Science/Grade 1

Unit 1:Air and Weather

Subject	Grade	Unit	Suggested Timeline
Science	1	Air and Weather	9 weeks

Grade Level Summary
The first grade science curriculum focuses on giving students a broad understanding of science concepts. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Air and Weather
Sound and Light
Plants and Animals

Unit Title
Air and Weather

Unit Summary

In this module, young students turn their focus to the sky to make observations that will heighten their awareness, curiosity, and understanding of Earth's dynamic atmosphere and the observable patterns of objects in the sky. Students explore the natural world by using simple instruments and calendars to observe and monitor change.

Students build on the science concepts of weather and how the Sun warms Earth's surface, introduced in kindergarten. They use new tools and methods to enrich observations. Students find out about properties of air by exploring how objects interact with air. Students observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. They monitor changes in hours of daylight over the seasons and connect them to changing weather conditions. And they find the Moon in the day and night skies and monitor its movement over the month.

Throughout the **Air and Weather Module**, students engage in science and engineering practices by collecting data and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.

Unit Essential Questions	Key Understandings
1. What is the universe, and what is earth's place in it?	1. The universe is composed of a variety of different objects, which are organized into systems each of which develops according to accepted physical processes and laws.
2. What is air and what are its effects?	2. Air is a gas and is all around us.Air is matter and takes up space.

	Air makes objects move. Air moves from place to place. Moving air is wind. Air resistance affects how things move. Air can be compressed. The pressure from compressed air can move things, including water.
3. What is the weather and how can we describe it through observation?	3. Weather describes conditions in the air outside. Temperature describes how hot or cold the air is. Temperature is measured with a thermometer. Clouds are made of liquid water drops that fall to Earth as rain. Winds move clouds in the sky. The sun and moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night.
4. What is wind and how can we describe it through observation and measurement?	4. Wind is moving air. Meteorologists use wind scales (models) to describe the strength of the wind. Meteorologists use anemometers to measure the speed of the wind. A wind vane points in the direction the wind is coming from. Wind lifts kites up into the sky.
5. How does weather change over time?	5. Daily changes in temperature and weather type can be observed, compared, and predicted over a month. The sun and moon can be observed, compared, and predicted over a month. Each season has a typical weather pattern that can be observed, compared, and predicted. The number of hours of daylight changes predictably through the seasons.

Focus Standards Addressed in the Unit	
3.2.1.B3	Observe and record daily temperatures. Draw conclusions from daily temperature records as related to heating and cooling.
3.3.1.A5	Become familiar with weather instruments. Collect, describe, and record basic information about weather over time.
3.3.2.A4	Explore and describe that water exists in solid (ice) and liquid (water) form. Explain and illustrate evaporation and condensation.
3.3.2.B1	Observe and record • location of the Sun and the Moon in the sky over a day. • changes in the appearance of the Moon over a month. Observe, describe, and predict seasonal patterns of sunrise and sunset.
3.3.3.B1	Relate the rotation of the earth and day/night, to the apparent movement of the sun, moon, and stars across the sky. Describe the changes that occur in the observable shape of the moon over the course of a month.

Important Standards Addressed in the Unit	
Math: CC.2.4.1.A.4	Represent and interpret data using tables/charts.
E&E: 4.2.1.A	Explain the path water takes as it moves through the water cycle.

E&E: 4.1.1.E	Describe the seasons and describe how the change of the season affects living things.
ELA: CC.1.5.1.A	Participate in collaborative conversations with peers and adults in small and larger groups.
ELA: CC.1.5.1.D	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.
ELA: CC.1.5.1.F	Add drawings or other visual displays when sharing aloud to clarify ideas, thoughts, and feelings.

Misconceptions	**Proper Conceptions**
● Primary students have difficulty understanding that air is matter (you can't see, feel, hear, smell, or taste it). ● Primary students may have background vocabulary but not necessarily understand weather patterns and basic principles that control weather. ● Primary students may have difficulty seeing wind as "real."	● Air and other gases are substantial and can be manipulated. ● Students will become familiar with the basic components of weather and changes in weather in that area. ● Wind is real and tangible. It can be measured.

