ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

DEPARTMENT
Science

COURSE TITLE
Fourth Grade Science

Board of Education

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BOARD OF EDUCATION INITIAL ADOPTION DATE:
October 2021

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 Fourth Grade Science allows learners to examine, explore and make sense of the world around them with deeper investigations into the natural and man made resources.. The following course description summarizes the course's three units, **Unit 1 Soils, Rocks and Landforms, Unit 2 Environments** and **Unit 3 Energy.**

In **Unit 1 Soils, Rocks, and Landforms** students examine Geology, the study of our planet's earth materials and natural resources. Because they are so ubiquitous and abundant, they are often taken for granted. The **Soils, Rocks, and Landforms Unit** provides students with firsthand experiences with soils and rocks and modeling experiences using tools such as topographic maps and stream tables to engage with the anchor phenomenon of the surface of Earth's landscape—the shape and the composition of landforms. The driving questions for the module are What are Earth's land surface made of? and Why are landforms not the same everywhere?

Unit 1 features four investigations that focus on the anchor phenomenon that animals and plants interact with their environment and with each other. The driving question for the module deals with structure and function—How do the structures of an organism allow it to survive in its environment? Students design investigations to study preferred environments, range of tolerance, and optimum conditions for growth and survival of specific organisms, both terrestrial and aquatic. Students conduct controlled experiments by incrementally changing specific environmental conditions to determine the range of tolerance for early growth of seeds and hatching of brine shrimp, and use these data to develop and use models to understand the impact of changes to the environment. Students explore how animals use their sense of hearing and develop models for detecting and interpreting sound. They graph and interpret data from multiple trials of experiments and build explanations from evidence. 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; energy and matter; structure and function; and stability and change.

Unit 2 on Environments has four investigations that focus on the phenomena that weathering by water, ice, wind, living organisms, and gravity breaks rocks into smaller pieces, erosion (water, ice, and wind) transports earth materials to new locations, and deposition is the result of that transport process that builds new land. Students conduct controlled experiments by incrementally changing specific environmental conditions to determine the impact of changing the variables of slope and amount of water in stream tables. Students interpret data from diagrams and visual representations to build explanations from evidence and make predictions of future events. They develop model mountains and represent the landforms from different perspectives to look for change. 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. The study

of the structures and behaviors of organisms and the relationships between one organism and its environment builds knowledge of all organisms. With this knowledge comes an awareness of limits. Such knowledge is important because humans can change environments.

The Unit on **Energy Unit** fosters firsthand experiences in physical science dealing with the anchor phenomenon of energy. The five investigations focus on the concepts that energy is present whenever there is motion, electric current, sound, light, or heat, and that energy can transfer from one place to another. The driving question for the module is how does energy transfer between systems? Students investigate electricity and magnetism as related effects and engage in engineering design while learning useful applications of electromagnetism in everyday life. Students conduct controlled experiments by incrementally changing variables to determine how to make an electromagnet stronger. They investigate how the amount of energy transfer changes when balls of different masses hit a stationary object. Students explore energy transfer through waves (repeating patterns of motion) that results in sound and motion. They gather information about how energy and fuels are derived from natural resources and how that affects the environment. They explore alternative sources of energy that use renewable resources. Students interpret data from graphs to build explanations from evidence and make predictions of future events. They develop models to represent how energy moves from place to place in electric circuits and in waves. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; systems and system models; and energy and matter.

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 • NewsELA

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: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.CI.2: Use appropriate communication technologies to collaborate with individuals with diverse perspectives about a local and/or global climate change issue and deliberate about possible solutions. 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue.
Critical Thinking and Problem Solving	Can be found in unit: 1: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process. 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
Digital Citizenship	Can be found in unit: 1: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.DC.4: Model safe, legal and ethical behavior when using online or offline technology. 9.4.5.DC.8: Propose ways local and global communities can engage digitally to participate in and promote climate action.

Global and Cultural Awareness	Can be found in unit: 1: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.GCA.1: Analyze how culture shapes individual and community perspectives and points of view.
Information and Media Literacy	Can be found in unit: 1: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue. 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines and cultures to answer questions.
Technology Literacy	Can be found in unit: 1: Soil, Rocks, and Landforms 2: Environments 3: Energy 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.

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.4: Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.	Students learn about various science related careers; such as geologists, biologists, and engineers; and what foundational knowledge these individuals use in this profession.

