far away.

Lesson 4: Day 9 - The Sun and Stars - Evaluate
Performance Task- Observe the Night Sky

- **Learning Intention:** I am learning about objects in the night sky.
- **Success Criteria:** I can observe and draw objects that I see in the night sky.
- **Brief Overview of Lesson:** Students will observe the night sky outside on a clear night with an adult and/or teacher can find a video showing the night sky. Students will draw a picture of what they see to record their observations.

Lesson 4: Days 10 and 11 - The Sun and Stars - Module Wrap-Up & Assessment
Performance Project- Observing the Moon

- **Learning Intention:** I am learning about the position of the Moon at night.

- **Success Criteria:** I can observe the position of the Moon during the night and record my observations.
- **Brief Overview of Lesson:** Students will make an observation every 30 minutes for 2 hours at home on a clear night with an adult. Students will make a table to organize and draw their observations.

Lesson 4 Assessment Options:

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How can you describe the Sun and stars?

What students should know and be able to do to engage in this lesson:

- Stars are hot, glowing balls of gas, made up of mostly hydrogen and helium. Stars produce energy and give off both heat and light. The color of a star depends on its temperature. The hottest stars are bluish-white. The coolest stars are red. The Sun is the star at the center of our solar system. It is a medium-sized yellow star. It appears larger than other stars because it is much closer. Many stars, such as supergiant stars, can be up to hundreds or thousands of times larger than the Sun.

LESSON FOUNDATION	
Assessed Standards for this lesson	**Important content not included in the standards**
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)	Preschool Standard 5.4.2 Explore the effects of sunlight on living and nonliving things (e.g., growing plants with and without sunlight, investigating shadows that occur when the sun's light is blocked by objects). (5.4.P.E.1)
Focus Question for this Lesson	
How can you describe the Sun and stars?	
Learning Intention	**Success Criteria**
I am learning … **Day 1:** • I am learning about the phenomenon of the night sky. • I am learning to ask questions about the phenomenon and what I want to learn about it. **Days 2 - 3:** • I am learning about how the Sun affects the temperatures on Earth. **Days 4 - 7:** • I am learning how stars are alike and different.	*I can …* **Day 1:** • I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. **Days 2 - 3:** • I can gather and record data about how the position of the Sun and the temperature change during the day. **Days 4 - 7:**

Day 8: ● I am learning how objects look different when they are near or far. **Day 9:** ● I am learning about objects in the night sky. **Days 10 - 11:** ● I am learning about the position of the Moon at night.	● I can explain in writing one way the Sun is like other stars and one way it is different from other stars in my notebook. **Day 8:** ● I can work with a partner to investigate the placement of ourselves near and far from an object. I can draw a picture to show and compare the appearance of the size of my partner and the object I observed when both near and far. **Day 9:** ● I can observe and draw objects that I see in the night sky. **Days 10 - 11:** ● I can observe the position of the Moon during the night and record my observations.

Assessment(s)

- Self-Assessment
- Peer Assessment
- Teacher Observations
- Work Samples
- Performance Task - Observe the Night Sky
- Lesson 4 - The Sun and Stars Test
- Earth and Space Module Test
- Module Performance Project- Observing the Moon
- STEM Gauge #496991
- CER Framework Grade 1

Feedback (Peer to peer/student to teacher/teacher to student)

- Observe the Night Sky Performance Task Rubric
- Observing the Moon Rubric
- CER Evidence Based Writing Rubric
- Peer to peer
- Self-monitoring

STUDENT CONSIDERATIONS - INTEGRATED ACCOMMODATIONS & MODIFICATIONS

Anticipated Student Pre-Conceptions/Misconceptions

- Students might think that all stars are the same distance from Earth.
- Students may also believe that all stars are the same size, or that Earth is larger than the Sun.

- Students may also believe that the stars "go away" during the day, and reappear at night.
- Many students might not understand that the Sun is also a star.
- Students might also incorrectly believe that the Sun moves across the sky when the Sun only appears to move across the sky.

Integrated Accommodations & Modifications

English Language Learners/Sociocultural Implications:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

Special Needs:

- Create a vocabulary anchor chart
- Create an anchor chart the class can utilize/reference throughout the module
- Use partnering strategy to allow students to work in teams.
- Provide students with pictures to cut and paste or use as a visual reference when answering questions
- Utilize scaffolding strategies
- Provide prompting and support
- Provide students with a picture, word and/or sentence bank. Students can use the answer bank options to draw and write or they can cut and paste their answers into the answer box.
- Provide students with images they can cut and paste into their notebook.
- Students can provide their answers verbally and the answers can be scribed. Students can copy their scribed answers to their questions.
- Provide students with only two answer choices for each fill in the blanks question to choose from.
- Provide students with tangible manipulatives to complete sorting tasks
- Provide students with vocabulary words on an index card - students can use the cards to assist with formulating answers or for activities which requires students to sort
- Use highlighter to guide students answering questions
- Reduce the number of questions a student answers (i.e., if there are 10 questions, some students may only answer 7 questions)
- Provide students with a sheet of paper to only see one question at a time to reduce distraction
- Allow students to use Google Read&Write for text to speech using *Science Notebook* digital format or any other reading materials
- Allow students to use Google Read&Write for speech to text to construct sentences independently.
- Display worksheet/textbook on SmartBoard

- Provide students mini-breaks when necessary

Gifted and Talented:

- Students can present what they have learned to the entire group.
- Independent projects can be assigned on the basis of ability level.
- Encourage creativity and original thinking.
- Plan for tiered learning

THE LESSON IN ACTION: Lesson 4, Day 1- Assess and Engage

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Ask students to describe what they see in the night sky.

Review Learning Intention(s) for the day with students:

- I am learning about the phenomenon of the night sky.
- I am learning to ask questions about the phenomenon and what I want to learn about it.

During the Lesson

Assess Lesson Readiness: Page Keeley Science Probe - Seeing Stars

- This probe is intended to uncover students' basic ideas about the Sun and stars.
- This probe can be used as an elicitation to find out when students think they can see stars. This probe can be used for pair talk, small-group talk, whole-class discussion, or a combination of talk configurations.
- Introduce the probe by asking students to describe what they see when they look up into the sky in the daytime. Then ask them what they can see when they look up into the night sky.
- Tell them the three friends in the picture are looking up at the sky in the nighttime, and they each have different ideas about when they can see the stars. Point to each character, say the character's name, and read what they are saying to the students. Make sure students understand what each character is saying. Then ask the students to choose the friend they think has the best idea about when you can see stars.

Science in My World- Phenomenon:

- Science often begins when someone makes an observation about a situation or occurrence. Scientists refer to an event or situation that is observed or can be studied as a phenomenon. Spark your students' curiosity about the world by introducing the lesson phenomenon of the night sky.

- Show the photo and ask students what questions they have about objects in the night sky and have them record them in their Science Notebook. If students are having trouble generating their own questions, then use the questions below to help guide a class discussion and get students thinking about what they saw and what they will learn in the lesson.
- ASK:
    - What did you see in the photo?
    - What did you notice about the night sky?
    - What did you wonder about what you saw in the photo?
    - What interests you about objects in the night sky?
- Help students turn their observations from the photo into questions that they can refer to during the lesson. Tell students that they do not need to be able to answer the questions that they generate right now. They will return to them later in the lesson.

STEM Career Kid Connection: Astronomer

- Reintroduce Career Kid Haley, who wants to be an astronomer when she grows up.
- Remind students that an astronomer studies objects in the sky.
- Ask for a few volunteers to name objects in the sky that they have learned or know about. As a class, read aloud what Haley says in the Science Notebook.
- ASK:
    - How do you think Haley could find out more about objects in the sky? Sample answer: She could look in the sky, look through a telescope, or read or watch videos about them.
    - Why might the night sky be interesting to Haley? Sample answer: She might be interested in why some objects are so bright, why some objects are bigger than other objects, or if objects in the night sky change position.

Essential Question: How can you describe the Sun and stars?

- Have students read the Essential Question in the **Science Notebook**. Have them use prior knowledge and observations to try to answer the question.
- Write their suggested answers on the board. Remind students that they are not expected to know the answer to this question right now, but throughout the lesson they will learn more and be able to apply what they have learned to add to and revise their answer at the end of the lesson.
- You might want to record students' thoughts and questions about the Essential Question by using chart paper or the whiteboard so they can reference them throughout the lesson.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Science and Engineering Practices:

- **I will** *analyze data.*
- **I will** *interpret data.*

Have students read the "I will . . ." statement in the **Science Notebook**. Throughout the lesson, students will analyze and interpret data about the Sun and the stars.

- Review with students the Science and Engineering Practices of analyzing and interpreting data. Remind them that analyze means "to carefully look at all the parts of something," and that interpret means "to explain the meaning of something." Scientists and engineers often analyze and interpret data in their investigations.
- **ASK**:
    - How would you analyze and interpret what is in the sky right now? Sample answer: I can observe the sky to see what is in it, and tell my classmates what I see. I can tell them that objects that are moving high in the sky are probably planes. I can tell them what might be moving lower in the sky, such as birds, because I can see what those objects are.

THE LESSON IN ACTION: Lesson 4, Days 2 and 3- Explore

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Would you want to be an astronomer? Why or why not? Talk to your partner.

Review Learning Intention(s) for the day with students:

- I am learning about how the Sun affects the temperatures on Earth.

