

Course Name:	First Grade Science		
Credits:	n/a		
Prerequisites:	n/a		
Description:	Science topics including Sound and Light, Air and Weather, and Plants and Animals.		
Academic Standards:	Next Generation Science Standards		
Units:	Unit Length:	Unit Standards:	Unit Outcomes:
Sound and Light	1st Quarter	<p>I can plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p> <p>I can make observations to construct an evidence-based account that objects can be seen only when illuminated.</p> <p>I can plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.</p> <p>I can use tools and materials to design and build a device that uses light or sound to solve the problem of communication over a distance.</p>	<p>Students will understand vibrating objects make sound; sound always comes from vibrating matter. Objects stop sound when they stop vibrating.</p>
Plants and Animals	2nd Quarter	<p>I can use materials to design a solution to a human problem by mimicking how plants and/or animals use their external part to help them survive, grow, and meet their needs.</p> <p>I can make observations to construct evidence-based account that young plants and animals are like, but not exactly like, their parents.</p>	<p>Seeds need water to grow into new plants. Not all plants grow alike. Plant roots take in water and nutrients, and leaves make food from sunlight. Seeds are alive and grow into new plants. Plants have different structures that function in growth and survival. Individuals of the same kind (of plant or animal) look similar but also vary in many ways. Plants need water, nutrients, air, space, and light; animals need water, food, air, and space with shelter. A habitat is a place where plants and animals live. Plants and animals live in different environments and have structures and behaviors that help them survive. Engineers learn from nature to solve problems.</p>
Air and Weather	4th Quarter	<p>I can use observations of the sun, moon, and stars to describe patterns that can be predicted.</p> <p>I can make observations at different times of year to relate the amount of daylight to the time of year.</p>	<p>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. Wind moves 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.</p>

Physical Science: Sound and Light	Length: 12 weeks
Standards: I can plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. I can make observations to construct an evidence-based account that objects can be seen only when illuminated. I can plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. I can use tools and materials to design and build a device that uses light or sound to solve the problem of communication over a distance.	Outcomes: Students will understand vibrating objects make sound; sound always comes from vibrating matter. Objects stop sound when they stop vibrating.
Topic 1: Sound and Vibrations	Length: 3 weeks
Essential Questions: What causes sound? What kinds of sounds are easy to identify? What information does sound give us?	Learning Targets: Vibration is a rapid back-and-forth motion. Vibrating objects make sound; sound always comes from a vibrating object. Objects stop making sound when they stop vibrating. Sound can make objects vibrate. Sounds can convey information. Ears are one kind of sound receiver. Sound sources can be natural or human-made. Words can describe the sounds objects make.
Standard(s): PS4.A: Wave Properties - Sound can make matter vibrate, and vibrating matter can make sound.	Academic Vocabulary: back-and-forth motion, compare, ear, hear, identify, information, listen, loud, observe, pluck, property, soft, sound, sound receiver, sound source, table fiddle, tuning fork, vibrate, vibration
Lesson Frame: Part 1 - Making Sounds	Students will know that vibration is a rapid back-and-forth motion. Vibrating objects make sound; sound always comes from a vibrating object. Objects stop making sound when they stop vibrating.
Lesson Frame: Part 2 - Hearing Sounds	Students will know vibrating objects make sound; sound always comes from a vibrating object. Sound can make objects vibrate. Sounds can convey information. Ears are one kind of sound receiver.
Lesson Frame: Part 3 - Outdoor Sounds	Students will know ears are one kind of sound receiver. Sound sources can be natural or human-made. Words can describe the sounds objects make.
Performance Tasks: Identify a variety of sound sources and receivers. Plan and carry out sound investigations (rubber bands, tongue depressors, table fiddle, book fiddle, tuning forks, tone generator). Analyze and interpret sound information.	Notes: Science Notebook Entry: Making sounds, hearing sounds, answer the focus question. Science Resources Book - "Vibrations and Sound", "Listen to This" Online Activity - "Sorting Sounds" Investigation 1 I-Check
Topic 2: Changing Sound	Length: 3 weeks

