

# Audubon Public Schools



## **Grade 1: Science Curriculum Guide**

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## Course Description

### Grade 1: Science

Students in kindergarten through fifth grade begin to develop an understanding of the four disciplinary core ideas: physical sciences; life sciences; earth and space sciences; and engineering, technology, and applications of science. In the earlier grades, students begin by recognizing patterns and formulating answers to questions about the world around them. By the end of fifth grade, students are able to demonstrate grade-appropriate proficiency in gathering, describing, and using information about the natural and designed world(s). The performance expectations in elementary school grade bands develop ideas and skills that will allow students to explain more complex phenomena in the four disciplines as they progress to middle school and high school. While the performance expectations shown in kindergarten through fifth grade couple particular practices with specific disciplinary core ideas, instructional decisions should include use of many practices that lead to the performance expectations.

## Overview / Progressions

### Grade 1: Science

Overview		Earth and Space Sciences	Life Sciences	Physical Sciences
<b>Unit 1</b>	<b>Focus standards (Objectives)</b>			1-PS4-1 1-PS4-2 1-PS4-3 1-PS4-4 K-2-ETS1-1
<b>Unit 2</b>	<b>Focus standards (Objectives)</b>	1-ESS1-1 1-ESS1-2 K-2-ETS1-1		
<b>Unit 3</b>	<b>Focus standards (Objectives)</b>		1-LS1-2 1-LS1-1 1-LS3-1 K-2-ETS1-2	

<b>Physical Science</b>	<b>Grade 1</b>	<b>Unit 1</b>	<b>Trimester 1</b>
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**Physical Science Unit 1- Waves and their Applications in Technologies for Information Transfer (20 Instructional Days)**

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials.

The crosscutting concept of *cause and effect* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations, constructing explanations, and designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Overarching Essential Questions	Overarching Enduring Understandings
<p>How is sound made?</p> <p>How does light travel?</p> <p>How can we communicate using sounds and light?</p> <p>*****</p> <p>Essential Questions:</p> <p>How is sound made?</p> <p>How do sound waves work?</p> <p>How does sound travel?</p> <p>How can we use flashlights to make light travel?</p> <p>How can we see when there is no light?</p>	<p>Vibrating matter can make sounds.</p> <p>Some materials allow light to pass through, others block all the light and make shadows.</p> <p>People can communicate through light signals or patterns of sound.</p> <p>*****</p> <p>Enduring Understandings:</p> <p>A vibration of an object makes sound.</p> <p>Sound waves are vibrations that travel through objects.</p> <p>Sound can travel through all matter in many</p>

<p>How is a shadow made?</p> <p>How can shadows change?</p> <p>How can we communicate with sounds?</p> <p>Why do some sounds travel farther than others?</p>	<p>directions.</p> <p>Flashlights are resources to show that light travels in waves and can pass through some (but not all) objects.</p> <p>Objects in darkness can be seen when illuminated.</p> <p>When an object blocks light, it casts a shadow.</p> <p>Shadows can change as the position of the sources of light changes.</p> <p>Animals communicate with sounds, from echos to songs.</p>
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**Student Learning Objectives**

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	1-PS4-1
Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.	1-PS4-2
Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.	1-PS4-3
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-PS4-4
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	K-2-ETS1-1

The Student Learning Objectives above were developed using the following elements from the NRC document [\*A Framework for K-12 Science Education\*](#):

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations	PS4.A: Wave Properties	Cause and Effect

<p>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"> <li>Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1),(1-PS4-3)</li> </ul> <p><b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.</p> <ul style="list-style-type: none"> <li>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)</li> <li>Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)</li> </ul>	<ul style="list-style-type: none"> <li>Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)</li> </ul> <p><b>PS4.B: Electromagnetic Radiation</b></p> <ul style="list-style-type: none"> <li>Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)</li> <li>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)</li> </ul> <p><b>PS4.C: Information Technologies</b></p>	<ul style="list-style-type: none"> <li>Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)</li> </ul> <p><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p><b>Influence of Engineering, Technology, and Science, on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)</li> </ul>
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	<b>and Instrumentation</b> <ul style="list-style-type: none"><li>• People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)</li></ul>	
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**Embedded English Language Arts/Literacy and Mathematics**



### **ELA/Literacy**

- SL.1.1 - Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1), (1-PS4-2), (1-PS4-3)
- W.1.2 - Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2)
- W.1.7 - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4-4)
- W.1.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1), (1-PS4-2), (1-PS4-3)

### **Mathematics**

- 1.MD.A.1 - Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4)
- 1.MD.A.2 - Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. (1-PS4-4)
- MP.5 - Use appropriate tools strategically. (1-PS4-4)

### Three-Dimensional Teaching and Learning

In this unit of study, students plan and conduct investigations and make observations as they explore sound and light energy. Students describe the relationships between sound and vibrating materials and the availability of light and the ability to see objects. They also investigate the effect on a beam of light when objects made of different materials are placed in its path. Throughout the unit, students will use their observations and data as evidence to determine cause-and-effect relationships in the natural world.

Students begin this unit by observing objects with and without available light. They need opportunities to observe a variety of objects in both illuminated and non-illuminated settings. For example, observations could be made in a completely dark room, or students can use a pinhole box to observe objects. Students can also watch videos of cave explorers deep in the earth, using light from a single flashlight. With experiences such as these, they will come to understand that objects can be seen only when illuminated, either from an external light source or by when they give off their own light.

Next, students plan and conduct simple investigations to determine what happens to a beam of light when objects made of various materials are placed in its path. Students need the opportunity to explore the interaction of light with a variety of materials, and they should record what they observe with each one. When selecting materials to use, teachers should choose some that allow all light to pass through (transparent), some that allow only a portion of the light to pass through (translucent), some that do not allow any light to pass through (opaque), and some that redirect the beam of light (reflective). Examples could include clear plastic, glass, wax paper, thin cloth, cardboard, construction paper, shiny metal spoons, and mirrors.

As students observe the interaction between light and various materials, they should notice that when some or all of the light is blocked, a shadow is created beyond the object. If only a portion of light is blocked (translucent materials), a dim shadow will form, and some light will pass through the object. If all the light is blocked (opaque materials), students will see only see a dark shadow beyond the object. They will also observe that shiny materials reflect light, redirecting the beam of light in a different direction. Students should use their observations as evidence to support their explanations of how light interacts with various objects.

After investigating light energy, students continue to plan and conduct investigations to develop an understanding of some basic properties of sound. Students can use a variety of objects and materials to observe that vibrating materials can make sound and that sound can make materials vibrate. Students need multiple opportunities to experiment with a variety of objects that will make sound. Some opportunities could include:

- Gently tapping various sizes of tuning forks on a hard surface.
- Plucking string or rubber bands stretched across an open box.

- Cutting and stretching a balloon over an open can to make a drum that can be tapped.
- Holding the end of a ruler on the edge of a table, leaving the opposite end of the ruler hanging over the edge, and then plucking the hanging end of the ruler.
- Touching a vibrating tuning fork to the surface of water in a bowl.
- Placing dry rice grains on a drum's surface and then touching the drum with a vibrating tuning fork or placing the drum near the speaker of a portable sound system.
- Holding a piece of paper near the speaker of a portable sound system.

As students conduct these simple investigations, they will notice that when objects vibrate (tuning forks that have been tapped and string, rubber bands, and rulers that have been plucked), sound is created. They will also notice that sound will cause objects to vibrate (sound from a speaker causes rice grains to vibrate on the surface of a drum, the vibrating tuning fork causes ripples on the surface of water, and sound from the speaker also causes paper to move). Students should use these types of observations as evidence when explaining the cause and effect relationship between sound and vibrating materials.

