First Grade Science Curriculum

Unit: Air & Weather	Time: September-December (June)	Standards:
Essential Questions • How can we compare the number of days of different kinds of weather? • What does the moon look like at different times during a month?	**Enduring Understandings** • Weather conditions change over time. • The moon phases change over the course of a month. The moon can usually be seen at night and sometimes during the day.	1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.

Benchmark Assessment(s)

- **SWBAT create a weather graph to represent different kinds of weather for a period of a month.** Students will be given a graph for the months that the weather will be recorded. Every day a different student will be chosen as the 'meteorologist' to decide what the weather is that day and why. They will be given time to discuss as a group what they think before announcing the weather to the class. They will have the choices of rainy, snowy, overcast, sunny or partly cloudy. They will fill in a box next to the appropriate weather choice. At the end of the month they can compare and contrast each type of weather for the month. (1.ESS1-2)

- **SWBAT observe and record changes in the moon's appearance every day for a month in order to create a moon calendar.** Students will be given a calendar for the month the moon will be observed. Use the US Naval Observatory Website: Current Moon provided under Resources by Investigation on www.fossweb.com to see a picture of the current moon. Students will record the appearance of the moon on their calendars. At the end of the month they will be able to observe how the moon moved through its phases. (1.ESS1-1)

Other Assessments

- ✓ Teacher observations
- ✓ Student journal entries
- ✓ Group and individual participation
- ✓ Investigation I-Checks

Materials

- Foss Science teacher manual
- Weather graph
- Phases of the moon calendar
- Student science journals
- Investigation materials (see teacher manual)
- Foss Science Resources book
- Investigation I-Checks

Date of BOE Approval: August 30, 2018

First Grade Science Curriculum

SUGGESTED ACTIVITIES

- **Foss Air & Weather, Investigation 1: Exploring Air, Part 1: Air Is There** – Students work with a set of objects to see how objects can be moved by and through air.
- **Foss Air & Weather, Investigation 1: Exploring Air, Part 4: Air and Water** – Students put together tubes, a bottle, water, a rubber stopper and two syringes to create a system. They add water and use air pressure to push the water around the system and investigate how bubbles are created by air.
- **Foss Air & Weather, Investigation 2: Observing Weather, Part 2: Measuring Temperature** – Students learn to use a thermometer and take turns measuring and recording the temperature. As a closing activity, visit **www.fossweb.com** and choose the activity What's the Weather? provided under Multimedia. The activity has a bear that needs to dress for the weather outside based on the temperature shown on the thermometer. Students will be able to display their understanding of reading a thermometer and how the temperature relates to the weather.
- **Foss Air & Weather, Investigation 2: Observing Weather, Part 3: Watching Clouds** – Students observe and compare several types of clouds and discuss how they move across the sky. As a closing activity, visit **www.fossweb.com** and choose the activity Cloud Catcher provided under Multimedia. The activity has different clouds move across the screen and students must choose which type of cloud it is; cirrus, cumulus or stratus.
- **Foss Air & Weather, Investigation 2: Observing Weather, Part 4: Measuring Rainfall** – The class discusses the kinds of clouds that bring rain or snow and natural sources of water. Students use a rain gauge to measure rain or snowfall. They are introduced to evaporation and condensation.
- **Phases of the Moon with Oreo Cookies –** Students will re-create the phases of the moon using Oreo cookies.
- **Foss Air & Weather, Investigation 4: Looking for Change, Part 3: Comparing the Seasons** – Each season, the class creates new graphs and compares them with the graphs from the preceding seasons.

REINFORCEMENT

- Read: A Tree for All Seasons by Robin Bernard
- Read: Colors of Weather by Laura Purdie Salas
- Provide students with printed notes, organizers, etc.
- Students can pair-up with partner to share answers to focus questions.

ENRICHMENT

- **Wind Vanes:** Read with the class the article *Understanding the Weather* located in the Science Resources Section on www.fossweb.com. Discuss the tools used by meteorologists. Prepare materials as shown in teacher preparation video 3.4. Students are presented with a simple wind vane design. Install the parts of the vanes with the class to demonstrate the assembly. Ask students to form hypothesis on which way the vane will point. Demonstrate vane and discuss with class test results.

  Extension: Have students create or assemble their own wind vane.

