ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

DEPARTMENT
Science

COURSE TITLE
First Grade Science

Board of Education

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BOARD OF EDUCATION INITIAL ADOPTION DATE:
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Course Philosophy

The Robbinsville educators have designed a science curriculum that meets the needs of all learners, integrates the Robbinsville Ready Skills and allows time for students to practice and experience social emotional learning. Students will experience at least one investigation in earth, life and physical science. Investigations are built to allow for exploration, investigation, recording/interpreting data and collaboration. Students also utilize reading, writing and research skills while the educator embeds interdisciplinary opportunities across the curriculum. New Jersey's emphasis on the Climate Change standards allows opportunities for students to become globally conscious critical thinkers who can make informed decisions about their impacts on the planet.

Course Description

The focus of First Grade Science allows learners to examine, explore and make sense of the world around them. The following course description summarizes the course's three units.

In the **First Unit, Air and Weather**, young students turn their focus upward. The anchor phenomena are the air that surrounds us and the natural objects that we see in the sky. Students explore the phenomenon that objects in the sky change position in predictable ways. They explore the natural world by using simple instruments and calendars to observe and monitor change. They use new tools and methods to build on their understanding of the weather and to find out about properties of air by exploring how objects interact with air. The driving question for the module is what is all around us and what do we observe in the sky above us? 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 Unit**, 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.

In the **Second Unit, Sound and Light** provides experiences that help students develop an understanding of how to observe and manipulate the phenomena of sound and light. They explore these dimensions of the natural world using simple tools and musical instruments. The driving question for the module is how do sound and light interact with objects? 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.

Last in the **Third Unit, Plants and Animals,** engages students with the anchor phenomenon that young plants and animals (offspring) have structures and behaviors that help them grow and survive. The driving question for the module is how do young plants and animals survive in their habitat? 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 young 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 the phenomenon of 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. They use that understanding of structure and function, including animal sensory structures, to invent solutions to human problems.

Throughout the **Plants and Animals Unit,** 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.

Core and Supplemental Instructional Materials

Core Materials	Supplemental Materials
● FOSS science resource books ● FOSS material kits ● FOSS online videos ● FOSS online activities	● BrainPOP Jr. ● Discovery Kids ● National Geographic Kids

Social Emotional Learning Connections
Below are the five core SEL Competencies as outlined by CASEL, and examples of how each may be addressed within this curriculum
Self-awareness: The ability to accurately recognize one's emotions and thoughts and their influence on behavior. This includes accurately assessing one's strengths and limitations and possessing a well-grounded sense of confidence and optimism. **Example 1:** Establish shared norms, expectations, and routines for classroom behavior. **Example 2:** Self-reflection checklists after completing self-directed learning center activities.
Self-management: The ability to regulate one's emotions, thoughts, and behaviors effectively in different situations. This includes managing stress, controlling impulses, motivating oneself, and setting and working toward achieving personal and academic goals. **Example 1:** Goal setting activities during self-directed learning center activities. **Example 2:** Discussion of Growth Mindset and Fixed Mindset, using videos, read alouds, and chart.
Social awareness: The ability to take the perspective of and empathize with others from diverse backgrounds and cultures, to understand social and ethical norms for behavior, and to recognize family, school, and community resources and supports. **Example 1:** Adding multicultural books into everyday learning.
Relationship skills: The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. This includes communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed. **Example 1:** Morning meeting games to prompt responsive classroom, which will foster positive classroom relationships. **Example 2:** Students will be provided with opportunities to build content knowledge through collaboration and sharing ideas during presentations, projects and group work.
Responsible decision-making: The ability to make constructive and respectful choices about personal behavior and social interactions based on consideration of ethical standards, safety concerns, social norms, the realistic evaluation of consequences of various actions, and the well-being of self and others.

Example 1: Creating classroom rules and revisiting the expectations when needed. Using read alouds to prompt the conversation.
Example 2: Use a lesson to teach students a simple formula for making good decisions (e.g., stop, calm down, identify the choice to be made, consider the options, make a choice and do it, how did it go?). Post the decision-making formula in the classroom.