### Prior Learning

- Matter; Solid, Liquid and Gases
- Push and Pull
- 5 senses: our sense of sight.
- Effects of sunlight

### Part A: What happens to a beam of light when you put different kinds of things in front of it?

**How would you design an experiment to prove your thinking?**

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>• Simple tests can be designed to gather evidence to support or refute student ideas about causes.</li> <li>• 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</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>• Design simple tests to gather evidence to support or refute ideas about cause and effect relationships.</li> </ul>

<p>any surface beyond them, where the light cannot reach.</p> <ul style="list-style-type: none"> <li>● Mirrors can be used to redirect a light beam. <i>(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.)</i></li> </ul>	<ul style="list-style-type: none"> <li>● Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question.</li> <li>● Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. Materials can be: <ul style="list-style-type: none"> <li>○ Transparent (clear plastic, glass)</li> <li>○ Translucent (wax paper, thin cloth)</li> <li>○ Opaque (cardboard, construction paper)</li> <li>○ Reflective (a mirror, a shiny metal spoon)</li> </ul> </li> </ul>
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**Part B: How can light or sound be used to communicate over a distance?**

<b>Concepts</b>	<b>Formative Assessment</b>
<ul style="list-style-type: none"> <li>● The shape and stability of structures of natural and designed objects are related to their function(s).</li> <li>● People depend on various technologies in their lives; human life would be very different without technology.</li> <li>● People also use a variety of devices to communicate (send and receive information) over long distances.</li> <li>● A situation that people want to change or create can be approached as a problem to be solved through engineering.</li> <li>● Asking questions, making observations, and gathering information are helpful in thinking about problems.</li> </ul>	<p><i>Students who understand the concepts can:</i></p> <ul style="list-style-type: none"> <li>● Describe how the shape and stability of structures are related to their function.</li> <li>● Ask questions based on observations to find more information about the natural and/or designed world.</li> <li>● Define a simple problem that can be solved through the development of a new or improved object or tool.</li> <li>● Ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be</li> </ul>

<ul style="list-style-type: none"> <li>• Before beginning to design a solution, it is important to clearly understand the problem.</li> <li>• Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.</li> </ul>	<p>solved through the development of a new or improved object or tool.</p> <ul style="list-style-type: none"> <li>• Develop a simple model based on evidence to represent a proposed object or tool.</li> <li>• Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</li> <li>• Use tools and materials provided to design a device that solves a specific problem.</li> <li>• Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. Examples of devices could include:</li> </ul> <p>A light source to send signals</p> <p>Paper cup and string telephones</p> <p>A pattern of drum beats</p>
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**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

*(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)*

- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.

- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principles ([http://www.cast.org/our-work/about-udl.html#.VXmoXcfD\\_UA](http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)).

### **Leveraging English Language Arts/Literacy and Mathematics**

#### **English Language Arts/Literacy**

To integrate the CCSS for English Language Arts into this unit, students need opportunities to read informational texts in order to gather information about light and sound. With adult guidance, they identify the main topic and retell key details from texts and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level appropriate texts and resources, and use that information to answer questions about light and sound. In pairs or small groups, students can use pictures and words to create simple books about vibration (sound) and illumination (light). The students' writing should include facts about the topic and have a sense of closure. Throughout the unit of study, students need multiple opportunities to share their experiences with light and sound in collaborative conversations with adults and peers, in small and large group settings.

#### **Mathematic**

N/A

**Samples of Open Education Resources for this unit:**

[Va Va-Vibrations](#) (2-3 days) Students will be creating instruments that will allow them to observe, explore and investigate the patterns of sound waves (pitch and volume). They will plan out a design for their instrument and then create it using classroom materials.

[Are you Afraid of the Dark?](#) (2-3 days) Using cause and effect, the students will demonstrate an understanding of objects illuminating using an external light source. Students will record their observations and evidence in their scientific journals.

[American Flag Shadow](#): Students can make observations to construct an evidence based account that objects in darkness can be seen only when illuminated. Students can plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. (2-days)

[STEM and Sound](#): (2 days) This lesson is designed to allow my students as much time as needed to analyze and test ways to solve a communication problem. They are given supplies to make a way to communicate.

[Sound Devices; Building and Testing](#): SWBAT construct and test a tool to transmit sounds. 2 part lesson; plan/ discuss and explore/ build. (2 days)

[The Dark Side](#): Students will conduct an investigation to determine that without light, we cannot see.

[The Science of the String Phone](#): This 4 minute and 37 second SciShow Kids video discusses how sound is made and how it travels by relating it to making string phones. It describes how to make a string phone and then how to test it. It provides students with encouragement to try the activity on their own and send in their results to Scishow Kids.

[Mystery Science](#): Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.



<b>Earth and Space Science</b>	<b>Grade 1</b>	<b>Unit 2</b>	<b>Trimester 2</b>
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**Earth and Space Science Unit 2- Space System: Pattern and Cycles (20 Instructional Days)**

Can we predict how the sky will change over time?

In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-ESS1-1 and 1-ESS1-2.

<b>Overarching Essential Questions</b>	<b>Overarching Enduring Understandings</b>
Why does the sun and moon move? Why do we have seasons? Why do we have day and night? ***** Essential Quesitons: Why are stars only visible at night? How does the sun and the moon move through the sky? How does weather change from season to season?	<ul style="list-style-type: none"> <li>- The earth rotates to the east and because of this the sun and moon make their way east across the sky throughout the day.</li> <li>- The earth rotates throughout the year and depending on how close or far the earth is to the sun determines the weather/ seasons.</li> <li>- Day and night are caused by the sun and the rotation of the Earth.</li> </ul> *****

<p>How are night and day different?</p> <p>Why do we need sun?</p> <p>Why does the moon shine and change shape?</p>	<p>Enduring Understandings:</p> <ul style="list-style-type: none"> <li>- During the day our brightest star the sun is so bright that you cannot see the dimmer stars until nighttime.</li> <li>- The earth rotates to the east and because of this the sun and moon make their way east across the sky throughout the day.</li> <li>- The earth rotates throughout the year and depending on how close or far the earth is to the sun determines the weather/ seasons.</li> <li>- The sun shines on various parts of the earth during a 24 hour period causing night and day.</li> <li>- All living things need energy which some from the sun.</li> <li>- The phases of the moon are caused by the light from the sun.</li> </ul>
<p><b>Student Learning Objectives</b></p>	
<p>Use observations of the sun, moon, and stars to describe patterns that can be predicted.</p>	<p><a href="#"><u>1-ESS1-1</u></a></p>
<p>Make observations at different times of year to relate the amount of daylight to the time of year.</p>	<p><a href="#"><u>1-ESS1-2</u></a></p>
<p>Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p>	<p>K-2-ETS1-1</p>

The Student Learning Objectives above were developed using [the following elements from the NRC document \*A Framework for K-12 Science Education\*](#):

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Planning and Carrying Out Investigations</b></p> <p>Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.</p> <ul style="list-style-type: none"> <li>• <u>Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)</u></li> </ul> <p><b>Analyzing and Interpreting Data</b></p> <p>Analyzing data in K–2 builds on prior experiences and progresses</p>	<p><b>ESS1.A: The Universe and Its Stars</b></p> <ul style="list-style-type: none"> <li>• <u>Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)</u></li> </ul> <p><b>ESS1.B: Earth and the Solar System</b></p> <ul style="list-style-type: none"> <li>• <u>Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)</u></li> </ul>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>• <u>Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)</u></li> </ul> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</b></p> <ul style="list-style-type: none"> <li>• <u>Science assumes natural events happen today as they happened in the past. (1-ESS1-1)</u></li> <li>• <u>Many events are repeated. (1-ESS1-1)</u></li> </ul>

to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

**Embedded English Language Arts/Literacy and Mathematics**

### **ELA/Literacy**

- **W.1.7** - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)
- **W.1.8** - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1), (1-ESS1-2)

### **Mathematics**

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

### **Three-Dimensional Teaching and Learning**

In this unit of study, students observe, describe, and predict some patterns of the movement of objects in the sky. Throughout the unit students look for patterns as they plan and carry out investigations and analyze and interpret data.

In this unit’s progression of learning, students develop the understanding that natural events happen today as they happened in the past, and that many events are repeated. In addition, they observe and use patterns in the natural world as evidence and to describe

phenomena. First graders ask questions and use observations of the sun, moon, and stars to describe apparent patterns of change in each. These patterns are then used to answer questions and make predictions. Some examples of patterns include:

The sun and moon appear to rise in one part of the sky, move across the sky, and set.

The shape of the moon appears to change over a period of time in a predictable pattern.

Stars, other than our sun, are visible at night but not during the day.

After students observe and document these types of patterns over a period of time, they need opportunities to describe the patterns and to make predictions about the changes that occur in the objects in the sky. It is important that they use observed patterns as evidence to support predictions they might make about the sun, moon, and stars.

In this unit, students also learn that seasonal patterns of sunrise and sunset can be observed, described, and predicted. They relate the amount of daylight to the time of year by making observations at different times of the year. Over time, they collect and use data in order to identify the relationship between the amount of sunlight and the season. Grade 1 students are expected to make relative comparisons of the amount of daylight from one season to the next, and assessment should be limited to relative amounts of daylight, not quantifying the hours or time of daylight.