<p>Essential Questions: How can we make loud and soft sounds? How can we make low-pitched and high-pitched sounds? How does sound travel from the source to the receiver? How can we use sound to communicate over long distances?</p>	<p>Learning Targets: Vibration is a rapid back-and-forth motion. Vibrating objects make sound; sound always comes from a vibrating source. Volume is how loud or soft a sound is. Pitch is how high or low a sound is. Large objects tend to vibrate slower than small objects. High-pitched sounds come from objects that vibrate rapidly. A system is made of parts that work together. Sound vibrations travel through objects and the air. Drawings can show how sound travels from a source to the receiver. Engineers design communication devices.</p>
<p>Standard(s): PS4.A, PS4.C, LS1.D, ETS1.A, ETS1.B, ETS1.C</p>	<p>Academic Vocabulary: Communicate, direction (away, toward), gentle, guitar, har, high-pitched, instrument, Kalimba, length, low-pitched, medium-pitched, message, pitch, spoon-gong system, string, system, travel, volume, xylophone</p>
<p>Lesson Frame: Part 1 - Changing Volume</p>	<p>Students will know vibration is a rapid back-and-forth motion. Vibrating objects make sound; sound always comes from a vibrating source. Volume is how loud or soft a sound is.</p>
<p>Lesson Frame: Part 2 - Changing Pitch</p>	<p>Students will know pitch is how high or low a sound is. Large objects tend to vibrate slower than small objects. High-pitched sounds come from objects that vibrate rapidly.</p>
<p>Lesson Frame: Part 3- Spoon-Gong Systems</p>	<p>Students will know a system is made of parts that work together. Sound vibrations travel through objects and the air. Drawings can show how sound travels from a source to the receiver.</p>
<p>Lesson Frame: Part 4 - Sound Challenges</p>	<p>Students will know vibrating objects make sound; sound always comes from a vibrating object. Engineers design communication devices.</p>
<p>Performance Tasks: Design a device to send messages by modifying two spoon-gong systems.</p>	<p>Notes: Science Notebook Entry - Changing volume, changing pitch, the Kalimba, spoon-gong systems, string-cup telephone Science Resources Book - "Animal ears and Hearing", "Strings in Motion", "More Musical Instruments" Investigation 2 I-Check</p>
<p>Topic 3: Light and Shadows</p>	<p>Length: 3 weeks</p>
<p>Standards: PS4.B</p>	<p>Academic Vocabulary: block, dark, flashlight, light, light source, opaque, shade, shadow, sun, sunlight, translucent, transparent</p>

<p>Essential Questions: What makes a shadow? How can we use the Sun to create shadows? What happens when different materials block light?</p>	<p>Learning Targets: Light sources are objects or systems that give off light. Shadows are the dark areas that result when light is blocked. To make a shadow, you need a light source, an object to block the light, and a surface in back of the object. The length and direction of the shadow depends on the position of the light source. Shadows change during the day because the position of the Sun changes in the sky. Light travels away from a source in all directions. Materials that are opaque block light. Materials that are transparent allow light to pass through them. Materials that are translucent allow some light to pass through them.</p>
<p>Lesson Frame: Part 1 - Making Shadows</p>	<p>Students will know light sources are objects or systems that give off light. Shadows are the dark areas that result when light is blocked. To make a shadow, you need a light source, an object to block the light, and a surface in back of the object.</p>
<p>Lesson Frame: Part 2 - Sun and Shadows</p>	<p>Students will know shadows are the dark areas that result when light is blocked. The length and direction of the shadow depends on the position of the light source. Shadows change during the day because the position of the Sun changes in the sky.</p>
<p>Lesson Frame: Part 3 - Light and Materials</p>	<p>Students will know light travels away from a source in all directions. Materials that are opaque block light. Materials that are transparent allow light to pass through them. Materials that are translucent allow some light to pass through them.</p>
<p>Performance Tasks: Plan and carry out shadow investigations. Analyze and interpret data about materials blocking light</p>	<p>Notes: Science Notebook Entry - Making shadows, sun and shadows, light and materials Science Resources Book - "Playing in the light" Video - "Light and Shadows", "All About Light", "My Shadow" Investigation 3 I-Check</p>
<p>Topic 4: Light and Shadows</p>	<p>Length: 3 weeks</p>
<p>Standards: PS4.B, PS4.C, LS1.D, ETS1.A, ETS1.B, ETS.C</p>	<p>Academic Vocabulary: angel, eye, light detector, mirror, model, redirect, reflect, reflection, vision.</p>
<p>Essential Questions: How can we redirect a light beam? What can we see with a mirror? What can be seen with no light? How can we communicate with light?</p>	<p>Learning Targets: Light sources are objects or systems that give off light. A mirror can be used to redirect light. Light travels in straight lines. Mirror images are the result of light reflected from a surface. Light travels in straight lines. Mirror images are the result of light reflected from a surface. Light travels in straight lines. An image produced by something that reflects, such as a mirror, is always reversed. Light is necessary for animals to see. Animal eyes receive light from objects and transfer the light to the brain to interpret as vision. Animal eyes are not all the same. There are different sizes, shapes, and placements on the head. Light can be used to communicate over long distances. Flashing lights of different colors communicate different information.</p>
<p>Lesson Frame: Part 1 - Mirrors and Light Beams</p>	<p>Students will know that light sources are objects or systems that give off light. A mirror can be used to redirect light. Light travels in straight lines.</p>