Integration of 21st Century Themes and Skills

NJSLS-CLKS 9.4: Life Literacies and Key Skills	
Creativity and Innovation	Can be found in unit: 1: Air and Weather 2: Sound and Light 3: Plants and Animals 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives. 9.4.2.CI.2: Demonstrates originality and inventiveness in work.
Critical Thinking and Problem Solving	Can be found in unit: 1: Air and Weather 2: Sound and Light 3: Plants and Animals 9.4.2.CT.1: Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem. 9.4.2.CT.2: Identify possible approaches and resources to execute a plan.
Digital Citizenship	Can be found in unit: 1: Air and Weather 2: Sound and Light 3: Plants and Animals 9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet.
Global and Cultural Awareness	Can be found in unit: 1: Air and Weather 2: Sound and Light

	3: Plants and Animals 9.4.2.GCA:1: Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals.
Information and Media Literacy	Can be found in unit: 1: Air and Weather 2: Sound and Light 3: Plants and Animals 9.4.2.IML.1: Identify a simple search term to find information in a search engine or digital resource. 9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults.
Technology Literacy	Can be found in unit: 1: Air and Weather 2: Sound and Light 3: Plants and Animals 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool. 9.4.2.TL.2: Create a document using a word processing application. 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content. 9.4.2.TL.5: Describe the difference between real and virtual experiences.

Robbinsville Ready 21st Century Skill Integration

The following skills will be embedded throughout the curriculum and instruction of this course.

Collaborative Team Member: Robbinsville students will learn more by working together than in isolation. As educational theorist Lev Vygotsky advocated, learning is a social process. Many workplaces today encourage employees to work in teams to solicit diverse perspectives, brainstorm new ideas and/or products, and solve problems. Further, collaboration fosters interpersonal relationships, self-management skills, cooperation, and a sense of collective responsibility. Collaborative team members are able to work with diverse groups of people who hold a variety of perspectives.

Effective Communicator: Robbinsville students must be able to clearly articulate their ideas orally, in writing, and across various media in order to successfully connect to the world around them. As the world becomes increasingly globalized, communication is more than just sharing one's ideas. Effective communicators are able to communicate their convictions, actively listen and analyze others' work to identify perspective and/or potential bias.

Emotionally Intelligent Learner: Robbinsville students who are emotionally intelligent learn to be empathetic, demonstrate integrity and ethical behavior, are kind, are self-aware, willing to change, and practice self-care. They are better able to cope with the demands of the 21st century digital society and workplace because they are reliable, responsible, form stable and healthy relationships, and seek to grow personally and professionally. Emotionally intelligent people are able to manage their emotions, work effectively on teams and are leaders who can grow and help to develop others.

Informed and Involved Citizen: Robbinsville students need to be digital citizens who are civically and globally aware. The concept of what it means to be "literate" has evolved along with 21st century technological and cultural shifts. Our progressive vision of literacy entails having our students explore real world problems in the classroom. Informed and involved citizens are able to safely and accurately communicate with people all around the world and are financially, environmentally and informationally literate.

Innovative Thinker: Robbinsville students must encompass innovative thinking skills in order to be successful lifelong learners in the 21st century world. As stated by Karl Fisch and Scott McLeod in the short film Shift Happens, "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't been invented . . . in order to solve problems we don't even know are problems yet." Innovative thinkers are able to think analytically, solve problems critically, creatively engage in curiosity and tinkering, and demonstrate originality.

Resilient and Self-Directed Learner: Robbinsville students need to take risks and ultimately make independent and informed decisions in an ever-changing world. Author of Life, the Truth, and Being Free, Steve Maraboli stated, "Life doesn't get easier or more forgiving, we get stronger and more resilient." Self-directed scholars of the 21st century are able to set goals, initiate resolutions by seeking creative approaches, and adjust their thinking in light of difficult situations. Resilient students are able to take risks without fear of failure and overcome setbacks by utilizing experiences to confront new challenges. Resilient and self directed scholars will consistently embrace opportunities to initiate solutions and overcome obstacles.

Career Awareness and Planning Standards 9.2	
9.2.4.A.2: Identify various life roles and civic and work‑related activities in the school, home, and community.	Students make the connection between the scientific processes that they encounter in the world and their community and the corresponding work roles that are related to these concepts. For example, when learning about plant growth, identifying the role of plant growers such as gardeners, landscapers, and farmers in the community and how they utilize this information.