Concepts	**Competencies**	**Vocabulary**
● Observable changes and patterns in the sky are caused by motions in the Earth-moon system. ● The motion of the sun, moon, and earth relates to time (days, months, years). ● Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. ● Seasonal patterns of sunrise and set can be observed, described, and predicted. ● Through the use of tools and/or media, objects can be observed more clearly then with the naked eye.	● Observe and describe patterns of objects in the sky that are cyclic and can be predicted. ● Use observations of stars, moon, and sun in the day and night sky to describe patterns that can be predicted. ● Use observations to compare the motion of the sun, earth, and moon as it relates to time. ● Observe, describe, and predict patterns of daily change in the appearance and visibility of the moon and sun. ● Observe, describe, and predict patterns of seasonal change in the timing and position of sunrise and sunset. ● Use scientific tools such as binoculars or telescopes to enhance observations.	Patterns Changes Describe Moon Observe Pattern Predict Star Sun System Earth Moon Motion Predict Sky Sunrise Sunset Sunrise Sunset Binocular Telescope Tools

Assessments:
*Science Notebook Entries
*Benchmark Assessment Investigation 1 I-Check
*Benchmark Assessment Investigation 2 I-Check
*Benchmark Assessment Investigation 3 I-Check

*Benchmark Assessment Investigation 4 I-Check

Suggested Strategies to Support Design of Coherent Instruction

Charlotte Danielson's Framework for Teaching: Domain 3 Instruction

(Transfer Goals)
Apply Knowledge of science and technology in public discussion on relevant issues in a changing world
Conduct investigations individually and collaboratively to answer questions
Validate scientific claims for validity
Think Systemically

Differentiation:

- Provide multiple means of representation. Give learners various ways to acquire information and knowledge.
- Provide multiple means of action and expression. Offers students alternatives for demonstrating what they know.
- Provide multiple means of engagement. Help learners get interested, be challenged, and stay motivated.

Interdisciplinary Connections:

- See FOSS and Common Core ELA-Grade 1 guide
- See FOSS and Common Core Math-Grade 1 guide

Additional Resources:

- Digital-Only Resources (www.fossweb.com)

Created By: Science Curriculum Committee, first grade teachers

Science / Grade 1

Unit 2:Sound and Light

Subject	Grade	Unit	Suggested Timeline
Science	1	Sound and Light	9 weeks

Grade Level Summary
The first grade science curriculum focuses on giving students a broad understanding of science concepts. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Air and Weather
Sound and Light
Plants and Animals

Unit Title
Sound and Light

Unit Summary
This module provides experiences that help students develop an understanding of how to observe and manipulate sound and light. They explore these dimensions of the natural world using simple tools and musical instruments.

Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from a source to a receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment.

Throughout the **Sound and Light Module**, students engage in science and engineering practices by collecting data and designing and using tools to solve problems and answer questions. Students gain experiences that contribute to their understanding of the crosscutting concepts: patterns; cause and effect; and systems and system models.

Unit Essential Questions	Key Understandings
1. How are waves used to transfer energy?	1. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter.
2. What causes sound and what information does sound give us?	2. Vibrating objects make sound; a sound always comes from a vibrating source. Sounds can convey information.
3. What makes a shadow?	3. Shadows are the dark areas that result when light is blocked.
4. How can we redirect light and communicate using light?	4. Light travels from a source in all directions.

	Light travels in straight lines. A mirror can be used to redirect light. Light can be used to communicate over long distances.

Focus Standards Addressed in the Unit	
3.2.1.B5	Compare and contrast how light travels through different materials. Explore how mirrors and prisms can be used to redirect a light beam.
3.2.3.B5	Recognize that light travels in a straight line until it strikes an object or travels from one material to another.
3.2.4.B5	Demonstrate how vibrating objects make sound and sound can make things vibrate. Demonstrate how light can be reflected, refracted, or absorbed by an object.
3.4.3.D1	Identify people's needs and wants and define some problems that can be solved through the design process.
3.4.3.E4	Recognize that information and communication technology is the transfer of messages among people and/or machines over distances through the use of technology.