During the Lesson

Another Sun Read Aloud:

- Read aloud the fiction selection, *Another Sun* on pages 4–13 in the Science Text Read Aloud. Students will learn about two astronomers who travel into space to observe a newly discovered star, and are surprised to find it is an orange-yellow star like our Sun and that it has planets.
- **ASK:**
    - What do Mark and Katie do in the story? They travel through space to study a star that was just discovered.
    - What special gear do Mark and Katie use while in space, and how does the gear help them? Their space gear keeps them safe, keeps their bodies from getting too hot or cold, provides air, and keeps their tools from floating away. Special sleeping bags keep them from floating away.
    - How are stars different as described on page 10? Some are red; some are blue; some are yellow. Some are hotter. Some are bigger.
    - How does Mark describe our Sun on page 12? as the star closest to Earth
    - What do Katie and Mark discover when they get near the star? The star doesn't twinkle. It is large, round, and yellow and orange like our Sun. It has two planets moving around it.

Inquiry Activity- Record Data

- Students will gather and record data about how the position of the Sun and the temperature change during the day

What to Expect:

- Students' data should show a pattern where the temperature increases as the Sun moves across the sky, then decreases as the Sun begins to set.

Advanced Preparation:

- Look at the weather forecast to choose three days when it will be sunny outside. Point out that students just saw a photo of the night sky. Now they will investigate how the Sun affects temperatures on Earth.

Safety:

- Caution students never to look directly at the Sun as it can damage their eyes.
- Read the steps of the investigation in the Science Notebook together with students.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might want to brainstorm predictions together as a class and write students' predictions on the board for them to copy.
- Have students write their predictions in their Science Notebook and explain their predictions based on previous observations.

Carry Out an Investigation:

- Discuss with students how to read a thermometer. Explain that temperature is given in degrees. Show them the difference in Fahrenheit and Celsius measurements, and tell them that scientists use Celsius when telling temperature.

Communicate Information:

- **Record Data:** Have students make their observations at home in the morning, at school during the day, and later in the day at home. Encourage them to record temperatures in both Fahrenheit and Celsius. Have students record their data immediately after their observations in the table in their Science Notebook.
- Have students complete the questions in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

Have students share their observations and data with those of their classmates.

- **ASK:**
  - How do your results compare to the results of your classmates? Sample answer: My classmates have results that are like mine. They show about the same temperatures for each of the readings.
  - Did you or your classmates see any patterns in your data? If so, describe them. Sample answer: The temperature was cooler in the morning; it got warmer during the day, and then became cooler later on.
  - How did the position of the Sun change during the day? Sample answer: It appeared to move across the sky.

THE LESSON IN ACTION: Lesson 3, Days 4, 5, 6 and 7 - Explain

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- What connection did you notice between the Sun's position in the sky and the temperature? Sample answer: The higher the Sun is in the sky, the higher the temperature.

Review Learning Intention(s) for the day with students:

- I am learning how stars are alike and different.

During the Lesson

Obtain and Communicate Information- Vocabulary:

- Have students read the vocabulary words listed in their **Science Notebook.** Have students circle the vocabulary word if they have heard it before. Using the teacher presentation slide, display the word and its definition. You might want to have students add the word to a word wall so they can reference it as they move through the lesson. Explain to students that they will see the word used in the content that they will be learning.
  - star -an object in the sky that makes it own light

The Sun and Stars Video**:**

- Have students watch the video *The Sun and Stars*. In the video, students learn that the Sun is a star, that stars make their own light, and that planets orbit a star.
- **ASK:**
  - How do you know the Sun is a star? Sample answer: It makes its own light.
  - What orbits around some stars? planets
- Have students complete the question in their **Science Notebook.**

Lights in the Sky Read Aloud:

- Read aloud the nonfiction selection, *Lights in the Sky* on pages 14–23 in the Science Text Read Aloud. Students will learn how stars are alike and different. They will learn that the Sun is a star that we can see during the daytime, and about other stars that we can only see at night. While reading, students will encounter the vocabulary word: star.
- **ASK:**
    - How is the Sun like other stars as explained on page 16? Sample answer: All stars give off energy in the form of heat and light. Some stars have planets moving around them.
    - How is the Sun different from other stars? Sample answer: It is the star closest to Earth. It is the only star we can see in the daytime. We get much more light and heat from the Sun than from other stars.
    - Why do we see the Sun but not other stars in the daytime? The Sun shines so brightly that it outshines other stars.
    - What can we use to see stars that are far away? a telescope
- Have students complete the questions in their **Science Notebook.**

The Sun in the Sky Digital Interactive:

- Have students complete the digital interactive The Sun in the Sky. Students click on the arrows to learn how the Sun appears to move across the sky during the day.
- **ASK:**
    - How does the Sun appear to move in the sky? Sample answer: The Sun is low in the sky and appears to rise in the morning, is high in the sky at noon, and is low in the sky and appears to set in the evening.
    - Why does the Sun make different size shadows? Sample answer: The Sun makes different size shadows depending on where it is in the sky.
    - Think back to what you learned in Lesson 1. Why does the Sun appear to move across the sky in the pictures? Sample answer: because Earth is revolving, or moving around the Sun
- Have students complete the question in their **Science Notebook.**

Reflect and Refine- Seeing Stars:

- At this point, students can go back to the Page Keeley Science Probe in their Science Notebook to decide whether they would like to change or justify their response. Students have had an opportunity to develop a conceptual understanding of the Sun and stars. Revisiting the probe here will reveal whether students are still holding on to a misconception or have gaps in conceptual understanding.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Use the following questions to assess students' understanding of what they have learned so far. If students do not demonstrate understanding about the Sun and stars, then have them revisit some activities in this lesson. **ASK:**

- How can you describe the Sun? Sample answer: The Sun is a star. It is the closest star to Earth. The Sun shines all the time and makes its own light.
- How can you describe stars? Sample answer: Stars are objects in the sky that make their own light. The Sun is a star. Stars other than the Sun look small because they are very, very far away. They shine all the time, even if we see them only at night.
- Why can we see the Sun and no other stars during the day? The Sun is the closest star to Earth. Other stars are too far away to see, except at night when it is dark outside.
- What can you predict about the pattern of the Sun's movement across the sky? Sample answer: The Sun appears to rise in one part of the sky in the morning, move across the sky, and appears to set in a different part of the sky in the evening.

Science and Engineering Practices:

- **I can** *analyze data.*
- **I can** *interpret data.*

Have students complete the "I can . . ." statements in the Science Notebook. The "I can . . ." statements for this lesson reference the Science and Engineering Practices of analyzing and interpreting data.

- **ASK:**
  - When and how did you analyze data? Sample answer: In the Record Data investigation, I recorded observations of the temperature when the Sun was at different positions over three days. Then I analyzed the data I recorded to tell if the position of the Sun and the temperature changed the same way for the three days.
  - What did you interpret about the Sun and temperature from this investigation? Sample answer: The data showed that the temperature gets higher as the Sun gets higher in the sky and gets lower as the Sun begins to set.

THE LESSON IN ACTION: Lesson 4, Day 8 - Elaborate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

Quick Check:

- Use this opportunity to do a quick assessment to determine if students are ready to move on. Display the Quick Check slide from the teacher presentation and **ASK**:
  - **Compare and Contrast:** How is the Sun like other stars? Sample answer: It makes its own light and heat. It shines in the sky.
- Complete the graphic organizer as a class. If students were not able to make comparisons between the Sun and other stars, have them revisit pages 14–23 of *Lights in the Sky* in the Science Text Read Aloud.

Review Learning Intention(s) for the day with students:

- I am learning how objects look different when they are near or far.

During the Lesson

Inquiry Activity - Near and Far

- Students will observe how the size of an object appears different with distance.

What to Expect:

- Students' drawings should show that, compared to a stationary object, their partner seems smaller when far away.

Safety:

- Point out to students that they should be in the company of an adult at all times during their observations.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. You might want to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in the Science Notebook together with students.

Carry Out an Investigation:

- Pair students up. You might wish to conduct this investigation in the school gym or outside so they have enough room to see a difference. Have students draw pictures of how their partner looks relative to objects that stay in the same place, such as playground equipment or a tree. Have students draw their picture, or record their data, immediately in their Science Notebook.
- Direct students in how far away to move from their first position. Remind them to only move when you tell them to. Have students draw their picture, or record their data, immediately in their Science Notebook.
- Have students complete the question in their Science Notebook.

Crosscutting Concepts - Patterns:

- Review the Crosscutting Concept of Patterns. Remind students that patterns are the repeated way in which something happens and that patterns are predictable. Remind them that patterns occur in the natural and human made world. Help students understand how patterns occur in space as well as on Earth. Students should recognize that the sizes of other stars appear different than our Sun because the other stars are at such great distances from Earth, and that the Sun appears in the daytime sky and other stars appear in the nighttime sky. **ASK:**
    - What can you predict about the pattern of when the Sun and other stars appear in the sky? Sample answer: I can predict the Sun appearing in the sky during daytime, and other stars appearing in the sky during nighttime.
    - How often does this pattern happen? Sample answer: This pattern happens every day
- Have students complete the question in their Science Notebook.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- Have students discuss and share their observations and data from the activity, *Near and Far*.
- **ASK:**
  - How do your results compare to your classmates'? Sample answer: Many of my classmates' drawings looked the same. They showed their partner bigger when close to another object and smaller when far away from the other object.
  - How did the class explain these results? Sample answer: The ones who stood far away did not change size; they only looked smaller from a distance.
- In this discussion, observe the student's ability to communicate that appearances change with distance.
  - How are the results of your investigation like comparing how the Sun looks to us compared to how other stars look to us at night? Sample answer: Like a person standing far away, the stars only look tiny because they are very far away.

THE LESSON IN ACTION: Lesson 4, Day 9- Evaluate

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Discuss with a partner one interesting fact you have learned about the Sun and stars.

Review Learning Intention(s) for the day with students:

- I am learning about objects in the night sky.