Unit Title	Unit Understandings and Goals	Recommended Duration/ Pacing	Assessments
Unit 1 Air and Weather	**Investigation 1:** Air is invisible, but can be compressed to create pressure and movement. 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.	8-10 weeks	Formative · Science notebook entry · Performance-based assessment Summative · End-of-investigation assessment Common Benchmark Assessments (mid/end of course) · Benchmark Assessment Alternative Assessments (projects, etc when appropriate) · Performance-based assessment
	Investigation 2: Weather and sky conditions can be measured and recorded. 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.		
	Investigation 3: Moving air creates wind. The movement of objects reflects the speed and direction of wind. 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.		

	Investigation 4: Weather, solar, lunar, and atmospheric patterns show daily, monthly and seasonal changes and patterns. 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.		
Unit 2 Sound and Light	**Investigation 1:** Sounds are caused by vibrating objects. Vibration is a rapid back-and-forth motion. Vibrating objects make sound. A sound always comes from a vibrating source. Some sounds are unique, and are easier to identify than others. Sound sources can be natural or human-made. **Investigation 2:** Sound can be manipulated in different ways at the source. The way sound is manipulated is detectable by a receiver. Objects can be different sizes and can vibrate at different rates, creating different pitches and volumes. Volume is how loud or soft a sound is. Pitch is how high or low a sound is. Sound vibrations travel from a source, through a medium (matter) to reach a receiver (ear). Large objects tend to vibrate slower than small objects. **Investigation 3:** Shadows are made by an object, a surface and a light source. Shadows are made when an opaque object blocks the light source. Shadows can be different sizes, based on the location of the opaque object in relation to the source. Light travels from a source in all directions. Different materials create differently-shaped shadows. Some materials block light entirely or partially, while other materials allow light to travel through. The length and direction of a shadow depends on the position of the light source. **Investigation 4:** Mirrors can be used to reflect	8-10 weeks	Formative · Science notebook entry · Performance-based assessment Summative · End-of-investigation assessment Common Benchmark Assessments (mid/end of course) · Benchmark Assessment Alternative Assessments (projects, etc when appropriate) · Performance-based assessment

	light. Objects seen in mirrors produce a reversed image. Light travels in straight lines and can be directed in different ways. Light can be reflected from the source to the receiver. People can communicate to each other using light that is reflected between a source and receiver. Light is necessary for animals to see. Animal eyes are not all the same.		
Unit 3 **Plants and Animals**	**Investigation 1:** Seeds require certain conditions to grow. 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. **Investigation 2:** Plants reproduce in different ways and plant life requires conditions to survive. New plants grow from old plants in different ways. Leaves, twigs, and roots develop on stems at nodes. Potatoes are underground stems; potato eyes are nodes where buds grow. New plants can grow from the stems of mature plants. Plants are living organisms that need water, air, nutrients, light, and space to grow. **Investigation 3:** Artificial environments can be created for scientists to observe interactions among living things. Living things adapt to survive in their environment. 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. It provides what a plant or animal needs to live. Plants and animals live in different environments and have structures and behaviors that help them survive. Animals use sensory structures to take in information about their surroundings and act on it. Engineers learn from nature to solve problems. **Investigation 4:** Plants have certain structures that allow them to grow, survive and reproduce. Plant bulbs are alive and grow new structures when	8-10 weeks	Formative · Embedded Assessment Science notebook entries · Investigation I-Check for each investigation Summative · Performance Assessment Common Benchmark Assessments (mid/end of course) · Benchmark Assessment Alternative Assessments (projects, etc when appropriate) ·

	provided with water. Some parts of roots will grow into new plants if they are provided with water. Other parts will not. Plants grow and change. Plants can produce new plants in many ways. Adult animals can have young (offspring), and the young resemble their parents. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring survive.		