Robbinsville Public Schools
Scope, Sequence, Pacing and Assessment

Fourth Grade Science

Unit Title	Unit Understandings and Goals	Recommended Duration/ Pacing	Assessments
Unit 1 **Soil, Rocks, and Landforms**	• Soils can be described by their properties and are composed of different kinds and amounts of earth materials and humus. • Weathering (physical and chemical) is the breakdown of rocks and minerals at or near Earth's surface. • Weathered rock material can be reshaped into new landforms by the slow processes of erosion and deposition. • Fossils provide evidence of organisms that lived long ago as well as clues to changes in the landscape and past environments • A topographic map uses contour lines to show the shape and elevation of the land. • Catastrophic events have the potential to change Earth's surface quickly. • Natural resources are natural materials taken from the environment and used by humans. • Some natural resources are renewable (sunlight, air and wind, water, soil, plants, and animals) and some are nonrenewable (minerals and fossil fuels). • Alternative sources of energy include solar, wind, and geothermal energy.	30 days	Formative • Survey prior to starting module • Science notebook entries • Response sheets • Performance Assessments • Class discussions • Reflections Summative • Performance assessment (observe collaborative group work) • I-Check after each investigation: Common Benchmark Assessments (mid/end of course) • Post-test after all investigations are completed Alternative Assessments (projects, etc when appropriate) •

Unit 2 **Environments**	• An environment is everything living and nonliving that surrounds and influences an organism. • A relationship exists between environmental factors and how well organisms grow. • Animals have structures and behaviors that function to support survival, growth, and reproduction. • Every organism has a set of preferred environmental conditions • The interaction of organisms with one another and with the nonliving environment is an ecosystem. Organisms may compete for resources in an ecosystem. • Organisms have sensory systems to gather information about their environment and act on it. • When environments change, some plants and animals survive and reproduce; others move to new locations; and some die. • Adaptations are structures and behaviors of an organism that help it survive and reproduce. • Fossils are important evidence about extinct organisms and past environments	30 days	Formative • Survey prior to starting module • Science notebook entries • Response sheets • Performance Assessments • Class discussions • Reflections Summative • Performance assessment (observe collaborative group work) • I-Check after each investigation: Common Benchmark Assessments (mid/end of course) • Post-test after all investigations are completed Alternative Assessments (projects, etc when appropriate) •
Unit 3 **Energy**	• Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can transfer from place to place. • An electric circuit is a system that includes a complete pathway through which electric current flows from an energy source to its components. • Magnets interact with each other and with some materials. • Magnets stick to (attract) objects that contain iron. Iron is the only common metal that sticks to magnets.	30 days	Formative • Survey prior to starting module • Science notebook entries • Response sheets • Performance Assessments • Class discussions • Reflections Summative • Performance assessment (observe collaborative group work) • I-Check after each investigation: Common Benchmark Assessments (mid/end of course) • Post-test after all investigations are completed

	• The magnetic force acting between magnets declines as the distance between them increases. • Earth has a magnetic field • The amount of electric current flowing in an electromagnet circuit affects the strength of the magnetism in the core (more current = stronger magnetism). • Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can be transferred from place to place. • Objects in motion have energy. The faster a given object is moving, the more kinetic energy it has. • When objects collide, energy can transfer from one object to another, thereby changing their motion. • Waves are a repeating pattern of motion that transfer energy from place to place. • Matter can absorb light.		Alternative Assessments (projects, etc when appropriate) .

Robbinsville Public Schools

Unit # 1:

Enduring Understandings:	**Essential Questions:**
• Soils can be described by their properties and are composed of different kinds and amounts of earth materials and humus. • Weathering (physical and chemical) is the breakdown of rocks and minerals at or near Earth's surface. • Weathered rock material can be reshaped into new landforms by the slow processes of erosion and deposition. • Fossils provide evidence of organisms that lived long ago as well as clues to changes in the landscape and past environments • A topographic map uses contour lines to show the shape and elevation of the land. • Catastrophic events have the potential to change Earth's surface quickly. • Natural resources are natural materials taken from the environment and used by humans. • Some natural resources are renewable (sunlight, air and wind, water, soil, plants, and animals) and some are nonrenewable (minerals and fossil fuels). • Alternative sources of energy include solar, wind, and geothermal energy.	Investigation 1: • What is soil? • What causes big rocks to break down into smaller rocks? • How are rocks affected by acid rain? • What's in our schoolyard soils? Investigation 2: • How do weathered rock pieces move from one place to another? • How does slope affect erosion and deposition? • How do floods affect erosion and deposition? • Where are erosion and deposition happening in our schoolyard? • How do fossils get in rocks and what can they tell us about the past? Investigation 3: • How can we represent the different elevations of landforms? • How can we draw a profile of a mountain from a topographic map? • How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people? • What events can change Earth's surface quickly? Investigation 4: • What are natural resources and what is important to know about them? • How are natural resources used to make concrete? • How do people use natural resources to make or build things?