Lesson Frame: Part 2 - Reflections	Students will know mirror images are the result of light reflected from a surface. Light travels in straight lines. An image produced by something that reflects, such as a mirror, is always reversed.
Lesson Frame: Part 3 - Eyes and Seeing	Light is necessary for animals to see. Animal eyes receive light from objects and transfer the light to the brain to interpret as vision. Animal eyes are not all the same. There are different sizes, shapes, and placements on the head.
Lesson Frame: Part 4 - Designing with Light	Students will know light travels in straight lines. Light can be used to communicate over long distances. Flashing lights of different colors communicate different information.
<p>Performance Tasks: Plan and carry out investigations with light and mirrors. Meet design challenges using light and mirrors.</p>	<p>Notes: Sciences Notebook Entry - Mirrors and Light Beams, Reflections, Eyes and Seeing, Designing with Light Science Resources Book - "Reflections", "Seeing the Light", "Communicating with Light" Video - "Light and Darkness" Investigation 4 I-Check</p>

Unit Name: Plants and Animals	Length: 12 weeks
Standards: I can use materials to design a solution to a human problem by mimicking how plants and/or animals use their external part to help them survive, grow, and meet their needs. I can make observations to construct evidence-based account that young plants and animals are like, but not exactly like, their parents.	Outcomes: Seeds need water to grow into new plants. Not all plants grow alike. Plant roots take in water and nutrients. Leaves make food from sunlight. Seeds are alive and grow into new plants. Plants have different structures that function in growth and survival. Individuals of the same kind (of plant or animal) look similar but also vary in many ways. Plants need water, nutrients, air, space, and light; animals need water, food, air, and space with shelter. A habitat is a place where plants and animals live. Plants and animals live in different environments and have structures and behaviors that help them survive. Engineers learn from nature to solve problems.
Topic 1: Grass and Grain Seeds	Length: 6 weeks
Essential Questions: What happens to ryegrass and alfalfa seeds in moist soil? What happens to the grass and alfalfa plants after we mow them? How does a wheat seed grow? How many different kinds of plants live in an area of the schoolyard?	Learning Targets: Students will know seeds need water to grow into new plants. Seeds need water to begin growth. Plants need water, nutrients, air, and space to grow. Students will know not all plants grow alike. There are variations in structures that serve the same function. Some plants die if they are cut near the ground, while others continue to live. Students will know wheat and other cereals that we eat come from seeds called grains. Seeds are alive and grow into new plants. Seeds need water to begin growth. Plants have different structures for growth and survival. Plant roots take in water and nutrients. Leaves make food from sunlight.
Standards: LS1.1, LS1.2	Academic Vocabulary: alfalfa, blade, fertilizer, function, grain, lawn, leaf, light, mow, nutrient, observe, plant, root, ryegrass, seed, soil, sprout, stem, structure, variation, wheat
Lesson Frame: Part 1 - Lawns	Students will know seeds need water to grow into new plants. Seeds need water to begin growth. Plants need water, nutrients, air, and space to grow.
Lesson Frame: Part 2 - Mowing the Lawn	Students will know not all plants grow alike. There are variations in structures that serve the same function. Some plants die if they are cut near the ground, while others continue to live.
Lesson Frame: Part 3 - Wheat	Students will know wheat and other cereals that we eat come from seeds called grains. Seeds are alive and grow into new plants. Seeds need water to begin growth. Plants have different structures that function growth and survival. Plant roots take in water and nutrients, and leaves make food from sunlight.
Lesson Frame: Part 4 - Variation in Plants and Animals	Students will know not all plants grow alike. There are variations in structures that serve the same function. Individuals of the same kind look similar but also vary in many ways.
Performance Tasks: Observe what happens when young ryegrass and alfalfa plants are cut near the soil surface. Sprout wheat seeds in straws and monitor growth, using a graph.	Notes: Science notebook entry - Growing a Lawn, Plant Picture, Growing and Mowing a Lawn, Growing Wheat, answer the focus question Science Resources Book - "What Do Plants Need?", "The Story of Wheat", "Variation" Video - How Plants Grow, Animal Growth Investigation 1 I-Check
Topic 2: Terrariums	Length: 6 weeks