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Unit #1: Air and Weather

Enduring Understandings:	Essential Questions:
- Air is invisible, but can be compressed to create pressure and movement. - Weather and sky conditions can be measured and recorded. - Moving air creates wind. The movement of objects reflects the speed and direction of wind. - Weather, solar, lunar and atmospheric patterns show daily, monthly and seasonal changes and patterns.	- What can air do? - How does a parachute interact with air? - What happens when air is pushed into a smaller space? - How can water be used to show that air takes up space? - How can compressed air be used to make a balloon rocket? - What is the weather today? - What time of day is the air the warmest? - What types of clouds are in the sky today? - What time of day can we observe the Moon? - How can bubbles be used to observe the wind? - How strong is the wind today? - How can pinwheels be used to observe the wind? - What does a wind vane tell us about the wind? - What weather conditions are good for kite flying? - How can we describe the weather over a month? - What does the Moon look like at different times during a month? - How does the amount of daylight change over the year? - How does the temperature and weather change over the seasons?

Interdisciplinary Connections

RI.1.5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.

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.

W.1.7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

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

SL.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

- Have students describe their observations and knowledge of a concept learned in their science notebook.
- Read and discuss from the student resources book.

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies

PS1.A	Structure and properties of matter ● Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (From grade 2)	**Content:** Air, air resistance, barrel, blow, bubble, compress, distance, engineer, gas, matter, move, parachute, plunger, pressure, push, rocket, submerge, syringe, system, tube, wind **Concepts:** 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.	Students explore properties of a common gas mixture—air. Using vials, syringes, and tubing, students experience air as matter, discovering that it takes up space and can be compressed, and that compressed air builds up pressure that can push objects around. They construct and compare parachutes and balloon rockets that use air. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall FOSS online videos and activities Science Resources Book: "What Is All around Us?" Video: "Friction and Air Resistance"	Science notebook entry Performance-based assessment Investigation checks for each investigation
ETS1.A ETS1.B	Defining and delimiting engineering problems ● Before beginning to design a solution, it is important to clearly understand the problem. Developing possible solutions ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a	**Skills:** Asking questions and defining problems. Developing and using models. Planning and carrying out investigations. Analyzing and interpreting data. Using mathematics and computational thinking. Constructing explanations and designing solutions. Obtaining, evaluating, and communicating information.	Students look for evidence of moving air. They observe and describe wind speed using pinwheels, an anemometer, and a wind scale. They observe bubbles and construct wind vanes to find the wind's direction. Students fly kites to feel the strength of the wind and the direction it is moving. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online videos and activities	Science notebook entry Performance-based assessment Investigation checks for each investigation

ETS1.C	problem's solution to other people. Optimizing the design solution ● Because there is always more than one possible solution to a problem, it is useful to compare and test designs.				
ESS1.A ESS1.B ESS2.D	The universe and its stars ● Patterns of the motion of the Sun, Moon, and stars in the sky can be observed, described, and predicted. Earth and the solar system ● Seasonal patterns of sunrise and sunset can be observed, described, and predicted. Weather and climate ● Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (Extended from kindergarten)	**Content (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 condition, weather instrument **Concepts:** 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.	Students use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. Students monitor temperature with a thermometer and (optionally) rainfall with a rain gauge. They learn to identify three basic cloud types by matching their observations with a cloud chart. They also monitor times of sunrise and sunset and record the number of daylight hours each day. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall FOSS online videos and activities Science Resources Book: "What Is the Weather Today?"; "Clouds"; "Water in the Air"; "Changes in the Sky" Online Activity: "Cloud Catcher" Science Resources Book: "Understanding the Weather"; "Resources" Online Activity: "Wind Speed" Science Resources Book: "Seasons" ; "Getting through the Winter"	Science notebook entry Performance-based assessment Investigation checks for each investigation