### Prior Learning

- Seasons; winter, spring, summer and fall
- Identify the sun, moon and stars
- Daytime and Nighttime

**Part A:** What patterns of change can be predicted when observing the sun, moon, and stars?

#### Concepts

- Science assumes that natural events happen today as they happened in the past.
- Many events are repeated.

#### Formative Assessment

Students who understand the concepts can:

- Observe and use patterns in the natural world as evidence and to describe phenomena.

<ul style="list-style-type: none"> <li>● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</li> <li>● Patterns in the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.</li> </ul>	<ul style="list-style-type: none"> <li>● Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</li> <li>● Use observations of the sun, moon, and stars to describe patterns that can be predicted. Examples of patterns could include: <ul style="list-style-type: none"> <li>○ The sun and moon appear to rise in one part of the sky, move across the sky, and set.</li> <li>○ Stars other than our sun are visible at night but not during the day.</li> </ul> </li> </ul>
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**Part B: What is the relationship between the amount of daylight and the time of year?**

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</li> <li>● Seasonal patterns of sunrise and sunset can be observed, described, and predicted.</li> </ul>	<p>Students who understand the concepts can:</p> <ul style="list-style-type: none"> <li>● Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>● Make observations (firsthand or from media) to collect data that can be used to make comparisons.</li> <li>● Make observations at different times of the year to relate the amount of daylight to the time of year. <i>(Note: The emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall; assessment is limited to relative amounts of daylight, not to quantifying the hours or time of daylight.)</i></li> </ul>

**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

*(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies for vignettes and explanations of the modifications.](#))*

- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.
- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals ([http://www.cast.org/our-work/about-udl.html#.VXmoXcfD\\_UA](http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)).

### **Leveraging English Language Arts/Literacy and Mathematics**

#### *English Language Arts/Literacy*

- In this unit of study, students need opportunities to participate in shared research and writing projects about patterns of change in the sky. For example, students can use online resources or books to research the patterns of change that are visible over time when we observe the objects in the sky. With guidance from adults, students could create books that



describe and illustrate the different patterns of change observed in objects in the sky. They could also describe and illustrate the relative amount of daylight in relation to the season using a sequenced set of journal entries or in a sequence-of-events foldable.

*Mathematic*

- Students need opportunities to represent and interpret data and to use addition and subtraction. The following examples from NGSS Appendix L could provide guidance for instruction and should be done with teacher support:
  - Science example 1: There were 16 hours of daylight yesterday. On December 21, there were 8 hours of daylight. How many more hours of daylight were there yesterday than on December 21?
  - Science example 2: Based on the data collected and posted on the bulletin board so far, which day has been the longest of the year so far? Which day has been the shortest?

**Samples of Open Education Resources for this unit:**

[The Dynamic Trio](#): In this lesson, students will learn about the stars, planets, and moons found in our solar system and how they relate to one another. The video segment enhances the learning. After a non-fiction read aloud, students work in groups to create models of the Solar System.

[Our Super Star](#): This is a three part lesson where students use observations, activities, and videos to learn basic facts about the Sun. Students also model the mechanics of day and night and use solar energy to make a tasty treat. One of the videos is a time-lapse video of a sunrise and a sunset.

[Keep a Moon Journal](#): The National Wildlife Federation's "Keep a Moon Journal" page allows students to get acquainted with the phases of the moon by keeping a moon journal to record their nightly observations for one month. The page has links to diagrams, a student printable, and activities connecting the journal to other content. The page is set up as a "family activity" and could be used as nightly homework for students then discussed weekly in class.

[Patterns of Daylight](#): This is a mini-unit that can be taught directly after Space Part 1 or independently. The author chose to teach the Space Part 1 unit (also available on Better Lesson! at <http://betterlesson.com/lesson/613469/introduction-and-pre-assessment> ) during January, and follows up at the end of the year in a recap in May. This lesson uses prior student knowledge and a video simulation.

[Observing the Sun](#): This lesson is an activity where students create a sun tracker and monitor the sun's position over the course of a day. Examples of student journals and connections within a larger unit are provided.

[Mystery Science](#): Mystery Science provides ready-made science mysteries for elementary school students. Each lesson contains a central mystery, discussion questions, supplemental reading, and a hands-on activity.



<b>Life Science</b>	<b>Grade 1</b>	<b>Unit 3</b>	<b>Trimester 3</b>
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**Unit 3: Life Science/Structure, Function and Information Processing: (20 Instructional Days)**

In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of *patterns* is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *obtaining, evaluating, and communicating information* and *constructing explanations*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-LS3-1 and 1-LS1-2.

<b>Overarching Essential Questions</b>	<b>Overarching Enduring Understandings</b>
<p>How do offspring learn from their parents?</p> <p>How does the exterior of a plant or animal affect them?</p> <p>*****</p> <p>Essential Questions:</p> <p>How do animals move?</p> <p>Why do animals have coverings?</p> <p>Why do animals have to learn from their parents?</p>	<p>Offspring learn many different skills from their parents to be able to survive on their own.</p> <p>Their exterior such as; fur, scales, feathers, shells and thorns help them survive in their environment in many different ways.</p> <p>*****</p>

<p>How are baby animals alike or different from their parents?</p> <p>How do animals survive?</p> <p>Why are some plants different from their parents?</p>	<p>Enduring Understandings:</p> <p>Animals move by walking, running, climbing, swimming and flying.</p> <p>Animals have different kinds of coverings such as fur, scales, feathers and shells to protect themselves and help them survive in their environment.</p> <p>Animals need to learn from their parents so they know the skills they will need to survive when they go out on their own.</p> <p>Some baby animals look like their parents and need their care while others look very different from their parents and are more independent.</p> <p>Animals need food, water, air and a place to live to survive.</p> <p>Some plants can have leaves or flowers that have the same shape as their parents but the size may be different.</p>
<p><b>Student Learning Objectives</b></p>	
<p>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.*</p>	<p>1-LS1-1</p>
<p>Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</p>	<p>1-LS1-2</p>
<p>Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.</p>	<p>1-LS3-1</p>

Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-2

The Student Learning Objectives above were developed using the following elements from the NRC document [A Framework for K-12 Science Education](#):

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Constructing Explanations and Designing Solutions</b></p> <p>Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomenon and designing solutions.</p> <ul style="list-style-type: none"> <li>• <u>Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)</u></li> <li>• <u>Use materials to design a device that solves a specific problem or a</u></li> </ul>	<p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>• <u>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)</u></li> </ul> <p><b>LS1.B: Growth and</b></p>	<p><b>Patterns</b></p> <ul style="list-style-type: none"> <li>• <u>Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2), (1-LS3-1)</u></li> </ul> <p><b>Structure and Function</b></p> <ul style="list-style-type: none"> <li>• <u>The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)</u></li> </ul> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Science, Engineering, and Technology on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>• <u>Every human-made product is designed by applying some</u></li> </ul>

<p><u>solution to a specific problem. (1-LS1-1)</u></p> <p><b>Obtaining, Evaluating, and Communicating Information</b></p> <p>Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> <li>• <u>Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)</u></li> </ul> <p><b>Connections to Nature of Science</b></p> <p><b>Science Knowledge Is Based on Empirical Evidence</b></p> <ul style="list-style-type: none"> <li>• <u>Scientists look for</u></li> </ul>	<p><b>Development of Organisms</b></p> <ul style="list-style-type: none"> <li>• <u>Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)</u></li> </ul> <p><b>LS1.D: Information Processing</b></p> <ul style="list-style-type: none"> <li>• <u>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)</u></li> </ul>	<p><u>knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)</u></p>
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<p><u>patterns and order when making observations about the world. (1-LS1-2)</u></p>	<p><b>LS3.A: Inheritance of Traits</b></p> <ul style="list-style-type: none"> <li>• <u>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)</u></li> </ul> <p><b>LS3.B: Variation of Traits</b></p> <ul style="list-style-type: none"> <li>• <u>Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)</u></li> </ul>	
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**Embedded English Language Arts/Literacy and Mathematics**