Interdisciplinary Connections

RI.4.1: Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.2: Determine the main idea of a text and explain how it is supported by key details; summarize the text.
RI.4.3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.4: Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
W.2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and

analysis of content..
W.4.2.D: Use precise language and domain-specific vocabulary to inform about or explain the topic.

Math:
4.OA.C.5: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
4.MD.B.4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

- Reading skills supported through reading the science resources book: reading fluency, reading comprehension, determining main ideas, integrating information from multiple texts, drawing evidence from informational texts, determining the meaning of domain specific vocabulary.
- Writing skills supported through writing in the science notebooks: produce clear and coherent writing ,gather relevant information, recall relevant information from experiences, take notes, draw evidence from informational texts.
- Mathematics:
    - Creating tables and graphs
    - Using metric measurements
    - Using critical and higher order thinking to solve problems
    - Measurement and Scale

Guiding / Topical Questions with Specific Standards		**Content, Themes, Concepts, and Skills**	**Teaching Strategies**	**Instructional Resources and Materials**	**Assessment Strategies**
4-ESS2-1 ESS2.A: ESS2.E:	**<u>Investigation 1:</u>** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. Earth materials and systems Biogeology	**Content (Vocabulary):** Abrasion, Acid rain, Basalt, Calcite, Chemical reaction, Chemical weathering, Clay, Conglomerate, Earth material, Expand, Freeze, Granite, Gravel, Humus, Limestone, Marble, Model, Pebble, Physical weathering, Rock, Sand, Sandstone, Silt, Soil, System, Weathering **Concepts:** Soils can be described by their properties. Soils are composed of different kinds and amounts of earth materials and humus. Weathering is the breakdown of rocks and minerals at or near Earth's surface. The physical-weathering processes of abrasion	Investigate properties of soil by comparing four different soils. Examine soils and how they are composed of essentially the same types of materials (inorganic earth materials and humus), but the amounts of the materials vary. Explore how rocks break into smaller pieces through physical and chemical weathering. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: • What is soil? Benchmark Assessment: Survey **<u>Part 2:</u>** Student notebook

		and freezing break rocks and minerals into smaller pieces. Chemical weathering occurs when exposure to water and air changes rocks and minerals into something new.			entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What causes big rocks to break down into smaller rocks? Embedded Assessment: Response Sheet **Part 3:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How are rocks affected by acid rain? Benchmark Assessment: Performance Assessment **Part 4:** Student notebook entry

					Student participation and discussion Student response to the focus question, using evidence from investigations: ● What's in our schoolyard soils? Benchmark Assessment: Investigation 1 I-Check
4-ESS1-1 4-ESS2-1 ESS1.C: ESS2.A: ESS2.B:	**<u>Investigation 2:</u>** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. The history of planet Earth Earth materials and systems Plate tectonics and large-scale system interactions	**Content (Vocabulary):** Alluvial fan, Basin, Canyon, Cast, Delta, Deposition, Erosion, Flood, Floodplain, Fossil, Imprint, Landform, Meander, Mold, Mountain, Petrification, Preserved remains, River channel, River mouth, Sediment, Sedimentary rock, Slope, Superposition, Valley **Concepts:** Weathered rock material can be reshaped into new landforms by the slow processes of erosion and deposition. Erosion is the transport (movement) of weathered rock material (sediments) by moving water or wind. Deposition is the settling of sediments when the speed of moving water or wind declines. The rate and volume of erosion relate directly to the amount of energy in moving water or wind. The energy of moving water depends on the mass of water in motion and its velocity. The greater the mass and velocity, the greater the energy. Fossils provide evidence of organisms that lived	Investigate stream-table models to observe that water moves earth materials from one location to another. Investigate the variables of slope and water quantity and plan and conduct their own stream-table investigations. Students look for evidence of erosion and deposition outdoors. Explore what happens to sediments over long periods of time as sediments layer on top of each other. Examine the different processes that can result in fossils and how fossils provide evidence of life and landscapes from the ancient past. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How do weathered rock pieces move from one place to another? **<u>Part 2:</u>** Student notebook entry Student participation and discussion Student response to the focus questions, using evidence from

		long ago as well as clues to changes in the landscape and past environments			investigations: ● How does slope affect erosion and deposition? ● How do floods affect erosion and deposition? Embedded Assessment: Performance Assessment **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● Where are erosion and deposition happening in our schoolyard? Embedded Assessment: Response Sheet **<u>Part 4:</u>** Student notebook entry Student participation