				Online Activity: "What's the Weather?"	
PS3.B	Conservation of energy and energy transfer ● Sunlight warms Earth's surface. (Extended from kindergarten)	**Content (Vocabulary):** Fall, graph, hibernate, migrate, season, spring, summer, winter **Concepts:** 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.	Students organize monthly weather data, using graphs to describe weather trends. They continue to monitor weather throughout the year, comparing the seasons and looking for weather patterns. Students use the observations they have recorded on the calendar to look for monthly patterns of the Moon and annual patterns of daylight hours. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online videos and activities	Science notebook entry Performance-based assessment Investigation checks for each investigation
ESS3.A	Natural resources ● Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (Extended from kindergarten)	**Content (Vocabulary):** Anemometer, calm, direction, east, gentle breeze, kite, moderate breeze, north, pinwheel, south, strong breeze, west, wind speed, wind vane **Concepts:** 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.	Students use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. Students monitor temperature with a thermometer and (optionally) rainfall with a rain gauge. They learn to identify three basic cloud types by matching their observations with a cloud chart. They also monitor times of sunrise and sunset and record the number of daylight hours each day. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall FOSS online videos and activities Science Resources Book: "Understanding the Weather"; "Resources" ; "Getting through the Winter"	Science notebook entry Performance-based assessment Investigation checks for each investigation

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Unit #2: Sound and Light

Enduring Understandings:	Essential Questions:
● Sounds are caused by vibrating objects. ● Sound can be manipulated in different ways at the source. The way sound is manipulated is detectable by a receiver. ● Shadows are made by an object, a surface and a light source. ● Mirrors can be used to reflect light. Objects seen in mirrors produce a reversed image.	● What causes sound? ● What kinds of sounds are easy to identify? ● What information does sound give us? ● How do objects make sound? ● How can we make loud and soft sounds? ● How can we change pitch? ● How can sound travel from the source to the receiver? ● How can we use sound to communicate over long distances? ● What makes a shadow? ● How can we use the sun to create shadows? ● What happens when different materials block light? ● How can a light beam be redirected? ● What can be seen with a mirror? ● What can be seen in the absence of light? ● How can people communicate with light?

Interdisciplinary Connections

RI.1.5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.

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.

W.1.7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).

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

SL.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

● Have students describe their observations and knowledge of a concept learned in their science notebook.
● Read and discuss from the student resources book.

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies

PS4.A PS4.B PS4.C	Wave properties • Sound can make matter vibrate, and vibrating matter can make sound. Electromagnetic radiation • 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. • Objects can be seen only when light is available to illuminate them. Some objects give off their own light. • Mirrors can be used to redirect a light beam. Information technologies and instrumentation • People also use a variety of devices to communicate (send and receive information) over long distances.	**Content (Vocabulary):** Back and forth motion, motion, compare, ear, hear, identify, information, listen, loud, observe, pluck, property, soft, sound, sound, receiver, sound, source, table, fiddle, tuning, fork, vibrate, vibration, block, dark, flashlight, light, light source, opaque, shade, shadow, Sun, sunlight, translucent, transparent, communicate, direction (away, toward), gentle, guitar, hard, high-pitched, instrument, kalimba, length, low-pitched, medium-pitched, message, pitch, spoon-gong system, string, system, travel, volume, xylophone **Concepts:** Vibration is a rapid back-and-forth motion. Vibrating objects make sound. A sound always comes from a vibrating source. Some sounds are unique, and are easier to identify than others. Sound sources can be natural or human-made. Shadows are made when an opaque object blocks the light source. Shadows can be different sizes, based on the location of the opaque object in relation to the source. Light travels from a source in all directions. Different materials create differently-shaped shadows. Some materials block light entirely or partially, while other materials allow light to travel through.	**Centers-based rotations/small group explorations:** Produce sounds using different types of materials. Identify the source of a given sound. Use words and phrases to describe different sounds. Learn how to discriminate between different kinds of sounds. Describe the information sounds convey. Identify and describe sounds made by different animals. Block light and create and change shadows. Investigate how light interacts with objects that are transparent, translucent, and opaque.	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activity: "Sorting Sounds" FOSS online videos "Light and Shadows", "All About Light" and "My Shadow"	Science notebook entry Performance-based assessment Investigation checks for each investigation