During the Lesson

Performance Task - Observe the Night Sky:

- Students will observe and draw objects they observe in the night sky.

What to Expect:

- Students' drawings should show the night sky with as many or as few stars as they observed. Drawings should also include the Moon in its phase and any other objects students observed in the night sky.

Safety:

- Encourage students to listen and follow the adult's directions at all times.

Make a Prediction:

- Read the question aloud with students. Help students make a prediction. You might wish to brainstorm predictions together as a class and write students' predictions on the board for them to copy. Remind them that a prediction is a statement of what they expect to observe in the future.
- Have students write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.
- Read the steps of the investigation in thee Science Notebook together with students.

Carry Out an Investigation:

- **Record Data -** Check the weather forecast in advance to be sure students will view the sky on clear night.
- Have students record their data in the box in their Science Notebook immediately after their observations.
- Pair students. Have partners describe how their drawings are alike and different.

Communicate Information:

- Help students write their labels, if necessary. Have students complete the questions in their Science Notebook.

Talk About It:

- In the activity, students observed the night sky. Allow time for students to share their drawings with the class and/or partner.
- **ASK:**
    - What did you show in your drawing? Sample answer: I showed a lot of stars and a full Moon.
    - How do your observations and data compare to your classmates'? Sample answer: Our drawings of the night sky were almost alike. Most of us observed the Moon in the same phase, as well as a lot of stars and maybe some planets. The class did not all show the same stars in their drawings.

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Essential Question: How can you describe the Sun and stars?
Have students refer to the answers you recorded to this question in the Science Notebook and see if and how their thinking has changed. Students can discuss and share their claims with evidence based writing on the Essential Question.

Science and Engineering Practices:

- **I did** *analyze data.*
- **I did** *interpret data.*

Have the students refer to the "I will . . ." and "I can . . ." statements in the Science Notebook. Read the "I did . . ." statement in the Science Notebook together as a class. **ASK**:

- How would you rate yourself in your ability to analyze and interpret data? Color in the number of stars that tell how well you did. Sample answer: Three stars colored in could mean “very good”; two stars colored in could mean “average”; one star colored in could mean “still learning.”

THE LESSON IN ACTION: Lesson 4, Days 10 and 11- Module Wrap-Up and Assessment

Lessons are designed to be able to transfer from IN-PERSON to HYBRID to VIRTUAL learning.

Lesson Opening

Do Now:

- Do you think the Moon tonight will look the same as last night?

Review Learning Intention(s) for the day with students:

- I am learning about the position of the Moon at night.

During the Lesson

Performance Task - Observing the Moon:

- Students will observe the position of the Moon during the night.

What to Expect:

- Students will make an observation every 30 minutes for 2 hours. Help students notice the position of the Moon relative to other objects. Help them notice and describe how the position of the Moon changes over time. (Teacher can find a time lapse video of the Moon during the night)

Advanced Preparation:

- In class, help students make a table to use during their observations. The table should have space for them to make four sketches and a place to label the time of each sketch.

Make a Prediction:

- Help students make a prediction. Remind them that a prediction is a statement of what they expect to observe in the future. Tell them to write their predictions in their Science Notebook. Then have students explain their predictions based on previous observations.

Carry Out an Investigation:

- Help students determine how they will tell how the Moon has changed position. What can they observe that does not move? How can they measure to accurately tell how much the Moon has moved? Have students sketch the Moon, and describe its position relative to an object on the ground that does not move.
- Set a timer for 30 minutes. (Teacher can find a timelapse video of the Moon during the night)
- **Record Data** Have students make a second drawing, noting how the position of the Moon has changed relative to the object that does not move.
- Repeat until students have 4 sketches and descriptions.

- Encourage students to be creative, but consistent, with their measurements. For example, do they want to use a ruler or a finger to measure how much the Moon has moved relative to an object on the ground?
- **Draw Conclusions** Students should conclude that the Moon moves higher in the sky.
- Make sure students understand the relationship between the rotation of Earth and the position of the Moon. As Earth rotates, the Moon appears to rise higher in the sky.
- Students answer the question posed in their **Science Notebook.**

Lesson Closing

Whole Group- Small Group- Turn and Talk- Think Pair Share- Independent

Talk About It:

- In the activity, students created a model of the Moon's phases.
- **ASK:**
  - How does your model compare to your classmates'? Sample answer: They looked similar. Some of my classmates drew their phases in a circle. Some drew them next to each other. We all labeled and drew arrows on our models.
  - How does your model show what you learned about the Moon? Sample answer: My model shows Moon phases that look like the Moon we see in the sky.
- In this discussion, observe students' understanding of the predictability of the pattern of the phases of the Moon. **ASK**:
  - Why can you predict the phases of the Moon? Sample answer: I can predict the phases of the Moon because they happen in a pattern.

Assessment Options

- Performance Task - Observe the Night Sky
- Lesson 4 - The Sun and Stars Test
- Earth and Space Module Test
- Module Performance Project- Observing the Moon
- STEM Gauge #496991

Lesson 4 Resources

Earth and Space PDF Folder
Reading Strategies for Science Folder
STEM Gauge #496991
Mystery #5: Why do the stars come out at night?
Mystery #6- Read-Along: How can stars help you if you get lost?
McGraw Hill *Be a Scientist* Notebook
Inspire Science

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 4:
Offspring and Their Parents

Stage 1 – Desired Results

ASSESSED FOCUS STANDARDS:

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)

CONTENT 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).
- W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- RI.1.1 Ask and answer questions about key details in a text.
- RI.1.2 Identify the main topic and retell key details of a text.
- RI.1.10 With prompting and support, read informational texts appropriately

Unit Description

Anchoring Phenomenon:
Statement: Plants and animals grow and change throughout their lifetime.
Observation/Demonstration/Experience: A photo of a tadpole.

Driving Question: How do plants and animals grow and change?

Meaning

ENDURING UNDERSTANDINGS

- All plants and animals go through stages of growth, or life cycles.
- Like animals, adult plants produce young. These kinds of plants produce seeds.
- Young plants are also similar to their parents.

ESSENTIAL QUESTIONS

- How do plants grow and change?
- How are plants like their parents?
- How are animals alike and different?
- How are young animals like and unlike their parents?

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- Animals are different from one another, but they have traits in common.
- Groups of animals live in different settings.
- Many animals, such as reptiles, birds, and mammals, resemble the adults they will grow into as young animals. Other animals, such as amphibians and insects, go through growth stages in which the young animal completely changes and looks very different from one stage to the next. This type of development is called metamorphosis.
- Almost all mammals give birth to live young.

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- How do animal offspring survive?

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<tr><td colspan="2">What students will know and be able to do</td></tr>
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KNOWLEDGE

- I can explain how plants grow and change.
- I can explain how plants are like their parents.
- I can explain how animals are alike and different.
- I can explain how young animals are like and unlike their parents.
- I can explain patterns in behavior of parents and offspring that help the offspring survive.

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SKILLS

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).] Obtaining, Evaluating, and Communicating Information
Patterns

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.]

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		Constructing Explanations and Designing Solutions Patterns

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - Life Cycle of an Apple Tree (Lesson 1)
  - Life Cycle of an Apple Tree Performance Task Rubric
- Lesson 1- Plants Grow and Change Test
- Performance Task - Compare Tulip Plants (Lesson 2)
  - Compare Tulip Plants Performance Task Rubric
- Lesson 2- Plants and Their Parents Test
- Performance Task - Describe an Animal (Lesson 3)
  - Describe an Animal Performance Task Rubric
- Lesson 3- Compare Animals Test
- Performance Task - Compare a Cat and Kittens (Lesson 4)
  - Compare a Cat and Kittens Performance Task Rubric
- Lesson 4- Animals and Their Parents Test
- Performance Task - Young Animal Book (Lesson 5)
  - Young Animal Book Performance Task Rubric
- Lesson 5- Offspring and Survival Test
- Offspring and Their Parents Module Test
- Module Performance Project- Bean Plant Life Cycle
  - Bean Plant Life Cycle Rubric
- STEM Gauge #473404 (Lesson 2)
- STEM Gauge #473424 (Lesson 2)
- STEM Gauge #469571 (Lesson 4)
- STEM Gauge #473410 (Lesson 5)
- STEM Gauge #471431 (Lesson 5)
- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe: Growing Plants (Lesson 1)
- Page Keeley Science Probe: Young Plants (Lesson 2)
- Page Keeley Science Probe: Comparing Animals (Lesson 3)
- Page Keeley Science Probe: Puppies (Lesson 4)
- Page Keeley Science Probe: Baby Animals (Lesson 5)