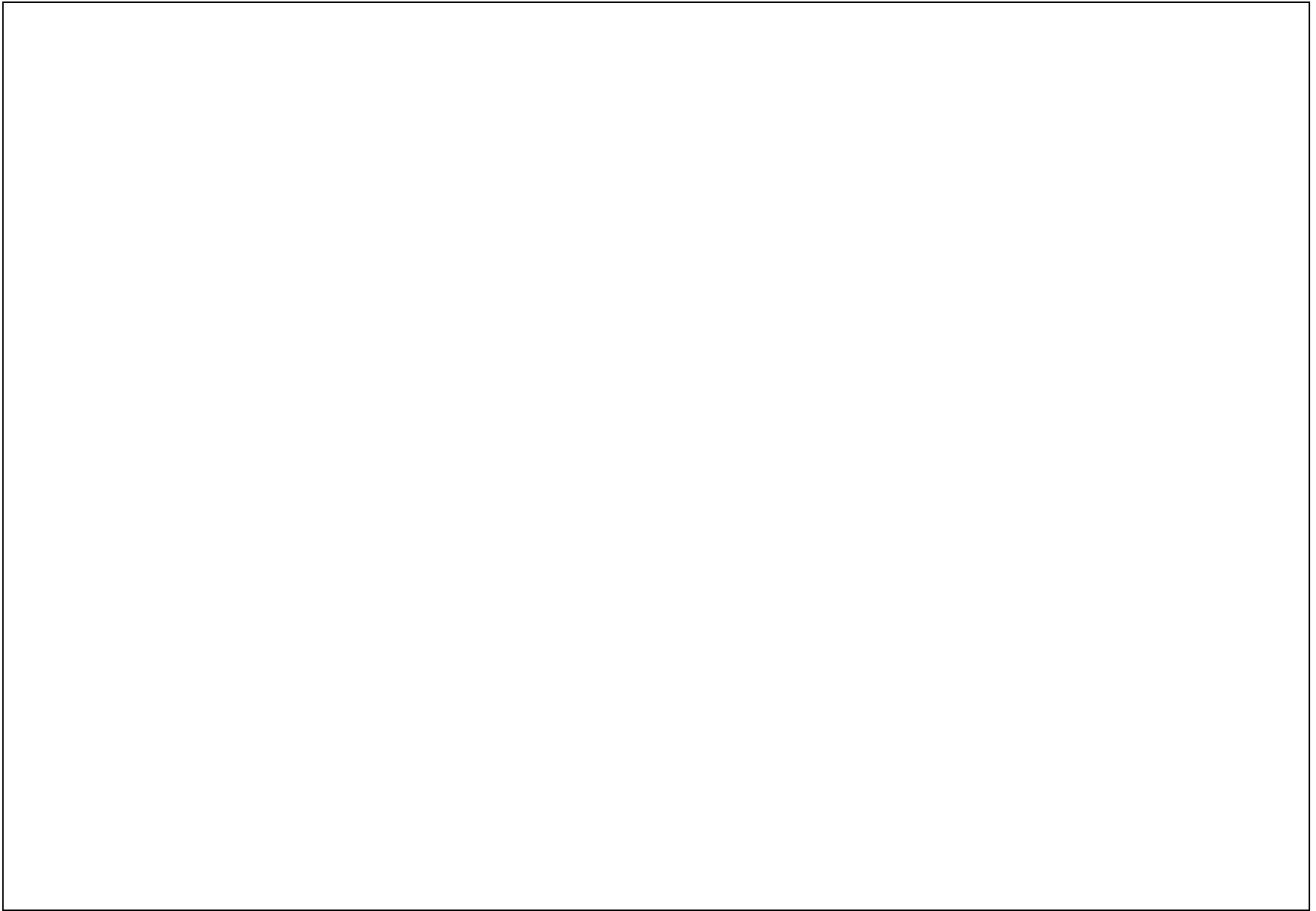


## ELA/Literacy

- **RI.1.1** - Ask and answer questions about key details in a text. (1-LS1-2), (1-LS3-1)
- **RI.1.10** - With prompting and support, read informational texts appropriately complex for grade 1. (1-LS1-2)
- **RI.1.2** - Identify the main topic and retell key details of a text. (1-LS1-2)
- **W.1.7** - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1), (1-LS3-1)
- **W.1.8** - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

## Mathematics

- **1.MD.A.1** - Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)
- **1.NBT.B.3** - Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols  $>$ ,  $=$ , and  $<$ . (1-LS1-2)
- **1.NBT.C.4** - Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- **1.NBT.C.5** - Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- **1.NBT.C.6** - Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)
- **MP.2** - Reason abstractly and quantitatively. (1-LS3-1)
- **MP.5** - Use appropriate tools strategically. (1-LS3-1)



### **Three-Dimensional Teaching and Learning**

In this unit of study, students observe organisms in order to recognize that many types of young plants and animals are like, but not exactly the same as, their parents. Students also observe how organisms use their external parts to help them survive, grow, and meet their needs, and how the behaviors of parents and offspring help offspring survive. Throughout the unit, students will look for patterns; obtain, evaluate, and communicate information; and construct explanations.

People look for patterns in the natural world and use these patterns as evidence to describe phenomena. Students begin this unit by observing and comparing external features of organisms, looking for patterns in what they observe. They will need opportunities to observe a variety of plants and animals in order to look for similarities and differences in their features. For example, when comparing the shape, size, color, or number of leaves on plants, students begin to notice that plants of the same kind have leaves that are the same shape and color, but the leaves of one plant may differ from another in size or number. When comparing body coverings; number, size, and type of external features (legs, tail, eyes, mouth parts); body size, body coloring, or eye color of animals, students learn that animals of the same kind have the same type of body covering and the same number and types of external features, but the size of the body, the size of external features, body color, and/or eye color of individuals might differ. Making observations like these helps students recognize that young plants and animals look very much, but not exactly, like their parents, and that even though individuals of the same kind of plant or animal are recognizable as similar, they can also vary in many ways.

In addition to observing and documenting similarities and differences in the external features of organisms, students also need opportunities to make direct observations, read texts, or use multimedia resources to determine patterns in the behaviors of parents and offspring that help offspring survive. While both plants and animals can have young, it is the parents of young animals who might engage in behaviors that help their young survive. Some examples of these patterns of behaviors could include the signals that offspring make, such as crying, cheeping, and other vocalizations, and the responses of parents, such as feeding, comforting, and protecting their young.

### **Prior Learning**

- How plants and animals can change the environment they live in.
- The relationship between plants and animals and the environment they live in.
- What animals, plants and humans need to survive.
- All living things need water to survive.
- Parts of plants

**Part A: How are young plants and animals alike and different from their parents?**

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</li> <li>● Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.</li> <li>● Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.</li> </ul>	<p>Students who understand the concepts are able to:</p> <ul style="list-style-type: none"> <li>● Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>● Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.</li> <li>● Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.               <ul style="list-style-type: none"> <li>○ Examples of patterns could include features plants or animals share.</li> <li>○ Examples of observations could include that leaves from the same kind of plant are the same shape but can differ in size and that a particular breed of puppy looks like its parents but is not exactly the same.</li> </ul> </li> </ul>

**Part B: What types (patterns) of behavior can be observed among parents that help offspring survive?**

Concepts	Formative Assessment
<ul style="list-style-type: none"> <li>● Scientists look for patterns and order when making observations about the world.</li> <li>● Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</li> <li>● Adult plants and animals can have young.</li> <li>● In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring survive.</li> </ul>	<p>Students who understand the concepts are able to:</p> <ul style="list-style-type: none"> <li>● Observe and use patterns in the natural world as evidence and to describe phenomena.</li> <li>● Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.</li> <li>● Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</li> </ul> <p>Examples of patterns of behaviors could include:</p> <ul style="list-style-type: none"> <li>○ The signals that offspring make, such as crying, cheeping, and other vocalizations.</li> <li>○ The responses of the parents, such as feeding, comforting, and protecting the offspring</li> </ul>

**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list. (See NGSS Appendix D)*

- *(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: [All Standards, All Students/Case Studies](#) for vignettes and explanations of the modifications.)*
- Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.

- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies).
- Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Use project-based science learning to connect science with observable phenomena.
- Structure the learning around explaining or solving a social or community-based issue.
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Restructure lesson using UDL principals ([http://www.cast.org/our-work/about-udl.html#.VXmoXcfD\\_UA](http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)).

### **Leveraging English Language Arts/Literacy and Mathematics**

#### ***English Language Arts***

- To integrate English Language Arts into this unit, students need opportunities to read informational texts to gather information about traits and behaviors of organisms. With adult guidance, they identify the main topic, retell key details from texts, and ask and answer questions about key details. Students should also participate in shared research and writing projects. They can gather information from a variety of preselected, grade-level-appropriate texts and resources and use that information to answer questions about traits and behaviors of organisms. In pairs or small groups, students can use pictures and words to create simple books that describe features that parents and offspring share or behaviors that parents and offspring exhibit that help offspring survive.