		The length and direction of a shadow depends on the position of the light source.			
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.	**Content (Vocabulary):** angle, eye, light detector, mirror, model, redirect, reflect, reflection, vision **Concepts:** Light travels in straight lines and can be directed in different ways. Light can be reflected from the source to the receiver. People can communicate to each other using light that is reflected between a source and receiver. Light is necessary for animals to see. Animal eyes are not all the same.	**Centers-based rotations/small group explorations:** Investigate ways to reflect and redirect light to different locations using one and two mirrors. Experience what can be seen when there is no light, and conclude that objects can only be seen when light is present. Explore the shapes and location of eyes on different animals.	Content-specific anchor charts, content-specific word wall FOSS online video "Light and Darkness" Student resources book FOSS online activities	Science notebook entry Performance-based assessment Investigation checks for each investigation
ETS1.A ETS1.B ETS1.C	Defining and delimiting engineering problems ● Before beginning to design a solution, it is important to clearly understand the problem. Developing possible solutions ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solution to other people.	**Concepts:** Objects can be different sizes and can vibrate at different rates, creating different pitches and volumes. Volume is how loud or soft a sound is. Pitch is how high or low a sound is. Sound vibrations travel from a source, through a medium (matter) to reach a receiver (ear). Large objects tend to vibrate slower than small objects. **Skills:** Asking questions and defining problems. Developing and using models. Planning and carrying out investigations. Analyzing and interpreting data.	**Centers-based rotations/small group explorations:** Investigate ways to change the volume (loud/soft) and pitch (high/low) of sounds. Manipulate the volume and pitch of sounds. Develop models of how sound travels from a source to a receiver. Identify and describe sound receivers used by different animals.	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online video "All About Sound"	Science notebook entry Performance-based assessment Investigation checks for each investigation

	Optimizing the design solution • Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	Using mathematics and computational thinking. Constructing explanations and designing solutions. Obtaining, evaluating, and communicating information.			

Robbinsville Public Schools

Unit #3: Plants and Animals

Enduring Understandings:	Essential Questions:
- Seeds require certain conditions to grow. - Plants reproduce in different ways and plant life requires conditions to survive. New plants grow from old plants in different ways. - Artificial environments can be created for scientists to observe interactions among living things. Living things adapt to survive in their environment. - Plants have certain structures that allow them to grow, survive and reproduce.	- 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? - How can we make a new plant from an old one? - What grows from the nodes of a potato? - How do we keep our cuttings alive? - What do plants need to live and grow in a terrarium? - What do animals need to live in a terrarium? - What structures or behaviors do plants or animals have that help them live in their habitat? - How do the behaviors of squirrels help them survive the winter? - How does a bulb grow? - What parts of the plant can grow new plants? - How do the plants in the schoolyard compare to the plants studied in class? - What do animal parents do to help their young survive?

Interdisciplinary Connections

RL.1.1. Ask and answer questions about key details in a text.
RL.1.2. Retell stories, including key details, and demonstrate understanding of their central message or lesson.
W.1.7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
W.1.8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- Have students describe their observations and knowledge of a concept learned in their science notebook.
- Read and discuss from the student resources book.

Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies

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 good water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.	**Content (Vocabulary):** alfalfa, blade, fertilizer, function, grain, lawn, leaf, light, mow, nutrient, observe, plant, root, ryegrass, seed, soil, sprout, stem, structure, variation, wheat, bud, cutting, eye node, potato, tuber **Concepts:** 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. Leaves, twigs, and roots develop on stems at nodes. Potatoes are underground stems; potato eyes are nodes where buds grow. New plants can grow from the stems of mature plants. Plants are living organisms that need water, air, nutrients, light, and space to grow.	Students plant miniature lawns with ryegrass and alfalfa. They mow the lawns and observe the response of grass and alfalfa to cutting. They plant individual wheat seeds in clear straws and observe how seeds germinate and grow, observing variation in the growth of the same kind of seed. They conduct a plant hunt in the schoolyard and continue to look for variation. They use the media to look at variation in animals and how animals use their senses to gather information about their surroundings to help them survive. Students make new plants from stems of houseplants. They put sections of stems into water and look for evidence that a new plant is forming. Stem pieces that develop roots are planted to make new plants. Students plant pieces of potatoes (modified stems) and observe them grow. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book: "What Do Plants Need?"; "The Story of Wheat"; "Variation" FOSS online videos "How Plants Grow"; "Animal Growth" FOSS online activities	Science notebook entry Performance-based assessment Investigation checks for each investigation
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.				
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.				
LS3.A LS3.B	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. Variation of traits • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.	**Content (Vocabulary):** bulb, carrot, garlic, offspring, onion, parent, radish, vermiculite **Concepts:** Plant bulbs are alive and grow new structures when provided with water. Some parts of roots will grow into new plants if they are provided with water. Other parts will not. Plants grow and change. Plants can produce new plants in many ways. Adult animals can have young (offspring), and the young resemble their parents. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring survive.	Students set up terrariums using seeds and plants from Investigations 1 and 2. They add local animals such as snails and isopods and provide for the needs of the plants and animals. Students learn about other animals and plants through readings and multimedia and compare and sort structures and functions. Through an outdoor simulation, students learn about variations in how squirrels store food for winter survival. Students read about how engineers learn from nature to solve human problems. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book: "Animals and Their Young" FOSS online video "Animal Offspring and Caring for Animals" FOSS online activities "Watch It Grow!"; "Find the Parent"	Science notebook entry Performance-based assessment Investigation checks for each investigation
ETS1.B	Developing possible solutions • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solution to other people.	**Content (Vocabulary):** behavior, desert, forest, grassland, habitat, map, map key, ocean; pond, predator, rain forest, shelter, survive, system, terrarium, tundra **Concepts:** 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. It provides what a plant or animal needs to live. Plants and animals live in different	Students plant onion or garlic bulbs in moist cotton and observe as they develop into new plants. They plant parts of roots—carrots and radishes—to discover which parts will develop into new plants. Students adopt a schoolyard plant and compare it to other plants. They use media to learn about the behavior of animals and their young and how these behaviors help the young to survive. Students observe how young plants and animals resemble their parents. Centers-based rotations	Content-specific anchor charts, content-specific word wall Student resources book: "What Do Animals Need?"; "Plants and Animals around the World"; "Learning from Nature" FOSS online videos "How Plants Live in	Science notebook entry Performance-based assessment Investigation checks for each investigation

		environments and have structures and behaviors that help them survive.	Socratic seminar	Different Places"; "Animal Growth"	
		Animals use sensory structures to take in information about their surroundings and act on it.	Partnership/small group explorations	FOSS online activity "Sorting Animals by Structures"	
		Engineers learn from nature to solve problems.			
		Skills: Asking questions and defining problems.			
		Developing and using models.			
		Constructing explanations and designing solutions.			
		Obtaining, evaluating, and communicating information.			

General Differentiated Instruction Strategies	
- Leveled texts - Chunking texts - Choice board - Socratic Seminar - Tiered Instruction - Small group instruction - Guided Reading - Sentence starters/frames - Writing scaffolds - Tangible items/pictures - Adjust length of assignment	- Repeat, reword directions - Brain breaks and movement breaks - Brief and concrete directions - Checklists for tasks - Graphic organizers - Assistive technology (spell check, voice to type) - Study guides - Tiered learning stations - Tiered questioning - Data-driven student partnerships - Extra time

Possible Additional Strategies for Special Education Students, 504 Students, At-Risk Students, and English Language Learners (ELLs)			
Time/General	**Processing**	**Comprehension**	**Recall**
- Extra time for assigned tasks - Adjust length of assignment - Timeline with due dates for reports and projects - Communication system between home and school - Provide lecture notes/outline	- Extra Response time - Have students verbalize steps - Repeat, clarify or reword directions - Mini-breaks between tasks - Provide a warning for transitions - Reading partners	- Precise step-by-step directions - Short manageable tasks - Brief and concrete directions - Provide immediate feedback - Small group instruction - Emphasize multi-sensory learning	- Teacher-made checklist - Use visual graphic organizers - Reference resources to promote independence - Visual and verbal reminders - Graphic organizers

Assistive Technology	Assessments and Grading	Behavior/Attention	Organization
- Computer/whiteboard - Tape recorder - Spell-checker - Audio-taped books	- Extended time - Study guides - Shortened tests - Read directions aloud	- Consistent daily structured routine - Simple and clear classroom rules - Frequent feedback	- Individual daily planner - Display a written agenda - Note-taking assistance - Color code materials

Enrichment

The goal of Enrichment is to provide learners with the opportunity to participate in extension activities that are differentiated and enhance the curriculum. All enrichment decisions will be based upon individual student needs.