Integration of 21st Century Skills	Integration of Technology	Career Education

• **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively. • **9.1.4.A.2:** Evaluate available resources that can assist in solving problems. • **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems. • **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process. • **9.1.4.A.5:** Apply critical thinking • **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking. • **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities. • **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community. • **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. • **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations. • **9.3.4.A.5:** Locate career information using a variety of resources.	• **Inspire Science Videos** ○ Seeds ○ Animal Groups ○ Similarities Between Offspring and Parents ○ Animal Communication ○ Needs of Living Things • **Inspire Science Files** ○ How Plants Grow ○ Other Ways Plants Grow ○ Plant Traits ○ Types of Animals • **Inspire Simulations & Digital Interactives** ○ Animal Characteristics ○ Survival ○ Animal Life Cycle: Bird ○ Animal Life Cycle: Cow ○ Baby Animals Calling Parent ○ Animals Meet Their Needs • **Inspire Science Readers** ○ Animal Parents ○ Wait and See • **Discovery Education** ○ Animal Life Cycles Board ○ Life Cycles ○ Plant Life Cycle ○ Investigating Heredity ○ Life Cycle of an Apple Skill Builder ○ Grouping Living Things • **Mystery Science** ○ Mystery #2: Why do baby ducks follow their mother? ○ Mystery #4: Why do family members look alike? • **Generation Genius** ○ Introduction to Traits	• **Park Ranger** ○ Introduce Career Kid Poppy, who wants to be a park ranger when she grows up. Poppy wants to help keep the national parks open for animals to roam free and for people to visit to appreciate nature • **Landscape Architect** ○ Introduce Career Kid Kayla, who wants to be a landscape architect when she grows up. Explain that a landscape architect designs outdoor places such as parks, playgrounds, and gardens. Explain that landscape architects also decide where flowers, bushes, trees, buildings, roads, and walking paths should go in these areas. • **Animal Trainer** ○ Introduce Career Kid Jordan, who wants to be an animal trainer when he grows up. Explain to students that Jordan enjoys animals and likes learning how to train them. Point out that animal trainers train animals for many things, including for riding and helping people with disabilities. Animal trainers often train animals to be around people and to respond to commands.
Stage 3 – Learning Plan		
UNIT VOCABULARY		

adaptation behavior carnivore characteristic	herbivore inherit learn life cycle	seedling signal trait young

SUMMARY OF KEY LEARNING

Lesson 1: Plants Grow and Change

Lesson 1: Day 1 - Plants Grow and Change - Module Opener

- **Learning Intention:** I am learning about the phenomenon of a tadpole. I am learning that plants and animals grow and change.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it. I can make initial explanations by observing a photo of a tadpole.
- **Brief Overview of Lesson:** Students will view a photo of a tadpole and make initial explanations. Students will also be introduced to the **Career Connection** of a *Park Ranger* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Plants Grow and Change - Assess and Engage
Page Keeley Science Probe - Growing Plants, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning that plants change as they grow.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Growing Plants.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how plants grow and change and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of a *plant starting to grow from a seed* by watching a video. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Landscape Architect* and answer questions in their notebook.

Lesson 1: Day 3 - Plants Grow and Change - Explore
Inquiry Activity- Examine Seeds

- **Learning Intention:** I am learning about different types of seeds and plants.
- **Success Criteria:** I can match three different seed varieties to an adult plant by drawing in my notebook the correct seed and its adult plant.
- **Brief Overview of Lesson:** Students will try to match each of three different seed varieties to an adult plant (or a photo of an adult plant) of the same variety.

Lesson 1: Days 4, 5, 6 and 7 - Plants Grow and Change - Explain
Seeds Video, Inquiry Activity- Potato Plant, Science Files- How Plants Grow and Other Ways Plants Grow

- **Learning Intention:** I am learning the different ways plants grow. I am learning the life cycle of a plant.

- **Success Criteria:** I can investigate and explain to a partner how not all plants grow from a seed. I can draw one way a plant can grow and write a sentence to describe my picture.
- **Brief Overview of Lesson:** After previewing the video, *Seeds*, students will learn that many plants grow from seeds. They will see how a seed grows into an adult plant and learn how seeds are formed. Students will read the Science Files to learn about the life cycle of a plant and the different ways it can grow. Students will then work with a partner to investigate how to grow a sweet potato plant from its parts.

Lesson 1: Day 8 - Plants Grow and Change - Elaborate
Inquiry Activity- Plant Life Cycle

- **Learning Intention:** I am learning about the life cycle of a plant.
- **Success Criteria:** I can research a plant of my choice and show the stages of its life cycle through pictures and words.
- **Brief Overview of Lesson:** Students will choose a plant that they will research. They will learn about the life cycle of their chosen plant.

Lesson 1: Day 9 - Plants Grow and Change - Evaluate
Performance Task- Life Cycle of an Apple Tree

- **Learning Intention:** I am learning about the life cycle of an apple tree.
- **Success Criteria:** I can describe and illustrate how an apple tree grows from a seed, to a seedling, to an adult tree.
- **Brief Overview of Lesson:** Students will use their knowledge of the plant life cycle to show how an apple tree begins as a seed, grows into a seedling, and then grows into an adult plant that has flowers and apples.

Lesson 1: Day 10 - Assessment Options

- **Learning Intention:** I am learning that plants grow and change.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How do plants grow and change?
- Performance Task - Life Cycle of an Apple Tree (Lesson 1)
  - Life Cycle of an Apple Tree Performance Task Rubric
- Lesson 1- Plants Grow and Change Test
- Teacher-created Assessment

Lesson 2: Plants and Their Parents

Lesson 2: Day 1 - Plants and Their Parents - Assess and Engage
Page Keeley Science Probe - Young Plants, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of tulip plants with different colored flowers. I am learning that plants are like their parents.
- **Success Criteria:** I am learning to ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Young Plants.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how young plants have similar traits as their parents but with some variations and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has

changed. Students will also be introduced to the **phenomenon** of *tulip plants with different colored flowers* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Landscape Architect* and answer questions in their notebook.

Lesson 2: Days 2 and 3 - Plants and Their Parents - Explore
Inquiry Activity- Observe Plants, Science Text- Perfect Acorn, Mighty Oak

- **Learning Intention**: I am learning that two plants of the same kind have similarities and differences.
- **Success Criteria:** I can create a model and explain how two plants are alike and different based on observations.
- **Brief Overview of Lesson:** Students will observe how two plants of the same kind are alike and different. Students will listen to a read aloud of the Science Text- *Perfect Acorn, Mighty Oak* to learn that an acorn seed grows into an oak tree.

Lesson 2: Days 4, 5 and 6- Plants and Their Parents - Explain
Plant Traits Science File, Science Text- Every Plant is Different

- **Learning Intention:** I am learning that young plants have many of the same traits as their parents. I am learning that plants of the same kind are similar, yet have some differences and can vary in many ways.
- **Success Criteria:** I can match each adult plant to its offspring by using pictures. I can explain to a partner how some plants of the same kind can be the same yet different.
- **Brief Overview of Lesson:** Students will watch the video, *Seasons Change* to learn what happens during each season. Students will listen to a read aloud of the Science Text- *The Four Seasons* to understand why Earth has seasons and what each season is like. The vocabulary words *season, summer, spring, fall and winter* will be encountered within the text.

Lesson 2: Day 7 - Plants and Their Parents - Elaborate
Survival Simulation

- **Learning Intention:** I am learning that different amounts of sunlight affect survival rates of plants and their offspring.
- **Success Criteria:** I can explore the simulation to find out how different amounts of sunlight affect survival rates. I can record my findings on the effects and explain my data to a partner.
- **Brief Overview of Lesson:** Students will observe the effects of planting from one to three seed types in three zones that receive different amounts of light over a simulated five-year period and identify patterns in their observations.

Lesson 2: Day 8 - Plants and Their Parents - Evaluate
Performance Task- Compare Tulip Plants

- **Learning Intention:** I am learning the similarities and differences between a tulip seedling and an adult.
- **Success Criteria:** I can create a model, label, and explain what is alike and different between a tulip seedling and an adult.
- **Brief Overview of Lesson:** Students will conduct research to create models of a tulip plant and its parent. Students should research and make models showing how a young tulip plant is like, but not exactly like, its parents.

Lesson 2: Day 9 - Assessment Options

- **Learning Intention:** I am learning that plants are like their parents.

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How are plants like their parents?
- Performance Task - Compare Tulip Plants (Lesson 2)
    - Compare Tulip Plants Performance Task Rubric
- Lesson 2- Plants and Their Parents Test
- STEM Gauge #473404 (Lesson 2)
- STEM Gauge #473424 (Lesson 2)
- Teacher-created Assessment

Lesson 3: Compare Animals

Lesson 3: Day 1 - Compare Animals - Assess and Engage
Page Keeley Science Probe - Comparing Animals, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning that animals are alike and different.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Comparing Animals.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how animals of the same kind have similarities and differences and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *cows* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of an *Animal Trainer* and answer questions in their notebook.

Lesson 3: Day 2 - Compare Animals - Explore
Inquiry Activity- Sort Animal Groups

- **Learning Intention:** I am learning that animals are alike.
- **Success Criteria:** I can investigate and categorize how animals are alike by sorting pictures of animals based on similar traits.
- **Brief Overview of Lesson:** Student groupings should show animals with similar traits, and the labels should help to explain the groupings by indicating how the animals are alike.

Lesson 3: Days 3 and 4 - Compare Animals - Explain
Types of Animals Science File, Animal Characteristics Digital Interactive

- **Learning Intention:** I am learning about different animals and their traits. I am learning the characteristics that help different animals survive.
- **Success Criteria:** I can create a model and label each type of animal in my notebook, as well as explain how each animal survives based on its characteristics: mammal, fish, amphibian, reptile, bird, and insect.
- **Brief Overview of Lesson:** Students will read the Science File, *Types of Animals* to learn about different animals and their traits. Students will complete the *Animal Characteristics* Digital Interactive to learn about characteristics that help different animals survive.

Lesson 3: Day 5 - Compare Animals - Elaborate

Animal Groups Video

- **Learning Intention:** I am learning the names of different animal groups.
- **Success Criteria:** I can create a model and label each of the animal groups in my notebook: school, flock, pride, and litter.
- **Brief Overview of Lesson:** Have students watch the video Animal Groups. Help students understand that animals can be grouped in similar sets and have offspring that are like themselves. Discuss the different names given to animal groups, such as school, flock, pride, and litter.

