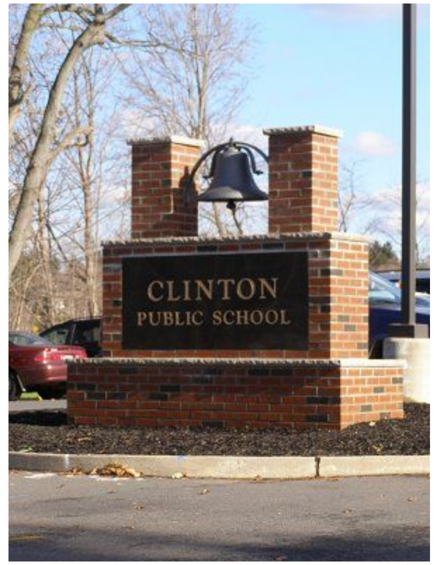
Clinton-Glen Gardner School District



Curriculum Management System

SCIENCE

Grade: 2

* **For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy #2200.**

Board Approved: August 23, 2017

CLINTON-GLEN GARDNER SCHOOL DISTRICT

ADMINISTRATION

Dr. Seth Cohen, Superintendent/Principal
Mrs. Lisa J. Craft, Business Administrator
Mrs. Jacqueline Turner, Assistant Principal
Mrs. Jenine Kastner, Director of Special Services

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Acknowledgments

The following individuals are acknowledged for their assistance in the preparation of this Curriculum Management System:

Writers' Names: **Kelly DeJesus**

Clinton-Glen Gardner School District

Mission

The Clinton-Glen Gardner School District is a community who values traditions. Our MISSION is to nurture and cultivate each child to be a compassionate, curious, and creative thinker, entrusted and empowered to build and lead the future.

Philosophy

Science, engineering, and technology influence and permeate every aspect of modern life. Some knowledge of science and engineering is required to engage with the major public policy issues of today as well as to make informed everyday decisions, such as selecting among alternative medical treatments or determining how to invest public funds for water supply options. In addition, understanding science and the extraordinary insights it has produced can be meaningful and relevant on a personal level, opening new worlds to explore and offering lifelong opportunities for enriching people's lives. In these contexts, learning science is important for everyone, even those who eventually choose careers in fields other than science or engineering.

The Next Generation Science Standards (NGSS) are K–12 science content standards. Standards set the expectations for what students should know and be able to do. The NGSS were developed by states to improve science education for all students.

A goal for developing the NGSS was to create a set of research-based, up-to-date K–12 science standards. These standards give local educators the flexibility to design classroom learning experiences that stimulate students' interests in science and prepares them for college, careers, and citizenship. The CPS Science Curriculum is designed to address the goals and philosophy of the New Jersey Next Generation Science Standards.

Grade Two
Science
Scope and Sequence

<table>
<tr><th colspan="2">Quarter I</th></tr>
<tr><td>Unit 1: Properties of Matter
● How do the properties of materials determine their use?
● How can we sort objects into groups that have similar patterns?
● Can some materials be a solid or a liquid?</td><td></td></tr>
<tr><td>(The ones that apply for these units are in bold)

<u>21st Century Skills</u>
1. Creativity & Innovation
2. Critical Thinking & Problem Solving
3. Communication & Collaboration
4. Media Literacy
5. Information Literacy
6. Information, Communication & Technology</td><td><u>Cross Cutting Concepts</u>
1. Patterns
2. Cause and Effect
3. Scale, Proportion and Quantity
4. System and System Models
5. Energy and Matter: flows, cycles and conservation
6. Structure and Function
7. Stability and Change</td></tr>
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1. Global Awareness
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1. Asking questions or defining a problem
2. Developing and using models
3. Planning and carrying out investigations
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5. Using mathematics and computational thinking
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Differentiation
Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations,graphs, charts, data tables, multimedia, modeling).•Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences).•Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.• Use project based science learning to connect science with observable phenomena.• Structure the learning around explaining or solving a social or community-based issue. • Provide ELL students with multiple literacy strategies.• Collaborate with after-school programs or clubs to extend learning opportunities.•Restructure lesson using UDL principles: (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)
Assessment
District End of Unit Benchmark Various opportunities during lab investigations for formative assessment and anecdotal notes. Foss Kit I-Investigations at the end of each investigation as benchmark. Review of student documentation of learning process in Science notebook and observations of approach to investigations as formative assessment. **During Work Period adjust lessons for individual students and small groups of students based on formative and summative data (Go back and re-teach for those that did not meet standard on benchmark and plan accordingly for those that exceeded benchmark)**

Quarter II

Unit 2: Changes to Matter

- How can objects change?
- Are all changes reversible?
- In what ways can an object made of a small set of pieces be disassembled and made into a new object?
- Can all changes caused by heating or cooling be reversed?