Suggested Websites

- **www.fossweb.com**
- **www.pebblego.com**
- **www.brainpopjr.com**
- **www.discoveryeducation.com**

Suggested Materials

- *Where is Air*
- *Come On, Rain!* by Karen Hesse
- *A Tree For All Seasons* by Robin Bernard
- *A Busy Year* by Leo Lionni
- *Changing Seasons* by Rose Greydanus
- *Mooncake* by Frank Asch
- *Papa, Please Get The Moon For Me* by Eric Carle
- Various informational texts about weather, air and the moon

Cross-Curricular Connections

21st Century Skills – CRP4. Communicate clearly and effectively and with reason.
Technology – 8.1.2.A.5. Enter information into a spreadsheet and sort the information.
SEL – Recognize and identify the thoughts, feelings and perspectives of others.
Language Arts or Math – 1.MD.C.4. Organize, represent and interpret data; ask and answer questions about total number of data points. *(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)*

Date of BOE Approval: August 30, 2018

First Grade Science Curriculum

Unit: Sound & Light	Time: December-March	Standards:
Essential Questions • What causes sound? • How can vibrations be used to communicate? • Can a beam of light be blocked and/or change direction? • Can objects be seen without the presence of light?	**Enduring Understandings** • Vibrating objects cause sound. • Vibrations can be used to communicate by creating a telephone with a cup and string. • Light travels in a straight line but can be blocked or re-directed if an object is put in its way. • Objects can only be seen when illuminated.	1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. 1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. 1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. 1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Benchmark Assessment(s)

- **SWBAT understand that vibrating materials make sound and sound always comes from a vibrating object.** Students will discuss common animals, machines and objects that make sound. They will then use cups with rubber bands and flat sticks to produce sound. They will focus on the source of the sound and find that it is vibrating Students will also explore a table fiddle to confirm their observations. They find that sound always come from objects that are vibrating and that vibrating objects always make sound. Sound can be stopped by stopping the object's vibration. (1.PS4-1)

- **SWBAT build working telephones with cups and string to communicate over a distance.** Students will be posed with the problem of how to communicate over a distance and can they create a tool to assist with this problem. Students will understand that they need a telephone. They will be creating telephones with cups and string. They will work with groups to construct

Other Assessments

- ✓ Teacher observations
- ✓ Student journal entries
- ✓ Group and individual participation
- ✓ Investigation I-Checks

Materials

- Foss Science teacher manual
- Student science journals
- Investigation materials (see teacher manual)
- Foss Science Resources book

Date of BOE Approval: August 30, 2018

First Grade Science Curriculum

their telephones. Each group will be given different materials to work with in order to decide which is the most effective. For example, some groups will have large cups, some will have small cups, some will have thin string, and some will have thick string. After building and experimenting, each group will share how their system worked, and the class will discuss which seemed to be the most effective. (1-PS4-4, K-2-ETS1-1, K-2-ETS1-3)

- **SWBAT determine the effect of placing objects made with different materials in the path of a beam of light.** Students will work in a group. They will see what happens when they place the given objects over the lens of a flashlight. Students find that opaque materials block the light. Transparent materials allow light to travel through the materials. Translucent objects allow some of the light to travel through. The darkest shadows are made by objects that are opaque, whereas translucent objects create lighter shadows. (1-PS4-3)

- **SWBAT discover that light is needed in order to see objects.** Students will sit with a partner in a dark room and attempt to read a book. They will have no source of light in order to see. After giving students time to attempt reading, the teacher will pose a question, asking students if they are having difficulty and what they need. Students should understand that they need a light source, which can include flashlights, or turning on the classroom lights. The students will then get flashlights and read with a partner. (1-PS4-2)

- Investigation I-Checks

SUGGESTED ACTIVITIES

- **FOSS Sound & Light, Investigation 1: Sound & Vibrations, Part 2: Hearing Sounds** – Students practice sound discrimination by listening to the sounds that object make when dropped. They work with a partner to identify objects by the properties of their sound. They investigate how tuning forks make sounds and observe the effect of the sound on other objects. At the end of the FOSS lesson, utilize the sound cards provided under Multimedia on www.fossweb.com as a supplement. Pull up the sound cards on the smartboard, but hide the visual display from the students, so they can only hear the sound. Play the sound card and have students guess what the sound is.
- **FOSS Sound & Light, Investigation 2: Changing Sound, Part 1: Changing Volume** – Students investigate two systems: the one-string guitar and the xylophone. They confirm that sounds come from objects that are vibrating and sound can be stopped by stopping the object's vibration. The added concept is that sounds can differ in volume over a range from soft to loud.
- **FOSS Sound & Light, Investigation 2: Changing Sound, Part 2: Changing Pitch** – Students observe the volume and pitch of the table fiddle. They use the one-string guitar and xylophone to change

REINFORCEMENT

- Read: Sounds All Around by Holly Keller
- Read: The Magic School Bus in the Haunted Mansion by Joanna Cole
- Provide students with printed notes, organizers, etc.
- Display "What Air Uses" pictures - Foss Teacher Page/Digital Only Resources /Image Gallery

ENRICHMENT

- **Dark Boxes**: Prepare the dark boxes as shown in the teacher preparation video 4.3. Have students discuss a source of sound and a sound receiver. Use example of a radio as a sound source and the human ear as the sound receiver. Then ask students to give examples of light sources and receivers (detectors). Discuss a lamp or flash light as a light source and

First Grade Science Curriculum

the pitch of the sound. Students record their understanding of the relationship between length and pitch. They apply their understanding of pitch and volume to a kalimba.