					and discussion Student response to the focus question, using evidence from investigations: ● How do fossils get in rocks and what can they tell us about the past? Embedded Assessment: Response sheet Benchmark Assessment: Investigation 2 I-Check
4-ESS2-2 ESS1.C: ESS2.A: ESS3.A ESS2.B: ESS3.B: ETS1.B:	**<u>Investigation 3:</u>** Analyze and interpret data from maps to describe patterns of Earth's features. The history of planet Earth Earth materials and systems Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. Plate tectonics and large-scale system interactions Natural hazards	**Content (Vocabulary):** Contour, interval, Contour line, Crust, Earthquake, Elevation, Landslide, Lava, Magma, Mantle, Profile, Satellite cone, Sea level, Topographic map, Volcano **Concepts:** A topographic map uses contour lines to show the shape and elevation of the land. The change in elevation between two adjacent contour lines is always uniform. The closer the contour lines, the steeper the slope and vice versa. A profile is a side view or cross-section representation of a landform, and can be derived from the information on a topographic map. The surface of Earth is constantly changing; sometimes those changes take a long time to occur and sometimes they happen rapidly.	Build a model of a landform to study topography. Use a model of Mount Shasta to create a topographic map, and use this map to produce another representation of the landforms— a profile of the mountain. Analyze the impact of the Mount St. Helens eruption. Explore the processes that cause rapid changes to Earth's surface: landslides, earthquakes, floods, and volcanoes. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How can we represent the different elevations of landforms? **<u>Part 2:</u>** Student notebook entry Student participation and discussion

	Developing possible solutions	Catastrophic events have the potential to change Earth's surface quickly. Scientists and engineers can do things to reduce the impacts of natural Earth processes on humans.			Student response to the focus question, using evidence from investigations: ● How can we draw the profile of a mountain from a topographic map? Embedded Assessment: Response sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people? Embedded Assessment: Performance Assessment

					<u>Part 4:</u> Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What events can change Earth's surface quickly? Embedded Assessment: Response sheet Benchmark Assessment: Investigation 3 I-Check
4-ESS3-2 ESS3.B: ETS1.A: :	**<u>Investigation 4:</u>** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* Natural resources Defining and delimiting engineering problems	**Content (Vocabulary):** Aggregate, Cement, Concrete, Fossil fuel, Geothermal power, Natural resource, Nonrenewable resource, Renewable resource, Solar energy, Wind power **Concepts:** Natural resources are natural materials taken from the environment and used by humans. Rocks and minerals are natural resources important for shelter and transportation. Concrete is an important building material made from earth materials (limestone to make cement, sand and gravel for aggregates, and water for mixing). Some natural resources are renewable (sunlight,	Explore how earth materials are renewable and nonrenewable natural resources. Identify the importance of earth materials as resources. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What are natural resources and what is important to know about

		air and wind, water, soil, plants, and animals) and some are nonrenewable (minerals and fossil fuels). Alternative sources of energy include solar, wind, and geothermal energy. Scientists and engineers work together to improve the use of natural resources to make them more durable and useful.			them? Embedded Assessment: Response Sheet **Part 2:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How are natural resources used to make concrete? **Part 3:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How do people use natural resources to make or build things? Embedded Assessment:

					Performance Assessment Benchmark Assessment: Post-Test

Robbinsville Public Schools

Unit #: 2

Enduring Understandings:	**Essential Questions:**
• An environment is everything living and nonliving that surrounds and influences an organism. • A relationship exists between environmental factors and how well organisms grow. • Animals have structures and behaviors that function to support survival, growth, and reproduction. • Every organism has a set of preferred environmental conditions • The interaction of organisms with one another and with the nonliving environment is an ecosystem. Organisms may compete for resources in an ecosystem. • Organisms have sensory systems to gather information about their environment and act on it. • When environments change, some plants and animals survive and reproduce; others move to new locations; and some die. • Adaptations are structures and behaviors of an organism that help it survive and reproduce. • Fossils are important evidence about extinct organisms and past environments.	Investigation 1: • How do mealworm structures and behaviors help them grow and survive? • What moisture conditions do isopods prefer? • What light conditions do isopods prefer? • What are the characteristics of animals living in the leaf-litter environment? Investigation 2: • What are the environmental factors in an aquatic system? • What are the roles of organisms in a food chain? • How does food affect a population in its home range? • How do animals use their sense of hearing? Investigation 3: • How can we find out if salinity affects brine shrimp hatching? • How does salinity affect the hatching of brine shrimp eggs? • Does changing the environment allow the brine shrimp eggs to hatch? • What are some benefits of having variation within a population? Investigation 4 • How much water is needed for early growth of different kinds of plants? • What is the salt tolerance of several common farm crops? • How does mapping the plants in the schoolyard help us to investigate environmental factors? • What are some examples of plant adaptations?

Interdisciplinary Connections

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RI.4.2: Determine the main idea of a text and explain how it is supported by key details; summarize the text.
RI.4.3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.4: Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
W.2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and

analysis of content..
W.4.2.D: Use precise language and domain-specific vocabulary to inform about or explain the topic.