Unit 3: The Earth's Land and Water

- Where do we find water?
- In what ways can an object made of a small set of pieces be disassembled and made into a new object?
- How can we identify where water is found on Earth and if it is solid or liquid?

(The ones that apply for these units are in bold)

21st Century Skills

1. **Creativity & Innovation**
2. **Critical Thinking & Problem Solving**
3. **Communication & Collaboration**
4. Media Literacy
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Cross Cutting Concepts

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Quarter III

Unit 4: Relationships in Habitats ● Why do we see different living things in different habitats? ● How does the diversity of plants and animals compare among different habitats? ● What do plants need to live and grow? ● Why do some plants rely on animals for reproduction?	

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Quarter IV

Unit 5: Changes to Earth's Land

- In what ways do humans slow or prevent wind or water from changing the shape of the land?
- What evidence can we find to prove that Earth events can occur quickly or slowly?
- In what ways do humans slow or prevent wind or water from changing the shape of the land?

(The ones that apply for these units are in bold)

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Grade 2	**Topic: Properties of Matter**
October	
Essential Questions	How can solid objects be described? What are solid objects made of? Can two or more objects have the same property? What are the properties of successful towers? How are liquids different from each other? How can liquids be described? How do liquids change in containers? Are these materials solid or liquid? How can mixtures of particles be separated? How do particles of solids move in bottles? What is a general rule for using screens to separate a mixture of small objects?

Disciplinary Core Concepts:	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. (2-PS1-1) ·Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3) ·A great variety of objects can be built up from a small set of pieces. (2-PS1-3) ETS1.C: Optimizing the Design Solution ·Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)
How will they learn it? Learning Activities:	Investigation 1: Everything Matters, Solid Objects and Materials, Towers & Bridges Investigation 2: Liquids Investigation 3: Pouring & Comparing Solids and Liquids
Resources	Investigation 1: Solids Videos: Clothing and Building Materials, Properties of Materials Investigation 2: Liquids Video: All about Properties of Matter Online Activity: Falling Bottle Puzzle Investigation 3: Bits and Pieces

How do we know that they know it? **Assessment**	**Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the** **learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.**
Interdisciplinary Connections	*English Language Arts* Students can participate in shared research, using trade books and online resources, to learn about the properties of matter. As students explore different types of materials, they can record their observations in science journals, and then use their notes to generate questions that can be used for formative or summative

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assessment. Students can add drawings or other visual displays to their work, when appropriate, to help clarify their thinking. To teach students how to describe how reasons support specific points an author makes in a text, teachers can model the comprehension skill of main idea and details using informational text about matter. Technology can be integrated into this unit of study using free software programs (e.g., Animoto) that students can use to produce and publish their writing in science.

Mathematics

Throughout this unit of study, students have opportunities to model with mathematics and reason abstractly and quantitatively. During investigations, students can collect and organize data using picture graphs and/or bar graphs (with a single-unit scale). This can lead to opportunities to analyze data and solve simple put together, take-apart, and compare problems using information presented in these types of graphs. Some examples of ways to sort and classify materials in order to create graphs include:

Classifying materials as solids, liquids, or gases.
Classifying materials by color, shape, texture, or hardness.
Classifying materials based on what they are made of (e.g., wood, metal, paper, plastic).
Classifying materials based on potential uses.

With any graph that students create, they should be expected to analyze the data and answer questions that require them to solve problems.
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What will students be able to do as a result of the learning in this unit?	*Students who understand the concepts can:* ·Observe patterns in the natural and human-designed world. ·Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. ·Plan and conduct an investigation to describe and classify different kinds of material by their observable properties. (Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.) ·Design simple tests to gather evidence to support or refute student ideas about causes. ·Analyze data from tests of an object or tool to determine if it works as intended. ·Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. (Assessment of quantitative measurements is limited to length.) Examples of properties could include: strength, flexibility, hardness, texture, & absorbency. ·Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of each.