#### ***Mathematics***

- To integrate mathematics into this unit, students reason abstractly and quantitatively and use appropriate tools strategically as they collect and organize data, and use it to solve problems. For example, when students gather information about the shape, size, color, and number of leaves on plants, they can:
  - Use grade-level-appropriate tools and strategies to measure, compare, and order leaves by length.
  - Organize data (e.g., number of leaves) into simple graphs or tables, and then use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to make comparisons.
  - Use drawings and equations as they solve problems (e.g., more or less, total amount, how many in each).

### **Samples of Open Education Resources for this unit:**

- **[The Emperor Penguin](#)** :The students will learn about parenting behaviors help the babies to survive. The class reads a book or watches a video about Emperor Penguins and use what they learn to act out how penguins care for the eggs. (1-2 days)
- **[How do animals move?](#)** The students will learn how animals movements help them survive in their habitats. Students will jump, run slither etc. (1-2 days)
- **[Baby animals and their moms](#)**; Students will watch video showing different baby animals with their mothers. They will learn how different animals learn very important things from their parents and how this helps them survive.(1-2 days)
- **[Bee-ing an Engineer](#)**; The students learn about pollution and how that affects plants. The students are able to make and design a stick that can pollute flowers in the same way a bee does. (2-3 days)
- **[Stem Lab: Designing a Nest](#)**; Students design a bird's nest to see if it compares to the real thing. Students will watch video or how the birds build their nests and attempt to make their own. Then the students will evaluate and communicate how they came up with their designs and ideas. (2-4 days)
- **[Persuasive Writing - "Who's the Best Parent?" - Part 1](#)**; SWBAT create a written opinion to the question, "Who is the best animal parent?" This written piece will include scientific evidence and will be presented in a written piece that includes a lead sentence, quality reasons and a closing. (2-3 days)
- **[Chip off the old Block](#)**; In this lesson students compare adult plants with young plants and then match pictures of adult animals with their young. They then are asked to identify specific physical traits of plants and animals that can be used to identify them.

## Appendix A

<b>1st Grade</b> <b>Unit 1: Physical Science; Waves and Their Applications in Technologies for Information Transfer</b> (20 Instructional Days)	
Rationale: Students will begin to understand how light travels and communication can be made with sounds and light. Content Statement: Students will learn about physical science properties such as vibrations and how they make sounds. They will learn about how light travels differently through different kinds of materials and when blocked it makes a shadow. They will also know how people and animals communicate through sounds and light.	
Overarching Essential Questions	Overarching Enduring Understandings
How is sound made?  How does light travel?  How can we communicate using sounds and light?	Vibrating matter can make sounds.  Some materials allow light to pass through, others block all the light and make shadows.  People can communicate through light signals or patterns of sound.
Essential Questions	Enduring Understandings
How is sound made? How do sound waves work? How does sound travel? How can we use flashlights to make light travel? How can we see when there is no light?	A vibration of an object makes sound. Sound waves are vibrations that travel through objects. Sound can travel through all matter in many directions. Flashlights are resources to show that light travels in waves and can pass through some (but not all) objects.



<p>How is a shadow made?</p> <p>How can shadows change?</p> <p>How can we communicate with sounds?</p> <p>Why do some sounds travel farther than others?</p>	<p>Objects in darkness can be seen when illuminated.</p> <p>When an object blocks light, it casts a shadow.</p> <p>Shadows can change as the position of the sources of light changes.</p> <p>Animals communicate with sounds, from echos to songs.</p>
<b>Student Learning Experiences and Formative Assessments</b>	
	NGSS <i>Standards</i>
<p><b>Va Va-Vibrations:</b>Students will be creating instruments that will allow them to observe, explore and investigate the patterns of sound waves (pitch and volume). They will plan out a design for their instrument and then create it using classroom materials. (2-3 days)</p> <p><a href="http://betterlesson.com/lesson/614793/va-va-vibrations">http://betterlesson.com/lesson/614793/va-va-vibrations</a></p>	<b>1-PS4-1</b>
<p><b>Are you Afraid of the Dark?:</b>Using cause and effect, the students will demonstrate an understanding of objects illuminating using an external light source. Students will record their observations and evidence in their scientific journals. (2-3 days)</p> <p><a href="http://betterlesson.com/lesson/627219/are-you-afraid-of-the-dark">http://betterlesson.com/lesson/627219/are-you-afraid-of-the-dark</a></p>	<b>1-PS4-2</b>
<p><b>American Flag Shadow:</b> Students can make observations to construct an evidence based account that objects in darkness can be seen only when illuminated. Students can plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. (2-days)</p> <p><a href="http://www.hookedonscience.org/files/2016_Experiment_Archive_American_Flag_Shadow.pdf">http://www.hookedonscience.org/files/2016_Experiment_Archive_American_Flag_Shadow.pdf</a></p>	<b>1-PS4-3</b>
<p><b>STEM and Sound:</b> This lesson is designed to allow my students as much time as needed to analyze and test ways to solve a communication problem. They are given supplies to make a way to communicate. (2 days)</p> <p><a href="http://betterlesson.com/lesson/622032/stem-sound-day-1">http://betterlesson.com/lesson/622032/stem-sound-day-1</a></p>	<b>1-PS4-4</b> <b>1-PS4-1</b> <b>K-2-ETS1-1</b>
<p><b>Sound Devices; Building and Testing:</b> SWBAT construct and test a tool to transmit sounds. 2 part lesson; plan/ discuss and explore/ build. (2 days) <a href="http://betterlesson.com/lesson/633823/sound-devices-building-and-testing">http://betterlesson.com/lesson/633823/sound-devices-building-and-testing</a></p>	<b>1-PS4-1</b>

	<p>1-PS4-2</p> <p>1-PS4-3</p> <p>1-PS4-4</p>
<p><b>The Dark Side:</b> Students will conduct an investigation to determine that without light, we cannot see.  <a href="http://www.livebinders.com/play/play?id=1176282#anchor">http://www.livebinders.com/play/play?id=1176282#anchor</a></p>	<p>1-PS4-1</p> <p>1-PS4-2</p> <p>1-PS4-3</p> <p>1-PS4-4</p>

**Summative (Benchmark) Assessment**

Labs; students will be able to observe and describe what is going on in the investigation. They will be able to explain how a material is making sounds through vibrations.

Observations; students will be able to observe and describe what is going on in the investigation. They will be able to identify what is happening with keys words and concepts. They will be able to describe what is happening using vocabulary words that were taught.

-Written Assessment; students will be able to describe and fill out lab forms that show their understanding of the materials being used and what the materials are doing during the experiments.

-Journals; Students will be able to collect and record observations when doing experiments about what causes materials to vibrate as well as what materials cause sound.

**Embedded English Language Arts/Literacy and Mathematics**

## ELA/Literacy

- **SL.1.1 - Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.** (1-PS4-1), (1-PS4-2), (1-PS4-3)
- **W.1.2 - Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.** (1-PS4-2)
- **W.1.7 - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions).** (1-PS4-1), (1-PS4-2), (1-PS4-3), (1-PS4-4)
- **W.1.8 - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.** (1-PS4-1), (1-PS4-2), (1-PS4-3)

## Mathematics

- **1.MD.A.1 - Order three objects by length; compare the lengths of two objects indirectly by using a third object.** (1-PS4-4)
- **1.MD.A.2 - Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.** (1-PS4-4)
- **MP.5 - Use appropriate tools strategically.** (1-PS4-4)

## Three-Dimensional Teaching and Learning

### Science and Engineering Practices

#### Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce evidence to answer a question. (1-PS4-1),(1-PS4-3)

#### Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

### Disciplinary Core Ideas

#### PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

#### 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)

**PS4.C: Information Technologies and Instrumentation**

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

**Crosscutting Concepts**

**Cause and Effect**

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)

**Connections to Engineering, Technology,  
and Applications of Science**

**Influence of Engineering, Technology, and Science, on Society and the Natural World**

- People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

**Prior Learning**

- Matter; Solid, Liquid and Gases
- Push and Pull
- 5 senses: our sense of sight.
- Effects of sunlight

**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

**Special Needs:**

Students are engaged in small group work, where students of differing abilities and learning styles should be grouped together. Students act as peer coaches to support students with special needs.