Math:
4.OA.C.5: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
4.MD.B.4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

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- Writing skills supported through writing in the science notebooks: produce clear and coherent writing ,gather relevant information, recall relevant information from experiences, take notes, draw evidence from informational texts.
- Mathematics:
    - Creating tables and graphs
    - Using metric measurements
    - Using critical and higher order thinking to solve problems
    - Measurement and Scale

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
4-LS1-1 4-LS1-2 LS1.A:	**Investigation 1:** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. Structure and function	**Content (Vocabulary):** Adult, Antennae, Behavior, Condition, Darkling beetle, Environment, Environmental factor, Function, Inference, Isopod, Larva, Life cycle, Living, Mealworm, Molting, Nonliving, Observation, Organism, Pill bug, Preferred environment, Pupa, Pupate, Sow, bug, Stage, Structure **Concepts:** An environment is everything living and nonliving that surrounds and influences an organism. A relationship exists between environmental factors and how well organisms grow.	Observe and describe the living and nonliving components (biotic and abiotic factors) in terrestrial environments. Observe life cycles over time. Set up an isopod environment and investigate how isopods respond to environmental factors. Investigate small animals that live in leaf-litter and study their structures. Centers-based rotations Socratic seminar	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**Part 1:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How do mealworm structures and behaviors help them grow and survive?

LS1.D: LS2.C: LS4.D:	Information processing Ecosystem dynamics, functioning, and resilience Biodiversity and humans	Animals have structures and behaviors that function to support survival, growth, and reproduction. Every organism has a set of preferred environmental conditions.	Partnership/small group explorations		Benchmark Assessment: Survey **<u>Part 2:</u>** Student notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● What moisture conditions do isopods prefer? ● What light conditions do isopods prefer? Embedded Assessment: Response Sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What are the characteristics of animals

					living in the leaf-litter environment? Benchmark Assessment: Investigation 1 I-Check
4-LS1-1 4-PS4-2 LS1.A: LS1.D: LS2.C: LS4.D:	**<u>Investigation 2:</u>** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. Structure and function. Information processing Ecosystem dynamics, functioning, and resilience Biodiversity and humans	**Content (Vocabulary):** Algae, Aquarium, Aquatic environment, Carnivore, Carrying capacity, Competition, Consumer, Decomposer, Ecosystem, Elodea, Energy, Food chain, Food web, Freshwater environment, Herbivore, Home range, Interaction, Microorganism, Omnivore, Phytoplankton, Population, Predator, Prey, Producer, Zooplankton **Concepts:** Aquatic environments include living and nonliving factors (water and temperature). The interaction of organisms with one another and with the nonliving environment is an ecosystem. Organisms may compete for resources in an ecosystem. Organisms interact in feeding relationships in ecosystems (food chains and food webs). Producers (plants, algae, phytoplankton) make their own food, which is also used by animals (consumers). Decomposers eat dead plant and animal materials and recycle the nutrients in the system. Organisms have sensory systems to gather information about their environment and act on it.	Set up a freshwater aquarium with different kinds of fish, plants, and other organisms. Monitor environments the environmental factors in a system and look for feeding interactions among populations Examine the role of producers, consumers, and decomposers in food chains and food webs in terrestrial and aquatic systems, including a marine ecosystem. Explore how animals receive information from their environment through their sensory system and use information to guide their actions. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What are the environmental factors in an aquatic system? **<u>Part 2:</u>** Student notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● What are the roles of organisms in a food chain? Embedded Assessment: Response

					Sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How does food affect a population in its home range? **<u>Part 4:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How do animals use their sense of hearing? Embedded Assessment: Response sheet Benchmark Assessment: Investigation 2 I-Check

LS1.A: LS2.C: LS4.B: LS4.D: ESS3.A:	**Investigation 3:** Structure and function Ecosystem dynamics, functioning, and resilience Natural selection Biodiversity and humans Natural resources	**Content (Vocabulary):** Brine, Brine shrimp, Concentration, Controlled experiment, Inherited trait, Migrate, Optimum, Range of tolerance, Reproduce, Salinity, Salt lake, Survive, Thrive, Tolerance, Variation, Viable **Concepts:** Organisms have ranges of tolerance for environmental factors. Within a range of tolerance, there are optimum conditions that produce maximum reproduction and growth. Brine shrimp eggs can hatch in a range of salt concentrations, but more hatch in environments with optimum salt concentration. When environments change, some plants and animals survive and reproduce; others move to new locations; and some die. Individuals of the same kind differ in their characteristics, and sometimes the differences give individuals an advantage in surviving and reproducing.	Conduct a controlled experiment to determine which of four salt concentrations allow brine shrimp eggs to hatch. Determine the range of tolerance and optimum condition for brine shrimp to hatch. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**Part 1:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How can we find out if salinity affects brine shrimp hatching? Embedded Assessment: Performance Assessment **Part 2:** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How does salinity affect the hatching of brine shrimp eggs? **Part 3:** Student notebook entry