Grade 2	Topic: Changes to Matter
November/December	
Essential Questions	What happens when solids are mixed with water? What happens when liquids are mixed with water? Is toothpaste solid or liquid? How do properties of materials change when they are heated or cooled? What happens when you mix water with solid plant material collected outdoors? Are all changes reversible?
Disciplinary Core Concepts:	PS1.A: Structure and Properties of Matter ·Different properties are suited to different purposes. (2-PS1-3) ·A great variety of objects can be built up from a small set of pieces. (2-PS1-3) PS1.B: Chemical Reactions ·Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

How will they learn it? **Learning Activities:**	Investigation 4: Mix It Up!, Heating and Cooling & Is Change Reversible?
Resources	Investigation 4: Solids, Liquids and Water Video: Solids and Liquids Online Activity: Change It! The following are suggested activities from the NJ Model Curriculum:

STEM in a BOX - Shakin' Up the Classroom: K-3EarthScienceSTEMintheboxprint.docx: In this engaging lesson, the students examine and describe materials and their properties in order to assemble these materials into a strong building that could withstand the earth shaking. The physical science core ideas in the Performance Expectation are met through a larger earth science/earthquake unit that is part of the unit level resource.

Go to the resource listed under K-3: k-3EarthScienceSTEMintheboxprint.docx

Thousands of tiny pieces can create something big: In this resource which is based on enactment in a second grade classroom and includes videos and examples of student work, the teacher introduces students to Watt's tower, a tower made of many pieces of junk in the neighborhood. Students make their own objects out of many pieces or materials that the teacher provides and the students think about and discuss whether they could use the same set of materials to make something different.

Take it apart, put it together: This is a wonderfully supported and creative lesson that involves students taking apart an old appliance and making a new object using the appliance parts. The teacher guides students using a variety of teacher prompts and individual journaling to track their idea development, questions, changing plans, and evidence-based explanations.

	Exploring Reversible Changes of State and Exploring Irreversible Changes of State These two lessons work together to explore reversible and irreversible changes of state through guided investigations. The PDF is a set of activities focusing on materials followed by some optional post-activity lessons. Two of these post activity lessons deal with reversible and irreversible changes to materials. The first lesson involves teachers showing students phenomena and then asking the students to generate questions about their observations of the phenomena. The second lesson involves students engaging in investigating, explaining and asking questions about two irreversible changes and using observations to identify what about the changes make them irreversible. The Magic School Bus Bakes in a Cake lesson and video, "Ready Set Dough" !: This is a lesson plan that accompanies the reading or watching of The Magic School Bus Bakes a Cake, or Ready Set Dough. The lesson is a short activity with guided questions that accompany making pretzel dough. In the book and video, which are not included in the resource, The Magic School Bus shrinks down to molecule size to observe and discuss chemical and physical changes while baking. The resource contains a link to purchase the book. The video can be found at https://www.youtube.com/watch?v=dTw-ok3KkuU.

	The Science of Macaroni Salad (and 2. Dig Deeper): This three minute video is great for teachers who need a short and deeper understanding of what is entailed in the Performance Expectations for Properties of Matter and what is involved when a physical and chemical change occurs. It would be over the heads of younger children, but perfect for elementary teachers who can either view the video themselves and translate the most pertinent ideas in it, or watch the video with the students and narrate in kid language. If the teacher watched the video first, they would be ensured that they had the understanding necessary for tough questions.

How do we know that they know it? Assessment	**Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.**
Interdisciplinary Connections	*English Language Arts* Students need opportunities to read texts that give information about matter and the changes that can happen to matter. With adult support, students can identify the main idea and details in informational text in order to answer questions about matter. With teacher support and modeling, students can ask and answer who, what, where, when, why, and how questions to demonstrate their understanding of key details in informational text. As students investigate reversible and irreversible changes to matter, they should record observations in science journals, using drawings or other visual displays, when appropriate, to help clarify their thinking. To further support their learning, students can conduct shared research using trade books and online resources in order to

	learn more about physical changes to matter. After reading informational texts and conducting investigations, students should be able to write opinion pieces in which they state an opinion, supply evidence to support their opinion, use linking words to connect opinion to evidence (reasons), and provide a concluding statement. For example, students can be presented with an example of matter that has been changed in some way, then asked to write an opinion piece in which they state whether or not they think the change is reversible or irreversible, and supply evidence to support their thinking. Evidence can include information recalled from experiences or information gathered from informational texts or other resources. Some possible changes that can be used are: tearing paper, bending a spoon, baking a cake, hammering a nail into a piece of wood, getting grass stains on a pair of jeans, & cutting your hair.

What will students be able to do as a result of the learning in this unit?	*Students who understand the concepts are able to:* ·Break objects into smaller pieces and put them together into larger pieces or change shapes. ·Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ·Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. ·Observe patterns in events generated due to cause-and-effect relationships. ·Construct an argument with evidence to support a claim. ·Construct an argument with evidence that some changes caused by heating or cooling can be reversed, & some cannot. (Examples of reversible changes include materials such as water and butter at different temperatures. Examples of irreversible changes could include: cooking an egg, freezing a plant leaf, heating paper.)