Standard(s): LS1.A, LS1.D, LS3.B, ETS1.B	Academic Vocabulary: behavior, desert, forest, grassland, habitat, map, map key, ocean, pond, predator, rainforest, shelter, survive, system, terrarium, tundra
Lesson Frame: Setting Up Terrariums	Students will know plants and animals need food, water, air and space; plants need sunlight to make food. A terrarium is a model habitat where plants and animals live in soil. A habitat is a place where plants and animals live.
Lesson Frame: Animals in the Terrarium	Students will know there are many different habitats around the world. Many changes take place in a terrarium habitat over time.
Lesson Frame: Habitat Match	Students will know a habitat is a place where plants and animals live. It provides what a plant or animal needs to live. Plants and animals have structures and behaviors that help them survive in different habitats. Habitats can be wet, dry, cold, or hot. Different plants and animals survive in each different habitat.
Lesson Frame: Squirrel Behavior	Students will know plants and animals habitats have features that will help them survive. Animals have sensory structures that provide them with information about their surroundings. Individuals of the same kind look similar but can vary in many ways. Engineers learn from nature in order to solve human problems.
Performance Tasks: Design and build a model habitat (a terrarium system) provides for the needs of a small community of plants and animals. Make observations of terrariums over time and record them on a map and class charts through drawing and writing.	Notes: Science Notebook Entry - Terrarium map, answer the focus question Science Resource Book - "What Do Animals Need?", "Plants and Animals Around the World", "Learning from Nature" Video - How Plants Live in Different Places, Animal Growth Investigation 3 I-Check

Unit Name: Air and Weather	Length: 12 weeks
Standards: I can use observations of the sun, moon, and stars to describe patterns that can be predicted. I can make observations at different times of year to relate the amount of daylight to the time of year.	Outcomes: 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. Wind moves 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.
Topic 1: Observing the Sky	Length: 6 weeks
Essential Questions: When you look up at the sky, what do you see, and how does it change?	Learning Targets: Weather describes conditions in the air outside. Temperature describes how hot or cold the air is. Temperature is measured with a thermometer. Wind moves clouds in the sky. Clouds are made of liquid water drops that fall to Earth as rain; water is also in the air as a gas that we can't see. The sun rises in the east, moves across the sky, and sets each day at predictable times. The sun warms the Earth. The 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.
Standard(s): ESS1.1, ESS1.2	Academic Vocabulary: change, cirrus, cloud, cold, cool, cumulus, day, degrees Celsius, degrees Fahrenheit, describe, hot, measure, meteorologist, moon, night, overcast, partly cloudy, pattern, rain gauge, rainy, record, snowy, star, stratus, sun, sunny, sunrise, sunset, symbol, temperature, thermometer, warm, water vapor, weather, weather conditions, weather instrument
Lesson Frame: Part 1 - Weather Calendars	Students will know weather describes the conditions of the air outside.
Lesson Frame: Part 2 - Measuring Temperatures and Daylight	Students will know that temperature describes how hot or cold the air is. Temperature is measured with a thermometer. The sun rises in the east, moves across the sky, and sets each day at predictable times. The sun warms the Earth.
Lesson Frame: Part 3 - Watching Clouds	Students will know that wind moves clouds in the sky. Clouds are made of liquid water drops that fall to Earth as rain; water is also in the air as a gas that we can't see.
Lesson Frame: Part 4 - Observing the Moon	Students will know that the moon can be seen sometimes at night and during the day. It looks different every day, but looks the same again every 4 weeks. The moon can be observed moving across the sky; we see it at different locations in the sky, depending on the time of day or night. There are more stars in the night sky than anyone can count.