- Show a high degree of intellectual, creative and/or artistic ability and demonstrate this ability in multiple ways.
- Pose questions and exhibit sincere curiosity about principles and how things work.
- The ability to grasp concepts and make real world and cross-curricular connections.
- Generate theories and hypotheses and pursue methods of inquiry.
- Produce products that express insight, creativity, and excellence.
- Possess exceptional leadership skills.
- Evaluate vocabulary
- Elevate Text Complexity
- Inquiry based assignments and projects
- Independent student options
- Tiered/Multi-level activities
- Purposeful Learning Center
- Open-ended activities and projects
- Form and build on learning communities
- Providing pupils with experiences outside the 'regular' curriculum
- Altering the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- A higher quality of work than the norm for the given age group.
- The promotion of a higher level of thinking and making connections.
- The inclusion of additional subject areas and/or activities (cross-curricular).
- Using supplementary materials in addition to the normal range of resources.

English Language Learner (ELL) Resources

- Learning style quiz for students- http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml
- "Word clouds" from text that you provide-http://www.wordle.net/
- Bilingual website for students, parents and educators: http://www.colorincolorado.org/
- Learn a language for FREE-www.Duolingo.com
- Time on task for students-http://www.online-stopwatch.com/
- Differentiation activities for students based on their Lexile-www.Mobymax.com
- WIDA-http://www.wida.us/
- Everything ESL - http://www.everythingESL.net
- ELL Tool Box Suggestion Site http://www.wallwisher.com/wall/elltoolbox
- Hope4Education - http://www.hope4education.com
- Learning the Language http://blogs.edweek.org/edweek/learning-the-language/
- FLENJ (Foreign Language Educators of NJ) 'E-Verse' wiki: http://www.flenj.org/Publications/?page=135
- OELA - http://www.ed.gov/offices/OBEMLA
- New Jersey Department of Education- Bilingual Education information http://www.state.nj.us/education/bilingual/

Special Education Resources

- Animoto -Animoto provides tools for making videos by using animation to pull together a series of images and combining them with audio. Animoto videos or presentations are easy to publish and share. https://animoto.com
- Bookbuilder -Use this site to create, share, publish, and read digital books that engage and support diverse learners according to their individual needs, interests, and skills. http://bookbuilder.cast.org/
- CAST -CAST is a non-profit research and development organization dedicated to Universal Design for Learning (UDL). UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. http://www.cast.org
- CoSketch -CoSketch is a multi-user online whiteboard designed to give you the ability to quickly visualize and share your ideas as images. http://www.cosketch.com/
- Crayon -The Crayon.net site offers an electronic template for students to create their own newspapers. The site allows you to bring multiple sources together, thus creating an individualized and customized newspaper. http://crayon.net/ Education Oasis -Education Oasis offers a collection of graphic organizers to help students organize and retain knowledge – cause and effect, character and story, compare and

contrast, and more! http://www.educationoasis.com/printables/graphic-organizers/

- Edutopia -A comprehensive website and online community that increases knowledge, sharing, and adoption of what works in K-12 education. We emphasize core strategies: project-based learning, comprehensive assessment, integrated studies, social and emotional learning, educational leadership and teacher development, and technology integration. http://www.edutopia.org/
- Glogster -Glogster allows you to create "interactive posters" to communicate ideas. Students can embed media links, sound, and video, and then share their posters with friends. http://edu.glogster.com/?ref=personal
- Interactives – Elements of a Story -This interactive breaks down the important elements of a story. Students go through the series of steps for constructing a story including: Setting, Characters, Sequence, Exposition, Conflict, Climax, and Resolution. http://www.learner.org/interactives/story/index.html
- National Writing Project (NWP) -Unique in breadth and scale, the NWP is a network of sites anchored at colleges and universities and serving teachers across disciplines and at all levels, from early childhood through university. We provide professional development, develop resources, generate research, and act on knowledge to improve the teaching of writing and learning in schools and communities. http://www.nwp.org
- Pacecar -Vocab Ahead offers videos that give an active demonstration of vocabulary with audio repeating the pronunciation, definition, various uses, and synonyms. Students can also go through flash cards which give a written definition and visual representation of the word. http://pacecar.missingmethod.com/