Grade 2	Topic: The Earth's Land and Water
January	
Essential Questions	What happens when rocks rub together? What happens when rocks are placed in water? How are river rocks the same? What are the properties of schoolyard rocks? How many ways can rocks be sorted? How can rocks be separated by size? How else can rocks be sorted by size? Is there an earth material smaller than sand? What earth material is smaller than silt? How do people use earth materials? How are bricks made?
Disciplinary Core Concepts:	ESS2.C: The Roles of Water in Earth's Surface Processes Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3) ESS2.B: Plate Tectonics and Large-Scale System Interactions Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

How will they learn it? **Learning Activities:**	Investigation 1: Exploring Rocks & Colorful Rocks Investigation 2: The Story of Sand, Rocks Move & Landforms Investigation 3: Making Things with Rocks & What Are Natural Resources?
Resources	Investigation 1: First Rocks Video: All about Volcanoes Online Activities: Rock Sorting & Property Chain Investigation 2: River Rocks Video: All about Land Formations Investigation 3: Using Rocks Online Activity: Find Earth Materials

How do we know that they know it? Assessment	**Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.**
Interdisciplinary Connections	*English Language Arts* Students gather information about the types of landforms and bodies of water from experiences or from text and digital resources. They can use this information to answer questions such as, "Where can water be found as solid ice or snow year round?" Students should also have the opportunity to use their research to publish a writing piece, with guidance and support from adults or collaboratively with peers, based on their findings about various landforms and bodies of water. Diagrams, drawings, photographs, audio or video recordings, poems, dioramas, models, or other visual displays can accompany students' writing to help recount experiences or clarify thoughts and ideas.

	Mathematics As students collect data about the size of landforms and bodies of water, these numbers can be used to answer questions, make comparisons, or solve problems. For example: ● If students know that a mountain is 996 feet in height, a lake is 550 feet deep, a river is 687 miles long, and a forest began growing about 200 years ago, have students show each number in three ways using base-ten blocks, number words, and expanded form. ● A stream was 17 inches deep before a rainstorm and 33 inches deep after a rainstorm. How much deeper did it get during the rainstorm? As students engage in these types of mathematical connections, they are also modeling with mathematics and reasoning abstractly and quantitatively. When modeling with mathematics, students diagram situations mathematically (using equations, for example) and/or solve addition or subtraction word problems. When students reason abstractly and quantitatively, they manipulate symbols (numbers and other math symbols) abstractly and attend to the meaning of those symbols while doing so.

What will students be able to do as a result of the learning in this unit?	*Students who understand the concepts are able to:* • Observe patterns in the natural world. •Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) and other media that will be useful in answering a scientific question. •Obtain information to identify where water is found on Earth and to communicate that it can be a solid or liquid.

	•Observe patterns in the natural world. •Develop a model to represent patterns in the natural world. •Develop a model to represent the shapes and kinds of land and bodies of water in an area.

Grade 2	**Topic: Relationships in Habitats**
March/April	
Essential Questions	What happens to seeds in moist soil? What happens to the grass and plants after we mow them? 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?
Disciplinary **Core Concepts:**	LS4.D: Biodiversity and Humans ·There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1) LS2.A: Interdependent Relationships in Ecosystems ·Plants depend on water and light to grow. (2-LS2-1) ·Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

	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 solutions to other people.*(secondary to 2-LS2-2)* ETS1.A: Defining and Delimiting Engineering Problems ·A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ·Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) ·Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

How will they learn it? **Learning Activities:**	Investigation 1: What Do Plants Need?, The Story of Wheat & Variation Investigation 3: What Do Animals Need?, Plants and Animals around the World & Learning from Nature Investigation 4: Animals and Their Young
Resources	Investigation 1: Grass and Grain Seeds Videos: How Plants Grow & Animal Growth Investigation 2: Stems Investigation 3: Terrariums Videos: How Plants Live in Different Places & Animal Growth Online Activity: Sorting Animals by Structures Investigation 4: Growth and Change Video: Animal Offspring and Caring for Animals Online Activities: Watch It Grow! & Find the Parent

How do we know that they know it? Assessment	**Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.**
Interdisciplinary Connections	*English Language Arts/Literacy* Students can participate in shared research using trade books and online resources to learn about the diversity of life in different habitats or to discover ways in which animals help pollinate plants or distribute seeds. Students can record their findings in science journals or use the research to write and illustrate their own books. Students can also learn to take notes in their journals order to help them recall information from experiences or gather information from provided sources. They can add drawings or other visual displays to their work, when appropriate, to clarify ideas, thoughts, and feelings.