<p>Performance Tasks: Observe and record air conditions using weather instruments, and hours of daylight to look for patterns. Record moon observations to look for patterns.</p>	<p>Notes: Science Notebook Entry - Answer the focus question, Thermometer Picture Science Resources Book - "What Is the Weather Today?", "Clouds", "Water in the Air", "Changes in the Sky" Online Activity - "Cloud Catcher" Investigation 2 I-Check</p>
<p>Topic 2: Looking for Change</p>	<p>Length: 6 weeks</p>
<p>Essential Questions: How do daylight and weather change through the seasons?</p>	<p>Learning Targets: Daily changes in temperature and weather type can be observed, compared, and predicted over a month. 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. 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.</p>
<p>Standard(s): ESS1.1, ESS1.2</p>	<p>Academic Vocabulary: fall, graph, hibernate, migrate, season, spring, summer, winter</p>
<p>Lesson Frame: Part 1 - Change over a Month</p>	<p>Students can organize and graph the class weather data recorded over a period of 4 weeks. The class can continue recording the weather on the calendar and then graph the following month. Students also revisit the Moon calendar and look for patterns over the month.</p>
<p>Lesson Frame: Part 2 - Daylight Through the Year</p>	<p>Students can look at the amount of daylight on the same day of each month over the year. Students describe the pattern they observe and predict the number of hours of daylight on their birthday that year. They compare the actual hours to their predicted number of hours.</p>
<p>Lesson Frame: Part 3 - Comparing the Seasons</p>	<p>Students can move from recording weather data on a calendar to creating seasonal graphs of the weather and temperature. Each season, the class creates new graphs and compares them with graphs from the preceding seasons.</p>
<p>Lesson Frame: Part 4 - Extensions</p>	
<p>Performance Tasks: Graph weather observations taken over a period of a month. Look for patterns in local weather conditions and temperatures throughout the seasons. Monitor and record the changing appearance of the moon over a month. Monitor and record the number of changing number of daylight hours over a year.</p>	<p>Notes: Science Notebook Entry - Answer the focus question, Hours of Daylight Science Resources Book - "Changes in the Sky", "Seasons", "Getting Through the Winter" Online Activity - "What's the Weather?" Investigation 4 I-Check</p>
<p>Topic 3: Investigation 1 - Exploring Air</p>	<p>Length: 2 weeks</p>

<p>Essential Questions: What is air and what can it do?</p>	<p>Learning Targets: Air is a gas and is all around us, including in the sky. 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.</p>
<p>Standard(s): (Engineering Standards) I can ask questions, make observations, gather information about a situation people want to change to define a simple problem that can be solved through the developments of a new or improved object or tool. I can develop a simple sketch, drawing, or physical model to illustrate how shapes of an object helps it function as needed to solve a given problem. I can analyze data from tests to two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs."</p>	<p>Academic Vocabulary: air, air resistance, barrel, blow, bubble, canopy, compress, distance, engineer, gas, matter, move, parachute, plunger, pressure, push, rocket, submerge, syringe, system, tube, wind</p>
Lesson Frame: Part 1 - Air Is There	Students can discover properties of air by observing interactions of air with objects.
Lesson Frame: Part 2 - Parachutes	Students can design and engineer parachutes and observe how they interact with air to solve a problem.
Lesson Frame: Part 3 - Pushing on Air	Students can use syringes to investigate air. Students will discover that air can be compressed and under pressure can push objects around.
Lesson Frame: Part 5- Balloon Rockets	Students can set up balloon rocket systems and find out how far they propel in a flight line.
<p>Performance Tasks: Discover properties of air by observing interactions of air with objects. Design and engineer parachutes and observe how they interact with air to solve a problem. Demonstrate that compressed air can be used to make things move.</p>	<p>Notes: Science Notebook Entry - Air is There, Parachutes, Pushing on Air, Balloon Rockets Science Resources Book - "What is All Around Us?" Video: "Friction and Air Resistance" Investigation 1 i-check Answer the Focus Questions</p>