Lesson 3: Day 6 - Compare Animals - Evaluate
Performance Task- Describe an Animal

- **Learning Intention:** I am learning the basic characteristics of animals and their characteristics to help them survive where they live.
- **Success Criteria:** I can research, observe, and record characteristics of animals.
- **Brief Overview of Lesson:** Students will research, observe, and record characteristics of animals. Students will represent animals with varying degrees of accuracy, but should understand the basic characteristics of their animal, and that its characteristics help the animal survive where it lives.

Lesson 3: Day 7 - Assessment Options

- **Learning Intention:** I am learning that animals are alike and different.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How are animals alike and different?
- Performance Task - Describe an Animal (Lesson 3)
  - Describe an Animal Performance Task Rubric
- Lesson 3- Compare Animals Test
- Teacher-created Assessment

Lesson 4: Animals and Their Parents

Lesson 4: Day 1 - Animals and Their Parents - Assess and Engage
Page Keeley Science Probe - Puppies, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning how young animals are like and unlike their parents. I am learning about the phenomenon of a mother cat and her kittens.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it. I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Puppies.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how animals are similar to and different from their parents and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *a mother cat and her kittens* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of an *Animal Trainer* and answer questions in their notebook.

Lesson 4: Days 2 and 3 - Animals and Their Parents - Explore
Inquiry Activity- Animals, Science Text- Daisy's Ducks

- **Learning Intention:** I am learning the relationships between young animals and their parents.
- **Success Criteria:** I can draw models to show what an animal looks like as a baby and as an adult.
- **Brief Overview of Lesson:** Students will draw models to show relationships between young animals and their parents. Students' model drawings should show ways in which the animal stays the same as well as ways it changes as it gets older. Students will learn about a duck family that Daisy observes in her yard, and how family members can be like and different from each other, in the read aloud of the Science Text, *Daisy's Ducks*.

Lesson 4: Days 4, 5, and 6 - Animals and Their Parents - Explain
Science Text- Families Are Similar, But Different, Similarities Between Offspring and Parents Video, Animal Life Cycle: Bird Digital Interactive, Animal Life Cycle: Cow Digital Interactive

- **Learning Intention:** I am learning that actions, not just physical characteristics, are also traits. I am learning that different animals grow and change.
- **Success Criteria:** I can recall various actions that are considered traits by answering questions in my notebook. I can explain to a partner how different animals grow and change.
- **Brief Overview of Lesson:** After watching the video, *Similarities Between Offspring and Parents* students learn that a baby chick looks very different from its parents when it hatches, but over time it grows to look more like its parents. Students will learn that actions, not just physical characteristics, are also traits. In the read aloud of the Science Text, *Families are Similar, But Different*. Completion of the Digital Interactives, students learn how both birds and cows grow and change.

Lesson 4: Day 7 - Animals and Their Parents - Elaborate
Inquiry Activity- Life Cycle of Butterfly

- **Learning Intention:** I am learning the life cycle of a butterfly.
- **Success Criteria:** I can create a model of each stage of a butterfly's life cycle and label each stage.
- **Brief Overview of Lesson:** Students will research the life cycle of a butterfly, and find that a butterfly looks very different at each stage of its life.

Lesson 4: Day 8 - Animals and Their Parents - Evaluate
Performance Task- Compare Cat and Kittens

- **Learning Intention:** I am learning that cats and kittens are alike and different.
- **Success Criteria:** I can complete a Venn Diagram to show the similarities and differences between cats and kittens.
- **Brief Overview of Lesson:** Students will revisit the picture of the cat and kittens from the Engage section to complete today's task. Students will observe the picture closely and apply what they have learned to identify the similarities and differences between the adult cat and kittens.

Lesson 4 Assessment Options:

- **Learning Intention:** I am learning that animals are alike and different.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How can you describe the Sun and stars?
- Performance Task - Compare a Cat and Kittens (Lesson 4)

- Compare a Cat and Kittens Performance Task Rubric
- Lesson 4- Animals and Their Parents Test
- STEM Gauge #469571 (Lesson 4)
- Mystery #2: Why do baby ducks follow their mother?
- Mystery #4: Why do family members look alike?
- Teacher-created Assessment

Lesson 5: Offspring and Survival

Lesson 5: Day 1 - Offspring and Survival - Assess and Engage
Page Keeley Science Probe - Baby Animals, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning the patterns in behavior of parents and offspring helps the offspring survive. I am learning about the phenomenon of baby birds and their parents.
- **Success Criteria:** I can ask questions about the phenomenon and what I want to learn about it.
  I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Baby Animals*. This is intended to serve as a pre-assessment and uncover students' basic ideas about how young animals learn behaviors that help them survive and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *baby birds and their parent* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of an *Animal Trainer* and answer questions in their notebook.

Lesson 5: Days 2 and 3 - Offspring and Survival - Explore
Inquiry Activity- Animal Young, Science Text- The Burrow

- **Learning Intention:** I am learning the different ways animals protect their young.
- **Success Criteria:** I can describe photos of animals protecting and helping their young with a partner.
- **Brief Overview of Lesson:** Students will gather and record data for three sunny days to show a pattern. Students should find the pattern, where the temperature increases as the Sun moves across the sky, then decreases and the Sun begins to set. Students will learn about ways a mother groundhog keeps her young safe and teaches them to survive, in the read aloud of the Science Text, *The Burrow*.

Lesson 5: Days 4, 5, 6 and 7- Offspring and Survival - Explain
Animal Communication Video, Science Text- Animal Messages, Animals Meet Their Needs Digital Interactive

- **Learning Intention:** I am learning ways young animals communicate with their parents. I am learning that adult animals help their offspring.
- **Success Criteria:** I can explain to my partner the behavior the babies use to communicate with parents.
- **Brief Overview of Lesson:** After watching the video, *Animal Communication,* students learn how young animals communicate with their parents. Students will learn how adult animals help their offspring in the read aloud of the Science Text, *Animal Messages*. Students will learn that the Sun is a star that we can see during the daytime, and about other stars that we can only see at night. Completion of the Digital Interactive, *Animals Meet Their Needs* will help students learn how animals get what they need. Students will learn ways animals get what they need and take care of their young, and adaptations that help them survive.

Lesson 5: Day 8 - Offspring and Survival - Elaborate
Needs of Living Things Video, Inquiry Activity- Animal Teeth

- **Learning Intention:** I am learning what animals need to live, and what different kinds of animals eat.
- **Success Criteria:** I can create a model of one example of a carnivore and one example of an herbivore. I can write detailed sentences about each and the type of teeth they have.
- **Brief Overview of Lesson:** Students will understand that carnivores and herbivores have different types of teeth by researching each. Students' models and drawings should show that carnivore teeth are much sharper than herbivore teeth.

Lesson 5: Day 9 - Offspring and Survival - Evaluate
Performance Task- Young Animal Book

- **Learning Intention:** I am learning that an animal helps its offspring survive.
- **Success Criteria:** I can explain how the animal I selected helps its offspring survive.
- **Brief Overview of Lesson:** Students will research an animal and tell how the animal helps its offspring survive. Students' books will explain how their chosen animal helps its offspring survive.

Lesson 5: Days 10 and 11 - Offspring and Survival - Module Wrap-Up & Assessment
Performance Project- Bean Plant Life Cycle

- **Learning Intention:** I am learning about the life cycle of a bean plant.
- **Success Criteria:** I can observe my bean plant grow over time and write and/or create a model of my daily observations.
- **Brief Overview of Lesson:** Students will plant and water a bean seed and watch it grow to observe the life cycle of a bean plant.

Lesson 5 Assessment Options:

- **Learning Intention:** I am learning the patterns in behavior of parents and offspring helps the offspring survive.
- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How can you describe the Sun and stars?
- Performance Task - Young Animal Book (Lesson 5)
  - Young Animal Book Performance Task Rubric
- Lesson 5- Offspring and Survival Test
- Offspring and Their Parents Module Test
- Module Performance Project- Bean Plant Life Cycle
  - Bean Plant Life Cycle Rubric
- STEM Gauge #473410 (Lesson 5)
- STEM Gauge #471431 (Lesson 5)
- Teacher-created Assessment

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Plants, Animals and Heredity"
  ○ DK findout! Famous Scientists
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills

○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers ● Discovery Education: ○ News and Current Events Channel ○ Discovery Education: George Washingston Carver ● Try to find examples of an Animal Trainer, Park Ranger and Landscape Architect	● Forming positive relationships, working in teams, dealing effectively with conflict ● SEL Strategies for Virtual Learning ● SOS Top Ten: Social and Emotional Learning Strategies

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 5:
Plants and Animals

Stage 1 – Desired Results

ASSESSED FOCUS STANDARDS:

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)

CONTENT 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).
- RI.1.1 Ask and answer questions about key details in a text.

Unit Description

Anchoring Phenomenon:
Statement: Living and nonliving things use their external parts to grow and survive.
Observation/Demonstration/Experience: A photo of an airplane flying overhead.

Driving Question: How are living and nonliving things different?