Important Standards Addressed in the Unit	
ELA: CC.1.4.1.A	Write informative/explanatory texts to examine a topic and convey ideas and information.
ELA: CC.1.5.1.A	Participate in collaborative conversation with peers and adults in small and larger groups.
ELA: CC.1.5.1.C	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
ELA: CC.1.5.1.F	Add drawings or other visual displays when sharing aloud to clarify ideas, thoughts, and feelings.
Math: CC.2.4.1.A.4	Represent and interpret data using tables/charts.

Misconceptions	**Proper Conceptions**
● Something inherent in an object makes the sound. ● Sound is inside the object. When the object is struck, the sound is released. ● Shadows are a dark shape on a surface. ● The image is in the mirror. ● We can see in the dark.	● Sound can make matter vibrate, and vibrating matter can make sound. ● Sound can make matter vibrate, and vibrating matter can make sound. ● Shadows are the entire space blocked by the light. ● Images are representations. ● Objects can be seen only when light is available to illuminate them.

Concepts	**Competencies**	**Vocabulary**
● Sound can make matter vibrate, and vibrating matter can make sound. ● An object can be seen when light reflected from its surface enters the eyes. ● Light travels from place to place. ● Mirrors can be used to reflect light.	● Plan and conduct investigations to provide evidence that vibrating materials can make sound. ● Investigate and explain that for an object to be seen, light must be reflected off the object and enter the eye.	Investigation Vibration Energy Surface Wave Light beam Mirror Reflection

● Materials allow light to pass through them in varying degrees. ● Objects can be seen if light is available to illuminate the object or if they give off their own light. ● A variety of devices are used to communicate over long distances. ● People depend on various technologies in their lives; human lives would be different without technology.	● Make observations to construct an evidence-based account that light travels from place to place. ● Plan and conduct an investigation to redirect light beams using mirrors. ● Investigate to determine the effect of placing objects made of different materials in a beam of light. ● Make observations to construct an evidence-based account that objects can be seen when illuminated. ● Use tools and materials to design a device that uses light or sound to solve the problem of communicating over a distance. ● Design and build a device that uses light to communicate.	Materials Opaque Translucent Transparent Illuminate Light Communicate Distance Sound Design Device

Assessments:

Science Notebook Entries
Benchmark Assessment Investigation 1 I-Check
Benchmark Assessment Investigation 2 I-Check
Benchmark Assessment Investigation 3 I-Check
Benchmark Assessment Investigation 4 I-Check

Suggested Strategies to Support Design of Coherent Instruction

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Interdisciplinary Connections:

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Additional Resources:

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Created By: Science Curriculum Committee, first grade teachers

Science / Grade 1

Unit 3: Plants and Animals

Subject	Grade	Unit	Suggested Timeline
Science	1	Plants and Animals	10 weeks

Grade Level Summary
The first grade science curriculum focuses on giving students a broad understanding of science concepts. The focus is on physical science, earth science, life/biological science, technology and engineering education, and crosscutting concepts. Students will experience an inquiry based learning approach using observation and scientific method that encourages collaboration, critical thinking, creativity, and communication.

Grade Level Units
Air and Weather
Sound and Light
Plants and Animals

Unit Title
Plants and Animals

Unit Summary
This module provides experiences that heighten students' awareness of the way that plants and animals meet their basic needs. Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom.

Students explore variation in the same kind of organism, including variation between young and adults. They learn about the behaviors of parents to help their young (offspring) survive. And they explore structure and function relationships as they sort different kinds of animal and plant structures.

Throughout the **Plants and Animals Module**, students engage in science and engineering practices by collecting and interpreting data to build explanations and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; and structure and function.