**ELL:**

Allow English Language Learners to play a very active role in selecting their hotspots to study. Many students' families may have immigrated from countries or regions that feature hotspots. The process of sharing their own perspective or cultural ties to their native region's biodiversity is invaluable to the group's work.

**Gifted Learners:**

Offer scientific journal articles as sources for research to gifted students. The vocabulary and writing style is very advanced, but gifted students might be able to

garner the needed information and data from these primary sources.

Mainstream Learners:

Throughout the unit during class time, plan and hold small learning sessions/work groups where students can selectively attend to learn more about a specific topic. Hold these sessions often, changing the topic every week. Topics can include, but not limited to using maps, planning an interview, interpreting scientific data, reading graphs and charts, etc. Allow students to select the sessions they would like to attend, based on their perceived need, and they should plan the sessions into their research schedule ahead of time.

#### Samples of Open Education Resources for this unit:

Websites:

[http://betterlesson.com/next\\_gen\\_science](http://betterlesson.com/next_gen_science)

[Stem4fun](#)

[NSTA Classroom Resources](#)

<https://mysteryscience.com/light/properties-of-light-sound>

<https://www.teachengineering.org/standards/ngss>

<http://www.hookedonscience.org/nextgenerationsciencestandards.html>

<http://www.siemensscienceday.com/activities/hands-on-science-activities.cfm#/physical-science>

<http://www.livebinders.com/play/play?id=1176282>

<http://www.alvordschools.org/cms/lib8/CA01900929/Centricity/Domain/2616/1st%20Grade%20Teachers%20Guide%20Complete.pdf>

<https://www.opened.com/search>

Videos:

Bill Nye Videos; Sound, Light bending and bouncing and waves

Youtube; Sound for Kids: Sound waves and Vibrations

Books:

[Magic School Bus: In the Haunted House - Sound is Vibration](#)

*The Pout-Pout Fish in the Big-Big Dark* by Deborah Diesen

Sounds All Around by Wendy Pfeffer

Light and Sound (Hands on Science) by Jack Challoner

## Appendix

<b>Differentiation</b>	
<b>Enrichment</b>	<ul style="list-style-type: none"><li>● Utilize collaborative media tools</li><li>● Provide differentiated feedback</li><li>● Opportunities for reflection</li><li>● Encourage student voice and input</li><li>● Model close reading</li><li>● Distinguish long term and short term goals</li></ul>

<b>Intervention</b>	<ul style="list-style-type: none"> <li>● Utilize “skeleton notes” where some required information is already filled in for the student</li> <li>● Provide access to a variety of tools for responses</li> <li>● Provide opportunities to build familiarity and to practice with multiple media tools</li> <li>● Leveled text and activities that adapt as students build skills</li> <li>● Provide multiple means of action and expression</li> <li>● Consider learning styles and interests</li> <li>● Provide differentiated mentors</li> <li>● Graphic organizers</li> </ul>
<b>ELLs</b>	<ul style="list-style-type: none"> <li>● Pre-teach new vocabulary and meaning of symbols</li> <li>● Embed glossaries or definitions</li> <li>● Provide translations</li> <li>● Connect new vocabulary to background knowledge</li> <li>● Provide flash cards</li> <li>● Incorporate as many learning senses as possible</li> <li>● Portray structure, relationships, and associations through concept webs</li> <li>● Graphic organizers</li> </ul>
<b>21st Century Skills</b>	
<ul style="list-style-type: none"> <li>● Creativity</li> <li>● Innovation</li> <li>● Critical Thinking</li> <li>● Problem Solving</li> <li>● Communication</li> <li>● Collaboration</li> </ul>	

## Integrating Technology

- Chromebooks
- Internet research
- Online programs
- Virtual collaboration and projects
- Presentations using presentation hardware and software

### 1st Grade

#### Unit 2: Earth/ Space Science; Space System: Patterns and Cycles (20 Instructional Days)

Rationale: Students will begin to understand patterns of the sun and the moon as well as be able to compare the amount of daylight in winter to the amount in spring or fall. It is important for students to understand why the sun, moon, and the stars are important.

Content Statement: Students will learn about Earth/ Space science properties such as patterns in the sun, moon and stars as well as how different times of the year effect the amount of sunlight in a day. The students will learn why there are patterns and why the moon and sun move across the sky. They will learn about why stars are only visible at night and why seasonal patterns and changes affect the amount of sunlight we get in a day.

#### Overarching Essential Questions

Why does the sun and moon move?  
 Why do we have seasons?  
 Why do we have day and night?

Essential Questions

#### Overarching Enduring Understandings

- The earth rotates to the east and because of this the sun and moon make their way east across the sky throughout the day.
- The earth rotates throughout the year and depending on how close or far the earth is to the sun determines the weather/ seasons.
- Day and night are caused by the sun and the rotation of the Earth.

Enduring Understandings



<p>Why are stars only visible at night?</p> <p>How does the sun and the moon move through the sky?</p> <p>How does weather change from season to season?</p> <p>How are night and day different?</p> <p>Why do we need sun?</p> <p>Why does the moon shine and change shape?</p>	<ul style="list-style-type: none"> <li>- During the day the our brightest star the sun is so bright that you cannot see the dimmer stars until nighttime.</li> <li>- The earth rotates to the east and because of this the sun and moon make their way east across the sky throughout the day.</li> <li>- The earth rotates throughout the year and depending on how close or far the earth is to the sun determines the weather/ seasons.</li> <li>- The sun shines on various parts of the earth during a 24 hour period causing night and day.</li> <li>- All living things need energy which some from the sun.</li> <li>- The phases of the moon are caused by the light from the sun.</li> </ul>
<b>Student Learning Experiences and Formative Assessments</b>	
<p>List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).</p>	<p>NGSS <i>Standards</i></p>
<p><u>Objects in the Sky</u>; students begin to learn how to observe and describe what the sky looks like at different times of the day. Students will be able to identify the differences between objects that are common during the day and at night (2-3 days) <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=508">http://ngss.nsta.org/Resource.aspx?ResourceID=508</a></p>	<p><a href="#">1-ESS1-1</a></p>
<p><u>Observing the Sun</u>; The students make a sun tracker and are able to observe and record where the sun is located in the sky at certain times of the day. They can use their students journals for this or separate pieces of paper. (1-2 days) ; <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=420">http://ngss.nsta.org/Resource.aspx?ResourceID=420</a></p>	<p><a href="#">1-ESS1-1</a></p>
<p><u>The Dynamix Trio</u>; students will learn about the stars, planets and moons in our solar system and how they are all connected. Students will work in groups to create a solar system. <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=205">http://ngss.nsta.org/Resource.aspx?ResourceID=205</a></p>	<p><a href="#">1-ESS1-1</a></p>
<p><u>The Predictable patterns of the sun and the seasons</u>; The students will discover the relationship between the days getting longer and the season summer that is coming. Students will make graphs and be able to interpret what they findings are. (2-3 days) <a href="https://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons">https://betterlesson.com/lesson/635856/the-predictable-patterns-of-the-sun-and-the-seasons</a></p>	<p><a href="#">1-ESS1-2</a></p>
<p><u>Seasons</u>; Students will be able to describe seasons in detail and create a project based off the information they learned or know. Students will work on this with partners. (1-2 days) <a href="https://betterlesson.com/lesson/633366/seasons">https://betterlesson.com/lesson/633366/seasons</a></p>	<p><a href="#">1-ESS1-2</a></p>

<p><u>It's a Pattern! The Moon's phases</u>: The students will learn about the different phases of the moon in a fun and interactive way using oreos. Students will learn the different patterns of the moon as well. (2-3 days)</p> <p><a href="https://betterlesson.com/lesson/615207/it-s-a-pattern-the-moon-s-phases">https://betterlesson.com/lesson/615207/it-s-a-pattern-the-moon-s-phases</a></p>	<p><a href="#">1-ESS1-1</a></p>
<p><u>Why does the sun move across the sky?</u>: Students will be able to use a model of the sun to observe the rotational patterns that make day and night. (2-3 days)</p> <p><a href="https://betterlesson.com/lesson/635103/why-does-the-sun-move-across-the-sky">https://betterlesson.com/lesson/635103/why-does-the-sun-move-across-the-sky</a></p>	<p><a href="#">1-ESS1-1</a> <b>K-2-ETS1-1</b></p>

**Summative (Benchmark) Assessment**

**Labs:** Students will be able to observe and describe what is going on in the investigation. They will be able to explain the movements of the sun and moon and why it is so important for those movements. They will also be being about to explain the phases of the moon and why seasons change.