					Student participation and discussion Student response to the focus question, using evidence from investigations: ● Does changing the environment allow the brine shrimp eggs to hatch? Embedded Assessment: Response sheet **<u>Part 4:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What are some benefits of having variation within a population? Embedded Assessment: Response sheet Benchmark Assessment: Investigation 3 I-Check

LS1.A: Structure and function LS2.C: Ecosystem dynamics, functioning, and resilience LS4.D: Evidence of common ancestry and diversity LS4.B: Natural selection LS4.D: Biodiversity and humans	**<u>Investigation 4</u>**	**Content (Vocabulary):** Adaptation, Dominant plant, Drought, Irrigate, Plant distribution, Salt-sensitive, Salt-tolerant **Concepts:** Organisms have ranges of tolerance for environmental factors. Within a range of tolerance, there are optimum conditions that produce maximum growth. Organisms have specific requirements for successful growth, development, and reproduction. A relationship exists between environmental factors and how well organisms grow. Adaptations are structures and behaviors of an organism that help it survive and reproduce. Fossils are important evidence about extinct organisms and past environments.	Set up and monitor experiments to determine the range of tolerance for germination of 4 kinds of seeds: corn, pea, barley, and radish. Test the effect of salinity on seeds. Examine plant adaptations and study local plants Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● How much water is needed for early growth of different kinds of plants? ● What is the salt tolerance of several common farm crops? Embedded Assessment: Performance Assessment **<u>Part 2:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How does mapping the

					plants in the schoolyard help us to investigate environmental factors? Embedded Assessment: Response Sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What are some examples of plant adaptations? Benchmark Assessment: Post-Test

Robbinsville Public Schools

Unit # 3:

Enduring Understandings:	**Essential Questions:**
• Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can transfer from place to place. • An electric circuit is a system that includes a complete pathway through which electric current flows from an energy source to its components. • Magnets interact with each other and with some materials. • Magnets stick to (attract) objects that contain iron. Iron is the only common metal that sticks to magnets. • The magnetic force acting between magnets declines as the distance between them increases. • Earth has a magnetic field • The amount of electric current flowing in an electromagnet circuit affects the strength of the magnetism in the core (more current = stronger magnetism). • Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can be transferred from place to place. • Objects in motion have energy. The faster a given object is moving, the more kinetic energy it has. • When objects collide, energy can transfer from one object to another, thereby changing their motion. • Waves are a repeating pattern of motion that transfer energy from place to place. • Matter can absorb light.	Investigation 1: • What is needed to light a bulb? • What is needed to make a complete pathway for current to flow in a circuit? • How can you light two bulbs brightly with one D-cell? • Which design is better for manufacturing long strings of lights—series or parallel? Investigation 2: • What materials stick to magnets? • What happens when two or more magnets interact? • What happens when a piece of iron comes close to or touches a permanent magnet? • What happens to the force of attraction between two magnets as the distance between them changes? Investigation 3: • How can you turn a steel rivet into a magnet that turns on and off? • How does the number of winds of wire around a core affect the strength of the magnetism? • How can you reinvent the telegraph using your knowledge of energy and electromagnetism? Investigation 4: • What do we observe that provides evidence that energy is present? • How does the starting position affect the speed of a ball rolling down a ramp? • What happens when objects collide? Investigation 5: • How are waves involved in energy transfer? • How does light travel?

	● How can you make a motor run faster using solar cells?

Interdisciplinary Connections

RI.4.1: Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.2: Determine the main idea of a text and explain how it is supported by key details; summarize the text.
RI.4.3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.4: Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
W.2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content..
W.4.2.D: Use precise language and domain-specific vocabulary to inform about or explain the topic.