Unit Essential Questions

1. How are the characteristics of one generation passed to the next?
2. How can individuals of the same species and even siblings have different characteristics?

Key Understandings

1. Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents.
2. All organisms are made of cells and can be characterized by common aspects of their structure and functioning.

3. How do organisms live, grow, respond to their environment, and reproduce?	3. Organisms have external structures that help them survive, grow and meet their needs.

Focus Standards Addressed in the Unit	
3.1.4.E	Recognize change in natural and physical systems.
3.3.4.A	Know the similarities and differences of living things.
3.1.4.A	Know that natural and human-made objects are made up of parts.
3.1.2.C	Explain that living things can only survive if their needs are being met.
3.1.KB1	Observe and describe how young animals resemble their parents and other animals of the same kind.
3.1.K.A3	Observe, compare, and describe stages of life cycles for plants and/or animals.

Important Standards Addressed in the Unit	
ELA: CC.1.5.1.A	Participate in collaborative conversations with peers and adults in small and larger groups.
ELA: CC.1.5.1.B	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
ELA: CC.1.5.1.C	Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
ELA: CC.1.5.1.F	Add drawings or other visual displays when sharing aloud to clarify ideas, thoughts, and feelings.
E&E: 4.1.1.A	Identify and describe the basic needs of living things in a terrestrial habitat.
E&E: 4.4.1.C	Describe the life cycles of different plants and animals in a terrestrial habitat.

Misconceptions	**Proper Conceptions**
● For many primary students, food is food, and that is a as far as their consideration of it goes. The connections between product and source are often obscured because most do not obtain food at its source. ● Students will be using scissors to cut up plants, and it is important for them to understand that their actions have a reason beyond the cutting itself: discovering how to generate more plants - creating more life. At other times, it may be appropriate to cut plants to prepare them for food, or to render them useful in other ways for people's survival.	● The investigations in this module could help students begin to make some of those connections, particularly the link between grains and plants. In addition, students will learn how plants are important to animals for nesting and shelter. ● One kind of plant may be sacrificed in order to advance the cause of another kind, such as removing weeds from a garden. It is important to promote an attitude of respect and consideration throughout the investigations involving living organisms - plant, animal, or other. ● Humans have learned some interesting and useful things from observing structures and behaviors in nature.

Concepts	Competencies	Vocabulary
● Organisms have external structures that serve various functions in growth, survival, behavior, and reproduction. ● Organisms have external structures that help them survive, grow and meet their needs. ● Parents and offspring engage in behaviors that help the offspring to survive. ● Every human made product is designed by applying knowledge of the natural world and is built using materials from nature. ● Young animals are very much but not exactly like their parents. Plants also are very much, but not exactly, like their parents. ● Adult plants and animals have young. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring to survive. ● Offspring resemble their parents, but can also vary in many ways. ● Plants and animals have a life cycle.	● Observe and categorize living and nonliving things by external characteristics. ● Make observations and describe the different parts of organisms that help them survive, grow, and meet their needs. ● Design a model that replicates the function of an organism's structure. Observe and determine patterns in behavior of parents and offspring that help offspring survive. ● Classify plants and animals according to physical characteristics they share. ● Use materials to design a solution to a human problem by mimicking how plant or animals use their external parts to help them survive, grow and meet their needs. ● Make observations and to construct an evidence-based account that young plants and animals are alike but not exactly like their parents. ● Note patterns in characteristics or behaviors that appear in adult and offspring (e.g. hair color, eye color,). ● Observe and compare the stages of life cycles of organisms (plants & animals).	Organism Structures Grow Movement Observations Parts (roots, leaves, flowers, stems, fruit) Reproduce Survival Survive Behavior Model Observe Classify Physical characteristic Mimic Problem Solution Similar Vary Offspring Patterns Characteristics Evidence Inherit Parents Plants Animals Life cycles

Assessments:

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*Benchmark Assessment Investigation 2 I-Check
*Benchmark Assessment Investigation 3 I-Check
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