**Observations:** Students will be able to observe and describe what is going on in the investigation. They will be able to identify what is happening with keys words and concepts. They will be able to describe what is happening using vocabulary words that were taught.

**Written Assessment:** Students will be able to describe and fill out lab forms that show their understanding of the materials being used and what the materials are doing during the experiments.

**Journals:** Students will be able to collect and record observations when doing experiments about what causes the seasons to change, the phases of the moon and the differences between day and night.

**Embedded English Language Arts/Literacy and Mathematics**

### ELA/Literacy

- **W.1.7** - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-ESS1-1), (1-ESS1-2)
- **W.1.8** - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1), (1-ESS1-2)

### Mathematics

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

## Three-Dimensional Teaching and Learning

### Science and Engineering Practices

#### Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

#### Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

### Disciplinary Core Ideas

#### ESS1.A: The Universe and Its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

#### ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

### Crosscutting Concepts

#### Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1), (1-ESS1-2)

#### Connections to Nature of Science

##### Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

### Prior Learning

- Seasons; winter, spring, summer and fall
- Identify the sun, moon and stars
- Daytime and Nighttime

**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

**Special Needs:**

Students are engaged in small group work, where students of differing abilities and learning styles should be grouped together. Students act as peer coaches to support students with special needs.

**ELL:**

Allow English Language Learners to play a very active role in selecting their hotspots to study. Many students' families may have immigrated from countries or regions that feature hotspots. The process of sharing their own perspective or cultural ties to their native region's biodiversity is invaluable to the group's work.

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**Samples of Open Education Resources for this unit:**

**Books:**

- “The Mystery of the Missing Hummingbirds”- students can learn about seasonal migration
- “Next Time you see a Sunset”- everyday phenomena of sunsets and sunrises.
- “Sun up, Sun Down”- Gail Gibbons
- “ The Sun is my favorite star”- Frank Asch

- "Where does the sun go" - Gary Craig

- "So that's how the moon changes shape!" - Allan Fowler

### **Videos:**

Bill Nye the Science Guy;

- Explains the Seasons
- The Moon

Day and Night Explanation- [https://www.youtube.com/watch?v=hWkKSki3gkU&list=PL2VSt\\_94tFOtbOGBMGjn2JEx7o6iDALyu](https://www.youtube.com/watch?v=hWkKSki3gkU&list=PL2VSt_94tFOtbOGBMGjn2JEx7o6iDALyu)

All about the Sun- <https://www.youtube.com/watch?v=VkW54j82e9U>

Mother nature: The Four seasons science video- <https://www.youtube.com/watch?v=It5hUpHpcbQ>

Phases of the Moon- <https://www.youtube.com/watch?v=f4ZHdzl6ZWg>

### **Websites:**

StoryBots.com - online program to build stories about different topics. They have outer space songs that are catchy with a lot of information in them.

[http://betterlesson.com/next\\_gen\\_science](http://betterlesson.com/next_gen_science)

[Stem4fun](#)

[NSTA Classroom Resources](#)

<https://www.teachengineering.org/standards/ngss>

<http://www.hookedonscience.org/nextgenerationsciencestandards.html>

<http://interactivesites.weebly.com/earth-moon-and-sun.html>

<http://www.teacherplanet.com/node/513>

[http://www.kidsastronomy.com/our\\_sun.htm](http://www.kidsastronomy.com/our_sun.htm)

<http://www.siemensstemday.com/educators/activities?c=1&g=5>

<http://www.livebinders.com/play/play?id=1176282>

[https://www.opened.com/search?grade=1&standard=1.ESS1.1\\_1.ESS1.2](https://www.opened.com/search?grade=1&standard=1.ESS1.1_1.ESS1.2)

## Appendix

<b>Differentiation</b>	
<b>Enrichment</b>	<ul style="list-style-type: none"><li>● Utilize collaborative media tools</li><li>● Provide differentiated feedback</li><li>● Opportunities for reflection</li><li>● Encourage student voice and input</li><li>● Model close reading</li><li>● Distinguish long term and short term goals</li></ul>
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<b>ELLs</b>	<ul style="list-style-type: none"> <li>● Pre-teach new vocabulary and meaning of symbols</li> <li>● Embed glossaries or definitions</li> <li>● Provide translations</li> <li>● Connect new vocabulary to background knowledge</li> <li>● Provide flash cards</li> <li>● Incorporate as many learning senses as possible</li> <li>● Portray structure, relationships, and associations through concept webs</li> <li>● Graphic organizers</li> </ul>
<b>21st Century Skills</b>	
<ul style="list-style-type: none"> <li>● Creativity</li> <li>● Innovation</li> <li>● Critical Thinking</li> <li>● Problem Solving</li> <li>● Communication</li> <li>● Collaboration</li> </ul>	
<b>Integrating Technology</b>	
<ul style="list-style-type: none"> <li>● Chromebooks</li> <li>● Internet research</li> <li>● Online programs</li> <li>● Virtual collaboration and projects</li> <li>● Presentations using presentation hardware and software</li> </ul>	



## 1st Grade

### Unit 3: Life Science/Structure, Function and Information Processing

(20 Instructional Days)

Rationale: Students will begin to understand patterns of animals and their offspring and what they need to do to survive. They will understand that plant/animals and their parents are alike but not exactly alike. Students will also understand that the external part of animals and plants help them survive, grow and meet their needs.

Content Statement: Students will learn about Life Science properties such as how animals have to teach their offspring very important skills to survive in their habitats. They will also learn how animals/plants parents are alike in certain ways but that they also have differences. Students will understand that plants/animals external features are their for a reason; to help them grow, survive and meets their needs in the environment that they live in. Students will learn about these features through many different kinds of texts and media.

Overarching Essential Questions	Overarching Enduring Understandings
<p>How do offspring learn from their parents?</p> <p>How does the exterior of a plant or animal affect them?</p>	<ul style="list-style-type: none"> <li>- Offspring learn many different skills from their parents to be able to survive on their own.</li> <li>- Their exterior such as; fur, scales, feathers, shells and thorns help them survive in their environment in many different ways.</li> </ul>
Essential Questions	Enduring Understandings
<p>How do animals move?</p> <p>Why do animals have coverings?</p> <p>Why do animals have to learn from their parents?</p> <p>How are baby animals alike or different from their parents?</p> <p>How do animals survive?</p> <p>Why are some plants different from their parents?</p>	<ul style="list-style-type: none"> <li>- Animals move by walking, running, climbing, swimming and flying.</li> <li>- Animals have different kinds of coverings such as fur, scales, feathers and shells to protect themselves and help them survive in their environment.</li> <li>- Animals need to learn from their parents so they know the skills they will need to survive when they go out on their own.</li> <li>- Some baby animals look like their parents and need their care while others look very different from their parents and are more independent.</li> <li>- Animals need food, water, air and a place to live to survive.</li> <li>- Some plants can have leaves or flowers that are have the same shape are their parents but the size may be different.</li> </ul>
Student Learning Experiences and Formative Assessments	