Math:
4.OA.C.5: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
4.MD.B.4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

- Reading skills supported through reading the science resources book: reading fluency, reading comprehension, determining main ideas, integrating information from multiple texts, drawing evidence from informational texts, determining the meaning of domain specific vocabulary.
- Writing skills supported through writing in the science notebooks: produce clear and coherent writing ,gather relevant information, recall relevant information from experiences, take notes, draw evidence from informational texts.
- Mathematics:
    - Creating tables and graphs
    - Using metric measurements
    - Using critical and higher order thinking to solve problems
    - Measurement and Scale

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
4-PS3-2 4-PS3-4	**<u>Investigation 1:</u>** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	**Content (Vocabulary):** Battery, Bulb base, Bulb casing, Circuit, Closed circuit, Component, Conductor, Contact point, D-cell, Electric current, Electricity, Energy, Energy source, Filament, Insulator, Light, Lightbulb, Metal, Motion, Motor, Open circuit, Parallel circuit, Series circuit, Shaft, Short circuit, Switch, System, Terminal, Transfer, Wire	Investigate electric current and circuits, the pathways through which electricity flows. Work with a variety of components—D-cells, lightbulbs, motors, switches, and wires—and explore conductors and insulators.	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities	**<u>Part 1:</u>** Student participation and discussion Student response to the focus question, using evidence from investigations:

PS3.A: PS3.D: ETS1.A: ETS1.B: ETS1.C:	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* Definitions of energy energy and energy transfer Energy in chemical processes and everyday life Defining and delimiting engineering problems Developing possible solutions Optimizing the design solution	**Concepts:** Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can transfer from place to place. An electric circuit is a system that includes a complete pathway through which electric current flows from an energy source to its components. Conductors are materials through which electric current can flow; all metals are conductors. In a series circuit, there is a single pathway from the energy source to the components; in a parallel circuit, each component has its own direct pathway to the energy source. The energy of two energy sources (D-cells or solar cells) adds when they are wired in series, delivering more power than a single source. Two cells in parallel have the same power as a single cell.	They explore series and parallel circuits and compare the functioning of the components in each circuit Formulate and justify their predictions, based on their observations of electricity transferring energy to produce light and motion. Centers-based rotations Socratic seminar Partnership/small group explorations	FOSS online videos	• What is needed to light a bulb? Benchmark Assessment: Survey Embedded Assessment: Science notebook entry **<u>Part 2:</u>** Student participation and discussion Student response to the focus questions, using evidence from investigations: • What is needed to make a complete pathway for current to flow in a circuit? Embedded Assessment: Science notebook entry **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations:

					• How can you light two bulbs brightly with one D-cell? Embedded Assessment: Response Sheet **<u>Part 4:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: • Which design is better for manufacturing long strings of lights—series or parallel? Embedded Assessment: Performance assessment Benchmark Assessment: Investigation 1 I-Check

4-PS3-2 4-PS3-4 PS2.B: PS3.B: PS3.D:	**<u>Investigation 2:</u>** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* Types of interactions Conservation of energy and energy transfer Energy in chemical processes and everyday life	**Content (Vocabulary):** Attract, Compass, Force, Gravity, Induced magnetism, Interact, Iron, Magnet, Magnetic field, Magnetism, North pole, Opposite Permanent magnet, Pole, Repel, South pole, Steel, Temporary magnet **Concepts:** Magnets interact with each other and with some materials. Magnets stick to (attract) objects that contain iron. Iron is the only common metal that sticks to magnets. All magnets have two poles, a north pole at one end (side) and a south pole at the other end (side). Like poles of magnets repel each other, and opposite poles attract. Magnets are surrounded by an invisible magnetic field, which acts through space and through most materials. When an iron object enters a magnetic field, the field induces magnetism in the iron object, and the object becomes a temporary magnet. The magnetic force acting between magnets declines as the distance between them increases. Earth has a magnetic field	Investigate the properties of magnets and their interactions with materials and each other Conduct an investigation to determine if like or opposite poles of a magnet attract Construct a simple compass and use it to detect magnetic effects Discover that magnetism can be induced in a piece of iron Investigate the strength of the force of attraction between two magnets by graphing data to look for patterns of interaction Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student participation and discussion Student response to the focus question, using evidence from investigations: ● What materials stick to magnets? Embedded Assessment: Science notebook entry **<u>Part 2:</u>** Science notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● What happens when two or more magnets interact? ● What happens when a piece of iron comes close to or touches a permanent magnet? Embedded Assessment: Response

					sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What happens to the force of attraction between two magnets as the distance between them changes? Embedded Assessment: Performance assessment Benchmark Assessment: Investigation 2 I-Check
4-PS3-2 4-PS3-4	**<u>Investigation 3:</u>** Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	**Content (Vocabulary):** Code, Coil, Core, Electromagnet, Electromagnetism, Key, Rivet, Telegraph **Concepts:** A magnetic field surrounds a wire through which electric current is flowing. The magnetic field produced by a current-carrying wire can induce magnetism in a piece of iron or steel.	Explore using electricity to make an electromagnet Explore the variables that influence the strength of the magnetism produced by their electromagnets Use all the concepts they have learned to engineer a simple telegraph system and communicate using a click code. Centers-based rotations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Science notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● How can you