Meaning

	ENDURING UNDERSTANDINGS ● All living things share certain characteristics: organization, growth, reproduction, the need for food, excretion of waste, respiration, and the ability to respond to stimuli. ● All living things require food for energy. ● Humans, animals, and plants all must meet daily needs for survival. ● Animals and plants have different parts that can function to help them meet those needs. ● Important parts of a plant include roots, stems, leaves, flowers and seeds. ● When humans design objects to help solve their problems, they might draw on or mimic solutions in the natural world. Solving human problems by mimicking designs seen in nature is known as biomimicry.	**ESSENTIAL QUESTIONS** ● How are living and nonliving things different? ● How do different parts of a plant help it live? ● How do body parts help animals? ● How can plant and animal parts help us solve human problems?
	What students will know and be able to do	
	KNOWLEDGE ● I can explain the differences between living and nonliving things. ● I can explain plant parts and structure. ● I can explain animal structure and function, what animals need to live, and how animals meet their needs. ● I can explain that animals and plants have parts that protect them or capture and convey information needed for growth and survival.	**SKILLS** 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.] Constructing Explanations and Designing Solutions

		Structure and Function

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - Tell What is Living and Nonliving (Lesson 1)
- Lesson 1- Living and Nonliving Things Test
- Performance Task - Plant Model (Lesson 2)
  - Plant Model Performance Task Rubric
- Lesson 2- Parts of Plants Test
- Performance Task - Animal Parts (Lesson 3)
- Animal Parts Performance Task Rubric
- Lesson 3- Parts of AnimalsTest
- Performance Task - Design a New Tool (Lesson 4)
  - Design a New Tool Performance Task Rubric
- Lesson 4- Plant and Animal Survival Test
- Plants and Animals Module Test
- Module Performance Project- Nature-Inspired Tools
  - Nature-Inspired Tools Rubric
- STEM Gauge #473009
- STEM Gauge #499071
- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe: Living and Nonliving (Lesson 1)
- Page Keeley Science Probe: Plant Parts (Lesson 2)
- Page Keeley Science Probe: Do They Have Body Parts? (Lesson 3)
- Page Keeley Science Probe: Sensing Things (Lesson 4)

Integration of 21st Century Skills	Integration of Technology	Career Education
• **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively. • **9.1.4.A.2:** Evaluate available resources that can assist in solving problems. • **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems. • **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process. • **9.1.4.A.5:** Apply critical thinking	• **Inspire Science Videos** ○ Jellyfish in the Ocean ○ Sea Turtle ○ Venus Fly Trap • **Inspire Science Files** ○ Ways Animals Use Their Senses • **Inspire Simulations & Digital Interactives** ○ Living and Nonliving Things ○ What is Living and Nonliving? ○ Parts of Plants ○ Animobile Adventures	• **Ocean Engineer** ○ Introduce students to Hiro, who wants to be an ocean engineer when he grows up. Explain to students that an ocean engineer helps develop equipment and ways to explore the ocean. Explain that Hiro's favorite things are swimming and snorkeling and that he likes the water so much that if he could live in the water, he would! Explain that Hiro recently went to an oceanarium to learn about the

• **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking. • **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. • **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities. • **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community. • **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. • **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations. • **9.3.4.A.5:** Locate career information using a variety of resources.	○ Animal Parts ○ Bugs and Lights ○ Animal Structure and Function ○ Plant Structure and Function • **Inspire Science Readers** ○ A World of Animals ○ Parts of Plants • **Discovery Education** ○ Living and Non-living Things ○ The Characteristics of Living Things ○ What Do Living Things Need? ○ External Animal Parts • **Mystery Science** ○ Mystery Science #1: Why do birds have beaks? ○ Mystery Science #3: Why are polar bears white? ○ Mystery #5: Why don't trees blow down in the wind? • **Generation Genius** ○ Living vs. Non-Living Things ○ Living Things Change Their Environment ○ Parts of a Plant ○ External Animal Parts ○ Animals Need Food	ocean and its animals. Explain that an oceanarium is a large aquarium where scientists keep and study sea animals. People can go and see the animals in an oceanarium. • **Landscape Architect** ○ Introduce Career Kid Kayla, who wants to be a landscape architect when she grows up. Explain that a landscape architect designs outdoor places such as parks, playgrounds, and gardens. Explain that landscape architects also decide where flowers, bushes, trees, buildings, roads, and walking paths should go in these areas. • **Animal Trainer** ○ Introduce Career Kid Jordan, who wants to be an animal trainer when he grows up. Explain to students that Jordan enjoys animals and likes learning how to train them. Point out that animal trainers train animals for many things, including for riding and helping people with disabilities. Animal trainers often train animals to be around people and to respond to commands.
Stage 3 – Learning Plan		
UNIT VOCABULARY		
adaptation behavior carnivore characteristic	herbivore inherit learn life cycle	seedling signal trait young
SUMMARY OF KEY LEARNING		
Lesson 1: Living and Nonliving Things		

Lesson 1: Day 1 - Living and Nonliving Things - Module Opener

- **Learning Intention:** I am learning about the phenomenon of the airplane. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can make initial explanations by observing a photo of the airplane.
- **Brief Overview of Lesson:** Students will view a photo of the airplane and make initial explanations. Students will also be introduced to the **Career Connection** of an Aerospace *Engineer* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Living and Nonliving Things - Assess and Engage
Page Keeley Science Probe - Living and Nonliving, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about living and nonliving objects. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Living and Nonliving.* This is intended to serve as a pre-assessment and uncover students' basic ideas about characteristics of living things that distinguish them from nonliving things and change and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of a jellyfish in the ocean by watching a video. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Ocean Engineer* and answer questions in their notebook.

Lesson 1: Days 3 and 4 - Living and Nonliving Things - Explore
Inquiry Activity- What Seeds Need to Grow, Science Text- A Funny Frog

- **Learning Intention:** I am learning what seeds need to grow.
- **Success Criteria:** I can investigate what seeds need to grow and whether rocks grow. I can draw my observations of the seeds and rocks over a few days/weeks and share my findings with a partner.
- **Brief Overview of Lesson:** Students will investigate over a few days/weeks what seeds need to grow and whether rocks grow.Students will learn how friends Beta, Venus, and Cat see a frog outside in the snow. Cat brings the frog inside and they all wonder why the frog doesn't move and doesn't try to get any water or food. The friends keep wondering until they realize that the frog isn't real—it is a toy!

Lesson 1: Days 5 and 6 - Living and Nonliving Things - Explain
What is Living and Nonliving? Digital Interactive, Living and Nonliving Things Digital Interactive

- **Learning Intention:** I am learning what makes things living or nonliving.
- **Success Criteria:** I can draw an example of a living thing and a nonliving thing. I can explain why each object is either living or nonliving.
- **Brief Overview of Lesson:** Students will view pictures of living and nonliving things and match a living or nonliving thing with the correct "living" or "nonliving" label.

Lesson 1: Day 7 - Living and Nonliving Things - Elaborate

Inquiry Activity- What Living Things Need

- **Learning Intention:** I am learning how to care for a living thing.
- **Success Criteria:** I can research a house pet and explain how to take care of the living thing by creating a "How-To" list.
- **Brief Overview of Lesson:** Students will research what living things need and write a "how-to" list that describes how to care for a living thing. Students should research a common house pet such as a dog, cat, fish, hamster, rabbit, bird, and so on.

Lesson 1: Day 8 - Living and Nonliving Things - Evaluate
Performance Task- Tell What Is Living and Nonliving

- **Learning Intention:** I am learning about living and nonliving things.
- **Success Criteria:** I can identify which pictures show things that are living and things that are not living.
- **Brief Overview of Lesson:** Students will look at pictures and identify which are living and which are not living. Students will communicate their reasoning for their selections.

Lesson 1: Assessment Options

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How are living and nonliving things different?
- Performance Task - Tell What is Living and Nonliving (Lesson 1)
- Lesson 1- Living and Nonliving Things Test

Lesson 2: Parts of Plants

Lesson 2: Day 1 - Parts of Plants - Assess and Engage
Page Keeley Science Probe - Plant Parts, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of a lobster claw plant. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Plant Parts.* This is intended to serve as a pre-assessment and uncover students' initial ideas about structures of living things, specifically plants and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *a lobster claw plant* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Landscape Architect* and answer questions in their notebook.

Lesson 2: Day 2 - Parts of Plants - Explore
Inquiry Activity- Parts of a Plant

- **Learning Intention**: I am learning the parts of a plant.
- **Success Criteria:** I can examine and compare the parts of two different plants. I can draw my observations in my notebook to show similarities and differences between the two plants.

- **Brief Overview of Lesson:** Students will examine and compare the parts of two different plants.

Lesson 2: Days 3, 4 and 5- Parts of Plants - Explain
The Parts of a Plant Digital Interactive, Science Text- Plants are Living Things

- **Learning Intention:** I am learning why plants are living things.
- **Success Criteria:** I can explain to a partner why plants are living things, the purpose of the parts of a plant, and where plants live.
- **Brief Overview of Lesson:** Have students complete *The Parts of a Plant* digital interactive. Students click on the indicated parts of a plant—flower, stem, leaves, and roots—and read about how each part helps the plant Students will listen a read aloud of the Science Text- *Plants are Living Things* to understand why plants are living things.

Lesson 2: Day 6 - Parts of Plants - Elaborate
Plants in Different Environments

- **Learning Intention:** I am learning about the different environments plants grow in.
- **Success Criteria:** I can research plants that live in different environments. I can draw a picture of a plant I researched and the environment it lives in.
- **Brief Overview of Lesson:** Students will research plants that live in different environments. Students should show that plants get everything they need from their environment.

Lesson 2: Day 7 - Parts of Plants - Evaluate
Performance Task- Plant Model

- **Learning Intention:** I am learning how to make a model of plant.
- **Success Criteria:** I can make a model of a plant and label the plant parts.
- **Brief Overview of Lesson:** Students will make a model of a plant. Student models should show plants that have all of the parts that help them survive, including roots, a stem, leaves, and flowers.

Lesson 2: Assessment Options

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How do different parts of a plant help it live?
- Performance Task - Plant Model (Lesson 2)
  - Plant Model Performance Task Rubric
- Lesson 2- Parts of Plants Test
- Mystery #5: Why don't trees blow down in the wind?
- Teacher-created Assessment

Lesson 3: Parts of Animals

Lesson 3: Day 1 - Parts of Animals - Assess and Engage
Page Keeley Science Probe - Do They Have Body Parts?, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of a sea turtle swimming in a tropical coral reef I am learning to ask questions about the phenomenon and what I want to learn about it.

- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Do They Have Body Parts?* This is intended to serve as a pre-assessment and uncover students' initial ideas about structures of living things, specifically animals and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of sea turtle swimming in a tropical coral reef by observing a video. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of an *Ocean Engineer* and answer questions in their notebook.

Lesson 3: Day 2 - Parts of Animals - Explore
Inquiry Activity- What Animal Am I?

- **Learning Intention**: I am learning about characteristics of animals.
- **Success Criteria:** I can identify different animals by descriptions of their different parts and features.
- **Brief Overview of Lesson:** Students will investigate different characteristics of animals by researching on the internet and in books.

Lesson 3: Days 3, 4, and 5 - Parts of Animals - Explain
Science Text- Animals Are Living Things, Animal Parts Digital Interactive, Animobile Adventures

- **Learning Intention:** I am learning about animal groups and their characteristics.
- **Success Criteria:** I can draw a picture for each of the six animal groups: mammal, bird, reptile, amphibian, fish, gills, lungs, and insect.
- **Brief Overview of Lesson:** Students learn about different animals and the parts of their bodies that help the animals survive where they live. Students will listen a read aloud of the Science Text- *Animals Are Living Things* to learn about six animal groups and the characteristics of the animals in each group.

Lesson 3: Day 6 - Parts of Animals - Elaborate
Inquiry Activity: Sorting Animals

- **Learning Intention:** I am learning how some animals have similar body parts.
- **Success Criteria:** I can sort photos of animals into groups based on similar body parts.
- **Brief Overview of Lesson:** Students will sort photos of animals into groups based on similar body parts. The groups will each contain photos of animals that have at least one body part in common.

Lesson 3: Day 7 - Parts of Animals - Evaluate
Performance Task- Animal Parts

- **Learning Intention:** I am learning how an animal uses its body parts to get what it needs.
- **Success Criteria:** I can draw a model of an animal and explain in writing how the animal uses its body parts to get what it needs.
- **Brief Overview of Lesson:** Students will research various animals and learn how each animal gets what it needs by using its body parts.

Lesson 3: Assessment Options

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How are plants like their parents?

- Performance Task - Animal Parts (Lesson 3)
    - Animal Parts Performance Task Rubric
- Lesson 3- Parts of AnimalsTest
- STEM Gauge #473009
- Mystery Science #1: Why do birds have beaks?
- Teacher-created Assessment

Lesson 4: Plant and Animal Survival

Lesson 4: Day 1 - Plant and Animal Survival - Assess and Engage
Page Keeley Science Probe - Sensing Things, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of a Venus flytrap. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Sensing Things.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how plants and animals get and respond to information from their environment and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of a *Venus flytrap* by observing a video. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Landscape Architect* and answer questions in their notebook.

Lesson 4: Day 2 - Plant and Animal Survival - Explore
Inquiry Activity- Bugs and Light

- **Learning Intention:** I am learning how bugs respond to light.
- **Success Criteria:** I can observe and discuss with a partner how ground beetles respond to light.
- **Brief Overview of Lesson:** Students will shine lamps on a group of ground beetles and observe their behavior. Students will find that the ground beetles spend more time in the dark area than in the light area. Students will also graph their results.

Lesson 4: Days 4, 5, and 6- Plant and Animal Survival - Explain
Science Text- Animals Are Living Things, Ways Animals Use Their Senses Science File, Plant Structure and Function Digital Interactive, Animal Structure and Function Digital Interactive

- **Learning Intention:** I am learning about how animals and plants get what they need to survive.
- **Success Criteria:** I can draw a picture showing how animals and plants use their body parts to get what they need in order to survive.
- **Brief Overview of Lesson:** Students will reread the Science Text -*Animals Are Living Things* to learn how animals use their body parts to get what they need in order to survive. Have students read the Science File *Ways Animals Use Their Senses* to learn how different animals use their body parts and the senses associated with body parts to get and use information.

Lesson 4: Day 7 - Plant and Animal Survival- Elaborate

Inquiry Activity- Solving Human Problems

- **Learning Intention:** I am learning to define a problem that will be solved by carrying out the design process.
- **Success Criteria:** I can design a solution that mimics a plant or animal part to help solve a human problem.
- **Brief Overview of Lesson:** Students will brainstorm a human problem and solution based on a plant or animal part. They will draw their solution and plant or animal part and explain how the solution is like the plant or animal part.

Lesson 4: Day 8 - Plant and Animal Survival - Evaluate
Performance Task- Design a New Tool

- **Learning Intention:** I am learning how to solve a human problem.
- **Success Criteria:** I can design a device that mimics the Venus flytrap.
- **Brief Overview of Lesson:** Students will brainstorm a device that solves a problem and that mimics the Venus flytrap. They will make and draw their device and then explain how it is similar to the Venus flytrap. Students will likely design a device that traps or catches small objects.

Lesson 4: Days 9 and 10 - Plant and Animal Survival - Module Wrap-Up & Assessment
Performance Project- Nature–Inspired Tools

- **Learning Intention:** I am learning how plants or animals use their external parts to help them survive, grow, and meet their needs.
- **Success Criteria:** I can draw a design for tools to carry camping items to a campsite. I can explain what plant or animal parts I used for my design.
- **Brief Overview of Lesson:** Students will use materials to design a solution to a human problem by mimicking how plants or animals use their external parts to help them survive, grow, and meet their needs.

Lesson 4 Assessment Options:

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How do offspring survive?
- Performance Task - Design a New Tool (Lesson 4)
  - Design a New Tool Performance Task Rubric
- Lesson 4- Plant and Animal Survival Test
- Plants and Animals Module Test
- Module Performance Project- Nature-Inspired Tools
  - Nature-Inspired Tools Rubric
- STEM Gauge #499071
- Mystery Science #3: Why are polar bears white?
- Teacher-Created Assessment

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Plants and Animals"
  ○ Discovery Education: Aerospace Engineers
  ○ DK findout! Famous Scientists
  ○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers
• Discovery Education:
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills
	• Forming positive relationships, working in teams, dealing effectively with conflict

○ News and Current Events Channel ○ Discovery Education: George Washington Carver ● Try to find examples of an Aerospace Engineer and Meteorologist from different cultures	● SEL Strategies for Virtual Learning ● SOS Top Ten: Social and Emotional Learning Strategies

**key: Disciplinary Core Idea
Science and Engineering Practice
Cross Cutting Concept

Module 6:
Use Energy to Communicate

Stage 1 – Desired Results

ASSESSED FOCUS STANDARDS:

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)

CONTENT 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).

Mathematics

- MP.5 Use appropriate tools strategically.
- 1.MD.A.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.
- 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

Unit Description

Anchoring Phenomenon:
Statement: Light and sound can be used to communicate.
Observation/Demonstration/Experience: Video of an emergency vehicle.

Driving Question: How do we use light and sound to communicate?

Meaning

overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.	**ENDURING UNDERSTANDINGS** ● All sounds begin with a vibration that pushes on air particles. ● It takes energy to make a vibration, and sound waves transfer energy from particle to particle. ● Communicating with sound takes many forms. Speaking may be the most common way we use sound to communicate. Other methods include clapping, sighing, school bells, and sirens. ● Humans have used light to communicate for centuries.	**ESSENTIAL QUESTIONS** ● How do we use light and sound to communicate? ● How has communication changed over time to make people's lives easier?
	What students will know and be able to do	
	KNOWLEDGE ● I can explain how light and sound can be used to communicate over a distance and how people use a variety of devices to send and receive information. ● I can explain how communication has changed over time and how new communication technologies help people solve problems.	**SKILLS** 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.] Constructing Explanations and Designing Solutions Influence of Engineering, Technology, and Science, on Society and the Natural World

Stage 2 – Evidence

SUMMATIVE ASSESSMENT(S)

- Performance Task - Paper Cup Phone (Lesson 1)
  - Paper Cup Phone Performance Task Rubric
- Lesson 1- Communicate with Light and Sound Test
- Performance Task - Send Messages (Lesson 2)
  - Send Messages Performance Task Rubric
- Lesson 2- Communication Technology Test
- Use Energy to Communicate Module Test

- Module Performance Project- Design a Communication Device
  - Design a Communication Device Rubric
- STEM Gauge #468462
- CER Framework Grade 1

PRE-ASSESSMENT

- Page Keeley Science Probe: Tin Can Message Sender (Lesson 1)
- Page Keeley Science Probe: Rescue at Sea (Lesson 2)

Integration of 21st Century Skills	Integration of Technology	Career Education
● **9.1.4.A.1:** Recognize a problem and brainstorm ways to solve the problem individually or collaboratively. ● **9.1.4.A.2:** Evaluate available resources that can assist in solving problems. ● **9.1.4.A.3:** Determine when the use of technology is appropriate to solve problems. ● **9.1.4.A.4:** Use data accessed on the Web to inform solutions to problems and the decision-making process. ● **9.1.4.A.5:** Apply critical thinking ● **9.1.4.B.1:** Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking. ● **9.1.4.D.1:** Use effective oral and written communication in face-to-face and online interactions and when presenting to an audience. ● **9.1.4.E.2:** Demonstrate effective communication using digital media during classroom activities. ● **9.3.4.A.2:** Identify various life roles and civic and work-related activities in the school, home, and community. ● **9.3.4.A.3:** Appraise personal likes and dislikes and identify careers that might be suited to personal likes. ● **9.3.4.A.4:** Identify qualifications needed to pursue traditional and nontraditional careers and occupations.	● **Inspire Science Videos** ○ Lighthouses ○ Communication Over Time ○ Technology Helps People ● **Inspire Science Files** ○ The Design Process ○ Alexander Graham Bell and the Telephone ● **Inspire Simulations & Digital Interactives** ○ Use Sound and Light to Communicate ○ Megaphone ○ Technology Helps People ● **Inspire Science Readers** ○ Alexander Graham Bell ○ Dolphin Sounds ● **Discovery Education** ○ Alexander Graham Bell ○ Designing for Communication ○ Designing for Communication Science Move-Along Song ● **Mystery Science** ○ Mystery #6: How do boats find their way in the fog? ● **Generation Genius** ○ Communication Over Distances	**Paramedic:** ● Introduce Career Kid Marisol, who wants to be a paramedic when she grows up. A paramedic is a person who helps people in an emergency. A paramedic drives an ambulance, which uses light and sound to warn people that it is coming. **Video Game Designer:** ● Introduce Career Kid Erik, who wants to be a videogame designer when he grows up. A video game designer creates video games. Video games use light and sound in different ways to tell the players what is happening in the game.