List and describe the learning experiences that will lead to answers to the essential questions, (the answers to the EQs are the enduring understandings). Some of the experiences will also be formative assessment (how you assess students during active instruction and learning experiences).	NGSS <i>Standards</i>
<b>The Emperor Penguin;</b> The students will learn about parenting behaviors help the babies to survive. The class reads a book or watches a video about Emperor Penguins and use what they learn to act out how penguins care for the eggs. (1-2 days) <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=664">http://ngss.nsta.org/Resource.aspx?ResourceID=664</a>	<a href="#">1-LS1-2</a>
<b>How do animals move?;</b> The students will learn how animals movements help them survive in their habitats. Students will jump, run slither etc. (1-2 days) <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=553">http://ngss.nsta.org/Resource.aspx?ResourceID=553</a>	<a href="#">1-LS1-1</a>
<b>Baby animals and their moms;</b> Students will watch video showing different baby animals with their mothers. They will learn how different animals learn very important things from their parents and how this helps them survive.(1-2 days) <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=507">http://ngss.nsta.org/Resource.aspx?ResourceID=507</a>	<a href="#">1-LS1-2</a>
<b>Bee-ing an Engineer;</b> The students learn about pollution and how that affects plants. The students are able to make and design a stick that can pollute flowers in the same way a bee does. (2-3 days) <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=330">http://ngss.nsta.org/Resource.aspx?ResourceID=330</a>	<a href="#">K-2-ETS1-2</a> <a href="#">1-LS1-1</a>
<b>Leaf it to me;</b> Students participate in a leaf scavenger hunt and create a leaf collection. Through the lesson students identify characteristics such as leaf size, thickness and texture and explore how these characteristics help plants survive in their environment. (1-2 days)	<a href="#">1-LS1-1</a>
<b>Stem Lab: Designing a Nest;</b> Students design a bird's nest to see if it compares to the real thing. Students will watch video or how the birds build their nests and attempt to make their own. Then the students will evaluate and communicate how they came up with their designs and ideas. (2-4 days) <a href="https://betterlesson.com/lesson/630317/stem-lab-designing-a-nest">https://betterlesson.com/lesson/630317/stem-lab-designing-a-nest</a>	<a href="#">K-2-ETS1-2</a> <a href="#">1-LS1-2</a>
<b>Persuasive Writing - "Who's the Best Parent?" - Part 1;</b> SWBAT create a written opinion to the question, "Who is the best animal parent?" This written piece will include scientific evidence and will be presented in a written piece that includes a lead sentence, quality reasons and a closing. (2-3 days) <a href="https://betterlesson.com/lesson/644944/persuasive-writing-who-s-the-best-parent-part-1">https://betterlesson.com/lesson/644944/persuasive-writing-who-s-the-best-parent-part-1</a>	<a href="#">1-LS1-2</a>
<b>Chip off the old Block;</b> In this lesson students compare adult plants with young plants and then match pictures of adult animals with their young. They then are asked to identify specific physical traits of plants and animals that can be used to identify them. <a href="http://ngss.nsta.org/Resource.aspx?ResourceID=190">http://ngss.nsta.org/Resource.aspx?ResourceID=190</a>	<a href="#">1-LS3-1</a>
<b>Plant Secrets;</b> Students will review the life cycle of a plant and then read about different kinds of plants. They write or draw to share ways the young plant and adult plant are similar but not exactly alike.	<a href="#">1-LS3-1</a>

### Summative (Benchmark) Assessment

**Labs:** Students will be able to observe and describe what is going on in the investigation. Students will be able to record and explain the differences between plants/animals and their parents. They will be able to take what they learn and put it in movements and experiments to show understanding of animals survival and features.

**Observations:** Students will be able to observe and describe what is going on in the investigation. They will be able to identify what is happening with keys words and concepts. They will be able to describe what is happening using vocabulary words that were taught.

**Written Assessment:** Students will be able to describe and fill out lab forms that show their understanding of the materials being used and what the materials are doing during the experiments.

**Journals:** Students will be able to collect and record observations when doing experiments about the differences and similarities of animals and their offspring. They will also be about to collect information about the different traits that animals use when teaching their offspring.

### Embedded English Language Arts/Literacy and Mathematics

#### ELA/Literacy

- **RI.1.1** - Ask and answer questions about key details in a text. (1-LS1-2), (1-LS3-1)
- **RI.1.10** - With prompting and support, read informational texts appropriately complex for grade 1. (1-LS1-2)
- **RI.1.2** - Identify the main topic and retell key details of a text. (1-LS1-2)
- **W.1.7** - Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). (1-LS1-1), (1-LS3-1)
- **W.1.8** - With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

#### Mathematics

- **1.MD.A.1** - Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)
- **1.NBT.B.3** - Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols  $>$ ,  $=$ , and  $<$ . (1-LS1-2)
- **1.NBT.C.4** - Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2)
- **1.NBT.C.5** - Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)
- **1.NBT.C.6** - Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

- **MP.2** - Reason abstractly and quantitatively. (1-LS3-1)
- **MP.5** - Use appropriate tools strategically. (1-LS3-1)

### Three-Dimensional Teaching and Learning

#### Science and Engineering Practices

##### Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomenon and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)
- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)

##### Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

##### Connections to Nature of Science

##### Science Knowledge Is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

### **Disciplinary Core Ideas**

#### **LS1.A: Structure and Function**

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

#### **LS1.B: Growth and Development of Organisms**

- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

#### **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)

#### **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)

### **Crosscutting Concepts**

#### **Patterns**

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2), (1-LS3-1)

#### Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

#### Connections to Engineering, Technology, and Applications of Science

#### Influence of Science, Engineering, and Technology on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

#### Prior Learning

- How plants and animals can change the environment they live in.
- The relationship between plants and animals and the environment they live in.
- What animals, plants and humans need to survive.
- All living things need water to survive.
- Parts of plants

**Modifications:** *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

#### Special Needs:

Students are engaged in small group work, where students of differing abilities and learning styles should be grouped together. Students act as peer coaches to support students with special needs.

#### ELL:

Allow English Language Learners to play a very active role in selecting their hotspots to study. Many students' families may have immigrated from countries or

regions that feature hotspots. The process of sharing their own perspective or cultural ties to their native region's biodiversity is invaluable to the group's work.

**Gifted Learners:**

Offer scientific journal articles as sources for research to gifted students. The vocabulary and writing style is very advanced, but gifted students might be able to garner the needed information and data from these primary sources.

**Mainstream Learners:**

Throughout the unit during class time, plan and hold small learning sessions/work groups where students can selectively attend to learn more about a specific topic. Hold these sessions often, changing the topic every week. Topics can include, but not limited to using maps, planning an interview, interpreting scientific data, reading graphs and charts, etc. Allow students to select the sessions they would like to attend, based on their perceived need, and they should plan the sessions into their research schedule ahead of time.

**Samples of Open Education Resources for this unit:**

List Internet Resources, Software, Videos, Books, Guest Speakers, etc. that may be used during the Instructional phase

**Videos:**

10 amazing animal parents: <https://www.youtube.com/watch?v=0auqYct-K9Q>

Bill Nye; Life Cycles

Emperor Penguins; <https://www.youtube.com/watch?v=c7M686pXr6M>

Life Science/ Types of Animal movement; <https://www.youtube.com/watch?v=KRx4FOERb3w>

Brain breaks/ Animals in action; <https://www.youtube.com/watch?v=vVdl60s1mZk>

Animal Exercise; <https://www.youtube.com/watch?v=26guG6wr5so>

**Websites:**

[http://betterlesson.com/next\\_gen\\_science](http://betterlesson.com/next_gen_science)

[Stem4fun](#)

[NSTA Classroom Resources](#)

<https://www.teachengineering.org/standards/ngss>

<http://www.hookedonscience.org/nextgenerationsciencestandards.html>

**Books:**

- “Animals and Their young” : Pamela Hickman
- “Who grows up in the Forest?”: Theresa Longenecker
- “Who grows up in the Snow?” : Theresa Longenecker
- “Who grows up in the Desert?” : Theresa Longenecker
- “Animals raising Offspring” : Wendy Perkins
- “Plant Secrets” : Emily Goodman

## Appendix

Differentiation	
Enrichment	<ul style="list-style-type: none"><li>● Utilize collaborative media tools</li><li>● Provide differentiated feedback</li><li>● Opportunities for reflection</li><li>● Encourage student voice and input</li><li>● Model close reading</li><li>● Distinguish long term and short term goals</li></ul>



<b>Intervention</b>	<ul style="list-style-type: none"> <li>● Utilize “skeleton notes” where some required information is already filled in for the student</li> <li>● Provide access to a variety of tools for responses</li> <li>● Provide opportunities to build familiarity and to practice with multiple media tools</li> <li>● Leveled text and activities that adapt as students build skills</li> <li>● Provide multiple means of action and expression</li> <li>● Consider learning styles and interests</li> <li>● Provide differentiated mentors</li> <li>● Graphic organizers</li> </ul>
<b>ELLs</b>	<ul style="list-style-type: none"> <li>● Pre-teach new vocabulary and meaning of symbols</li> <li>● Embed glossaries or definitions</li> <li>● Provide translations</li> <li>● Connect new vocabulary to background knowledge</li> <li>● Provide flash cards</li> <li>● Incorporate as many learning senses as possible</li> <li>● Portray structure, relationships, and associations through concept webs</li> <li>● Graphic organizers</li> </ul>
<b>21st Century Skills</b>	
<ul style="list-style-type: none"> <li>● Creativity</li> <li>● Innovation</li> <li>● Critical Thinking</li> <li>● Problem Solving</li> <li>● Communication</li> <li>● Collaboration</li> </ul>	

## **Integrating Technology**

- Chromebooks
- Internet research
- Online programs
- Virtual collaboration and projects
- Presentations using presentation hardware and software