PS2.B:	Types of interactions	An electromagnet is made by sending electric current through an insulated wire wrapped around an iron core. The number of winds of wire in an electromagnet coil affects the strength of the magnetism induced in the core (more winds = more magnetism). The amount of electric current flowing in an electromagnet circuit affects the strength of the magnetism in the core (more current = stronger magnetism). A telegraph system is an electromagnet- based technology used for long-distance communication.	Socratic seminar Partnership/small group explorations		turn a steel rivet into a magnet that turns on and off? Embedded Assessment: Response sheet **<u>Part 2:</u>** Science notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● How does the number of winds of wire around a core affect the strength of the magnetism? Embedded Assessment: Performance assessment **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question,

					using evidence from investigations: ● How can you reinvent the telegraph using your knowledge of energy and electromagnetism? Embedded Assessment: Science notebook entry Benchmark Assessment: Investigation 3 I-Check
4-PS3-1 4-PS3-2 4-PS3-3 4-PS3-4	**<u>Investigation 4:</u>** Use evidence to construct an explanation relating the speed of an object to the energy of that object. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] Apply scientific ideas to design, test, and refine a	**Content (Vocabulary):** Collide, Collision, Friction, Fuel, Heat, Kinetic energy, Potential energy, Sound, Stationary, Transfer of energy **Concepts:** Energy is evident whenever there is motion, electric current, sound, light, or heat. Energy can be transferred from place to place. Objects in motion have energy. The faster a given object is moving, the more kinetic energy it has. When objects collide, energy can transfer from one object to another, thereby changing their motion. Kinetic energy is energy of motion; potential energy is energy of position. For identical objects at rest, the objects at higher heights have more potential energy than the objects at lower heights.	Observe energy transfer that results in heat, light, sound, and motion and they are introduced to sources of energy and components that store energy Conduct structured investigations with steel balls and ramps to discover how the variable of starting position on the ramp affects the speed of the rolling ball Test the variables of mass and release position to find out how these variables affect energy transfer. Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Science notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What do we observe that provides evidence that energy is present? Embedded Assessment: Performance assessment **<u>Part 2:</u>** Student participation

PS3.A:	device that converts energy from one form to another.* Definitions of energy				and discussion Student response to the focus questions, using evidence from investigations: ● How does the starting position affect the speed of a ball rolling down a ramp? Embedded Assessment: Science notebook entry **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to the focus question, using evidence from investigations: ● What happens when objects collide? Embedded Assessment: Response sheet Benchmark Assessment: Investigation 4 I-Check

4-ESS3-1: 4-PS4-1: 4-PS4-3: ETS1.A: 	**<u>Investigation 5:</u>** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. Generate and compare multiple solutions that use patterns to transfer information.* Defining and delimiting engineering problems	**Content (Vocabulary):** Amplitude, Compression, Cycle, Frequency, Mirror, Peak, Ray, Reflect, Reflection, Refract, Refraction, Solar cell, Trough, Wave, Wavelength **Concepts:** Waves are a repeating pattern of motion that transfer energy from place to place. Some electromagnetic waves can be detected by humans (light); others can be detected by designed technologies (radio waves, cell phones). There are sound waves, light waves, radio waves, microwaves, and ocean waves. Waves have properties—amplitude, wavelength, and frequency. Light travels in straight lines and can reflect (bounce) off surfaces. Light can refract (change direction) when it passes from one transparent material into another. Matter can absorb light. An object is seen only when light from that object enters and is detected by an eye. White light is a mixture of all colors (wavelengths) of visible light. Solar cells are designed technologies to transfer visible light into electricity. The energy of two energy sources (D-cells or solar cells) adds when they are wired in series, delivering more power than a single source. Two cells in parallel have the same power as a single cell	Experience waves through firsthand experiences using ropes, demonstrations with waves in water, spring toys, and a sound generator Use videos, animations, and readings to gather information Design series and parallel solar cell circuits and observe the effect on the speed of a motor Observe that cells in series make the motor run faster, but cells in parallel do not deliver additional power to the motor Read about alternative energy sources Centers-based rotations Socratic seminar Partnership/small group explorations	Content-specific anchor charts, content-specific word wall Student resources book FOSS online activities FOSS online videos	**<u>Part 1:</u>** Student participation and discussion Student response to the focus question, using evidence from investigations: ● How are waves involved in energy transfer? Embedded Assessment: Science notebook entry **<u>Part 2:</u>** Science notebook entry Student participation and discussion Student response to the focus questions, using evidence from investigations: ● How does light travel? Embedded Assessment: Response sheet **<u>Part 3:</u>** Student notebook entry Student participation and discussion Student response to

					the focus question, using evidence from investigations: ● How can you make a motor run faster using solar cells? Embedded Assessment: Performance assessment Benchmark Assessment: Post-test

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/