● **9.3.4.A.5:** Locate career information using a variety of resources.		

Stage 3 – Learning Plan

UNIT VOCABULARY

communicate	electricity	receiver transmitter

SUMMARY OF KEY LEARNING

Lesson 1: Communicate with Light and Sound

Lesson 1: Day 1 - Communicate with Light and Sound - Module Opener

- **Learning Intention:** I am learning about the phenomenon of an emergency vehicle. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can make initial explanations by watching a video of an emergency vehicle.
- **Brief Overview of Lesson:** Students will view a photo of a tadpole and make initial explanations. Students will also be introduced to the **Career Connection** of a *Paramedic* and answer questions in their Science Notebook.

Lesson 1: Day 2 - Communicate with Light and Sound - Assess and Engage
Page Keeley Science Probe - Tin Can Message Sender, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about how sound is used to communicate. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Tin Can Message Sender*. This is intended to serve as a pre-assessment and uncover students' basic ideas about how sound is used to communicate and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of a *lighthouse at night* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be introduced to the **Career Connection** of a *Video Game Designer* and answer questions in their notebook.

Lesson 1: Day 3 - Communicate with Light and Sound - Explore
Inquiry Activity- Communicate with Light and Sound, Science Text- The Energy Challenge

- **Learning Intention:** I am learning about different forms of energy.
- **Success Criteria:** I can identify and sort objects that communicate using sound, light, or both light and sound.

- **Brief Overview of Lesson:** Students correctly sort objects/pictures based on whether they communicate with light, sound, or both. Students will learn from the Science Text, *The Energy Challenge*, about a group of animal friends including an elephant, a viper, a firefly, and a monkey who enter an energy challenge. Students also learn that the friends combine their talents to complete three tasks that require different forms of energy.

Lesson 1: Days 4, 5, and 6 - Communicate with Light and Sound - Explain
Science Text- Light and Sound Are Energy, Lighthouses Video, Use Sound and Light to Communicate Digital Interactive

- **Learning Intention:** I am learning about different forms of energy.
- **Success Criteria:** I can write one way I use light and sound to communicate every day in my notebook.
- **Brief Overview of Lesson:** Students will learn that light and sound are both forms of energy after reading the Science Text, *Light and Sound are Energy*. They will also learn about various ways we use light and sound to communicate. Students will learn how energy and electricity are related. Students will watch the video, *Lighthouses* to learn what lighthouses are and how they communicate with ships using light. Students will learn that lighthouses guide ships around dangerous places near the shore.

Lesson 1: Day 7 - Communicate with Light and Sound - Elaborate
Inquiry Activity- Games with Light and Sound

- **Learning Intention:** I am learning how games use light and sound to communicate.
- **Success Criteria:** I can design, draw and label a game that uses light and sound to communicate.
- **Brief Overview of Lesson:** Students will communicate how games use light and sound. Students will design and draw a game that uses light and sound to communicate. They will correctly label the parts of their game that use light and sound.

Lesson 1: Day 8 - Communicate with Light and Sound - Evaluate
Performance Task- Paper Cup Phone

- **Learning Intention:** I am learning how to use a paper cup phone to communicate with a classmate.
- **Success Criteria:** I can work with a partner to investigate how the length of string affects sound between paper cups.
- **Brief Overview of Lesson:** Students will observe that the shorter the string and the closer a person is, the more clearly they can hear someone using a paper cup phone.

Lesson 1: Day 9 - Assessment Options

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How do we use light and sound to communicate?
- Performance Task - Paper Cup Phone (Lesson 1)
  - Paper Cup Phone Performance Task Rubric
- Lesson 1- Communicate with Light and Sound Test
- Teacher-created Assessment

Lesson 2: Communication Technology

Lesson 2: Day 1 - Communication Technology - Assess and Engage
Page Keeley Science Probe - Rescue at Sea, STEM Career Kid Connection, Science in My World: Lesson Phenomenon

- **Learning Intention:** I am learning about the phenomenon of an astronaut in space. I am learning to ask questions about the phenomenon and what I want to learn about it.
- **Success Criteria:** I can explain my reasoning through writing a response to the Page Keeley Science Probe which is supported by evidence. *(Students will not be given the answer at this time in the lesson, and as such, success should be measured by the questions that students ask about the phenomenon.)*
- **Brief Overview of Lesson:** Students will complete the **Page Keeley Science Probe -** *Rescue at Sea.* This is intended to serve as a pre-assessment and uncover students' basic ideas about how light is used to communicate over a distance and uncover misconceptions that will drive lesson instruction. Students will return to the probe after completing the lesson to see how their thinking has changed. Students will also be introduced to the **phenomenon** of *an astronaut in space* by observing a photo. Students will make observations and ask questions about the phenomenon (questions to *hopefully* be answered throughout the lesson). Students will also be reintroduced to the **Career Connection** of a *Video Game Designer* and answer questions in their notebook.

Lesson 2: Day 2 - Communication Technology - Explore
Inquiry Activity- Making Megaphones

- **Learning Intention:** I am learning how a megaphone affects sound.
- **Success Criteria:** I can draw and create the best megaphone by examining and trying out different materials. I can test it out my megaphone by focusing sound across the classroom or outside.
- **Brief Overview of Lesson:** Students will investigate how a megaphone affects sound. Students will observe that the sound of people's voices are louder and more focused toward a specific direction when they use the megaphone.

Lesson 2: Days 3, 4, 5 and 6- Communication Technology - Explain
Communication Over Time Video, Science Files- The Design Process & Alexander Graham Bell and the Telephone, Technology Helps People Digital Interactive

- **Learning Intention:** I am learning how ways of communication have changed and helped people over time.
- **Success Criteria:** I can respond in writing to the question, "How has technology changed over time? How has it helped people who are not able to speak or see?" in my notebook.
- **Brief Overview of Lesson:** After watching the video, *Communication Over Time,* students learn about ways communication has changed and how telephones were one of the first forms of technology to help people communicate over long distances. Students will learn about ways technology is used to help people who are deaf, hard of hearing, visually impaired, and cannot speak.

Lesson 2: Day 7 - Communication Technology - Elaborate
Megaphones Simulation

- **Learning Intention:** I am learning how to help sound reach across a distance.
- **Success Criteria:** I can investigate how megaphones focus sound waves to help sound reach across distance.
- **Brief Overview of Lesson:** Students demonstrate how megaphones focus sound waves to help sound reach across distance. Students should observe that a long megaphone with a medium width best focuses the sound waves to help sound reach across distance.

Lesson 2: Day 8 - Communication Technology - Evaluate
Performance Task- Send Messages

- **Learning Intention:** I am learning about Morse Code.
- **Success Criteria:** I can research, investigate, and demonstrate how Morse Code helped people communicate information over a distance.
- **Brief Overview of Lesson:** Students will learn that Morse Code is a series of short and long sounds or flashes of lights called dots and dashes that symbolize letters and numbers, and they will use light to send and receive messages using Morse Code.

Lesson 2: Day 9 - Communication Technology - Module Wrap-Up & Assessment
Performance Project- Design a Communication Device

- **Learning Intention:** I am learning how light and/or sound can solve a problem.
- **Success Criteria:** I can solve a problem at school by designing a device that uses light, sound, or both to communicate.
- **Brief Overview of Lesson:** Students will solve a problem at school by designing a device that uses light, sound, or both to communicate. Students' devices should show how light, sound, or both are used to solve the school problem.

Lesson 2: Day 10 - Assessment Options:

- **Success Criteria:** I can discuss and share my claim with evidence based on the EQ: How has communication changed over time to make people's lives easier?
- Performance Task - Send Messages (Lesson 2)
  - Send Messages Performance Task Rubric
- Lesson 2- Communication Technology Test
- Use Energy to Communicate Module Test
- Module Performance Project- Design a Communication Device
  - Design a Communication Device Rubric
- STEM Gauge #468462
- Teacher-Created Assessment

CULTURALLY RESPONSIVE TEACHING in PRACTICE	SOCIAL EMOTIONAL LEARNING in PRACTICE

• Search for famous scientists in the field of "Communication/Light/Sound"
  ○ DK findout! Famous Scientists
  ○ Diversity in STEM: NOVA: Secret Life of Scientists & Engineers
• Discovery Education:
  ○ News and Current Events Channel
  ○ Discovery Education: Alexander Graham Bell
• Try to find examples of an Aerospace Engineer and Meteorologist from different cultures
	• Responsible Decision-Making
	  ○ Making ethical, constructive choices about personal and social behavior
	• Relationship Skills
	• Forming positive relationships, working in teams, dealing effectively with conflict
	• SEL Strategies for Virtual Learning
	• SOS Top Ten: Social and Emotional Learning Strategies