- **FOSS Sound & Light, Investigation 2: Changing Sound, Part 3: Spoon-Gong Systems -** Students use a spoon-gong system to review their understanding of how to produce sound. Students will develop a simple model or drawing of how sound travels within the spoon-gong system.
- **FOSS Sound & Light, Investigation 3: Light & Shadows, Part 1: Making Shadows** – Students use a flashlight as a light source to find out what happens when you block light with an object. They determine how to position the light source relative to the object and observe the resulting shape and size of the shadow. They observe what happens to the shadow when the object gets closer to and farther away from the light source.
- **FOSS Sound & Light, Investigation 3: Light & Shadows, Part 2: Sun and Shadows** – Students continue to explore how to make shadows, this time using a natural source of light, the Sun. They go outside to look for shadows and determine what objects are creating those shadows. They work as individuals and teams to meet shadow challenges.
- **FOSS Sound & Light, Investigation 4: Light & Mirrors, Part 1: Mirrors and Light Beams** – Students are introduced to a mirror as an opaque object with a reflective surface. They use a flashlight and mirror to redirect a beam of light from their desks to the ceiling. Students go outside and use the mirror to redirect sunlight onto a wall.
- **FOSS Sound & Light, Investigation 4: Light & Mirrors, Part 2: Reflections** – Students explore how they can use a mirror to see things behind them, to the side of them, and on their face. They use a mirror to study and make a drawing of their own eyes. Students discuss photographs that have images reflected from smooth surfaces such as mirrors, glass and water.

eyes as a light receiver. Show students the short video *Light and Darkness in Resources 4.3*. Discuss any sources of light on the video and light receivers or detectors. Using the dark boxes, have students make observations on the sources of light sources that their eyes or light detectors receive before and after the use of the flashlight.

Extension: Discuss with class what sources of light can their eyes or light detectors during a walk outside at night. (example: Light in a Moon vs moonless night)

Suggested Websites

- www.fossweb.com
- www.pebblego.com
- www.brainpopjr.com
- www.discoveryeducation.com

Suggested Materials

- *What Are Light Waves?* by Robin Johnson
- *What Are Shadows and Reflections?* by Robin Johnson
- *What Are Sound Waves?* by Robin Johnson
- *How Does Sound Change?* by Robin Johnson
- *Sounds All Around* by Wendy Pfeffer

Cross-Curricular Connections

21st Century Skills – CRP4. Communicate clearly and effectively and with reason., CRP6. Demonstrate creativity and innovation.
Technology – 8.2.2.C.1. Brainstorm ideas on how to solve a problem or build a product.
SEL – Utilize positive communication and social skills to interact effectively with others.
Language Arts or Math – SL.1.1. Participate in collaborative conversation with diverse partners about grade 1 topics and text with peers and adults in small and larger groups. *(1-PS4-1, 1-PS4-2, 1-PS4-3)*, MP.5. Use appropriate tools strategically. *(1-PS4-4)*

Date of BOE Approval: August 30, 2018

First Grade Science Curriculum

Unit: Plants & Animals

Time: March-June

Standards:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs.

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

K-2ETS1-2. Develop a simple sketch, drawing or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Essential Questions

- What do plants need in order to survive, grow and meet their needs?
- What do animals need in order to survive, grow and meet their needs in their habitat?
- How do plants and animals protect themselves?
- How do parents help their offspring survive?
- Are young plants and animals exactly the same as their parents?

Enduring Understandings

- Plants need air, water, sunlight and space to grow.
- Animals need food, water, air, and sometimes teachers. Their habitat provides what they need.
- Plants and animals protect themselves by using a variety of physical structures.
- Parents help their offspring survive by teaching different behaviors and skills.
- Young plants and animals are not exactly like their parents, but they are the same in some ways.

Benchmark Assessment(s)

- **SWBAT understand and observe that plants need water, air, sunlight and space to grow.** Students plant a miniature lawn in a cup of soil – ryegrass and alfalfa seeds. They draw, compare and record the growth of the two plants over time. Students read that plants need water, air, sunlight and space to grow. (1-LS1-1)

- **SWBAT understand that the basic needs of animals are food, water, shelter and space.** However, also understand that the specific needs of animals vary depending on the type of animal. Read *Plants and Animals around the World* in the Science Resources book. Students will discuss what the plants and animals need to survive as well as the structures that allow it to live in a specific habitat. (1-LS1-1)

- **SWBAT design clothing, equipment or a device for humans to use that mimics an animal's structure.** First, introduce organisms, structures, functions and human design. Make a chart as a whole class and discuss each section. This will help students make connections to how humans mimic nature in their designs. Then, they will work with a partner or in a group to create a piece of clothing, equipment or device for humans to will use structures from organisms in their design. They will label the parts of the design and then write about it.

Other Assessments

- ✓ Teacher observations
- ✓ Student journal entries
- ✓ Group and individual participation
- ✓ Investigation I-Checks

Materials

- Foss Science teacher manual
- Student science journals
- Investigation materials (see teacher manual)
- Foss Science Resources book
- *Animal Teachers* by Janet Halfmann
- *Animal Babies* by Harry McNaught
- Investigation I-Checks

Date of BOE Approval: August 30, 2018

First Grade Science Curriculum

Once they have completed the design, they can then take it a step further and build a model of it. (1-LS1-1, K-2ETS1-2)

- **SWBAT understand what behaviors parents employ to teach their offspring how to survive.** Students will listen to the book *Animal Teachers* by Janet Halfmann and discuss what all the different animals taught their offspring. Students will also work with their buddies from an older grade to research a specific animal and its offspring. They will type a research paper describing what that specific animal needs and how it cares for its offspring. (1-LS1-2)

- **SWBAT understand how young plants and animals are different than their parents.** Read *Animal Babies* by Harry McNaught and make observations about the animal adults and the babies. Compare the physical similarities and differences. Discuss and define the words adult and offspring. Have students complete a comparison chart. Model how to complete the chart first, then have students complete the chart on their own. They can use the text that was read and other resources to assist them. (1-LS3-1)

SUGGESTED ACTIVITIES

- **Foss Plants & Animals, Investigation 1: Grass and Grain Seeds, Part 1: Mowing the Lawn** – After the two kinds of plants have grown tall, students cut the lawn plants to simulate mowing. They observe and make drawings of what happens to the two kinds of plants.
- **Foss Plants & Animals, Investigation 1: Grass and Grain Seeds, Part 1: Wheat** – Students plant seeds of an important grain: wheat. The wheat is carefully positioned in transparent straws with pieces of paper towel to provide support and to water the seeds. Students observe what happens to the plants and record changes by drawing pictures and making bar graphs.
- **Growing Lettuce Plants** – Read a book about plants and seeds. Discuss what students already know about plants and what seeds need to grow. Explain to students that we will be growing lettuce plants to be planted in the school garden. Have students' plant lettuce seeds and make a class calendar entry. Observe again over time and track growth on calendar.
- **Growing Root Vegetables -** Discuss what students already know about plants and what seeds need to grow. Explain to students that some plants do not grow above ground, like their lettuce plants. Read *Tops and Bottoms* by Janet Stevens. Have students' plant the root vegetable seeds (carrots, radishes, potatoes, etc.) and make a class calendar entry. Observe again over time and track growth on the calendar.

REINFORCEMENT

- Show video: All About Animal Life Cycles – Foss Teacher Page/Digital Only Resources/Streaming Videos
- Show video: All About Plant and Animal Interdependency – Foss Teacher Page/Digital Only Resource/Streaming Videos
- Vocabulary Matching Game
- Provide students with printed notes, organizers, etc.

ENRICHMENT

- Plant and Animal Terrarium: Prepare the materials as shown in the teacher preparation video 3.1. Students build a terrarium with soil and the seeds and plants from unit investigations completed. Using the notebook page 5, students construct a map showing the location of the seeds and plants. Model for students the use of the map and key. As a class, students review and list what plants need to live.

  Extension: Review teacher preparation video 3.2. Students add small animals they find in the school garden area.

First Grade Science Curriculum

	Students discuss and list what animals need to live in a terrarium.
Suggested Websites • www.fossweb.com • www.pebblego.com • www.brainpopjr.com • www.discoveryeducation.com	**Suggested Materials** • *Flip, Float, Fly: Seeds on the Move* by JoAnn Early Macken • *The Magic School Bus Plants Seeds: How Seeds Grow* by Joanna Cole • *The Tiny Seed* by Eric Carle • *The Dandelion Seed* by Joseph Anthony • *Tops and Bottoms* by Janet Stevens • *The Mixed Up Chameleon* by Eric Carle • *"How to Hide a"* series by Ruth Heller • National Geographic books about various animals • Various informational texts about plants and animals
Cross-Curricular Connections ***21st Century Skills*** CRP4. Communicate clearly and effectively and with reason. ***Technology*** – 8.1.2.E.1. Use digital tools and online resources to explore a problem or issue. ***SEL*** – Demonstrate an awareness of the expectations for social interactions in a variety of settings. ***Language Arts***– W.1.7. Participate in shared research and writing projects.	