	Mathematics Throughout this unit of study, students need opportunities to represent and interpret categorical data by drawing picture graphs and/or bar graphs (with a single-unit scale) to represent a data set with up to four categories. This will lead to opportunities to solve simple put-together, take-apart, and compare problems using information presented in these types of graphs. For example, students could create bar graphs that show the number of seedlings that sprout with and without watering or that document plant growth. They could also create a picture graph showing the number of plant species, vertebrate animal species, and invertebrate animal species observed during a field trip or in a nature photograph. As students analyze the data in these types of graphs, they can use the data to answer simple put-together, take apart, and compare problems. This unit also presents opportunities for students to model with mathematics. They can diagram situations mathematically or solve a one-step addition or subtraction word problems. Data collected in bar graphs and picture graphs can easily be used for this purpose.

What will students be able to do as a result of the learning in this unit?	*Students who understand the concepts can:* ·Look for patterns and order when making observations about the world. ·Make observations (firsthand or from media) to collect data that can be used to make comparisons. ·Make observations of plants and animals to compare the diversity of life in different habitats. *(Note: The emphasis is on the diversity of living things in each of a variety of different habitats; assessment does not include specific animal and plant names in specific habitats.)* ·*Observe patterns in events generated by cause-and-effect relationships.*

	·*Plan and conduct an investigation collaboratively to produce data to serve as a basis for evidence to answer a question.* ·*Plan and conduct an investigation to determine whether plants need sunlight and water to grow. (Note: Assessment is limited to one variable at a time.)* ·*Describe how the shape and stability of structures are related to their function.* ·*Develop a simple model based on evidence to represent a proposed object or tool.* ·*Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* ·*Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.*

Grade 2	**Topic: Changes to Earth's Land**
May/June	
Essential Questions	What evidence can we find to prove that Earth events can occur quickly or slowly? In what ways do humans slow or prevent wind or water from changing the shape of the land? How can soil erosion be reduced? **First two are from the model curriculum. The last one was from the FOSS kit module.**
Disciplinary **Core Concepts:**	<u>ESS1.C: The History of Planet Earth</u> ·Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1) <u>ESS2.A: Earth Materials and Systems</u> ·Wind and water can change the shape of the land. (2-ESS2-1) <u>ETS1.A: Defining and Delimiting Engineering Problems</u> ·A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ·Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) ·Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) 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 solutions to other people. (K-2-ETS1-2)

How will they learn it? **Learning Activities:**	Investigation 4: What Is in Soil?, Testing Soil, Where Is Water Found?, States of Water, Erosion & Ways to Represent Land and Water
Resources	Investigation 4: Soil and Water Videos: All about Soil & All about Landforms
	Sample of Open Education Resources via the NJ Model Curriculum: How Can Water Change the Shape of the Land? In this lesson plan children investigate water erosion. Students make a sand tower and observe the erosion as they drop water on it. Students observe, illustrate, and record notes about the process. Short videos and a read aloud also further support understanding of the Performance Expectation. How Can Wind Change the Shape of the Land? This lesson builds on another lesson created by Jeri Faber in which students discovered how water changes the earth. For this lesson, students take part in a teacher-led investigation to show how wind changes the land. The children use straws to blow on a small mound or hill of sand. As each child takes a turn, the other students record their detailed observations that will later be used to draw conclusions. Students also watch a short video on wind erosion and discuss the new learning with partners. Finding Erosion at Our School In this lesson, students walk around the school grounds, neighborhood, or another area of their community to

	locate evidence of erosion. Various problems caused by erosion are discussed and a solution is developed for one of the problems. This lesson is one in a series on erosion by Jeri Faber. A follow-up lesson is available where students compare their erosion design solutions.

How do we know that they know it? Assessment	**Benchmark assessments are short summative assessments given after each investigation. These I-Checks are actually hybrid tools: they provide summative information about students' achievement, and because they occur soon after teaching each investigation, they can be used diagnostically as well. Reviewing specific items on an I-Check with the class provides additional opportunities for students to clarify their thinking. The embedded assessments are based on authentic work produced by students during the course of participating in the FOSS activities. Students do their science, and teachers review their notebook entries. Bullet points in the Guiding the Investigation tell you specifically what students should know and be able to communicate. If student work is incorrect or incomplete, you know that there has been a breakdown in the learning/communicating process. The assessment system then provides a menu of next-step strategies to resolve the situation. Embedded assessment is assessment for learning, not assessment of learning.**
Interdisciplinary Connections	*English Language Arts* Students participate in shared research to gather information about Earth events from texts and other media and digital resources. They will use this information to answer questions and describe key ideas and details about ways in which the land can change and what causes these changes. Students should also have opportunities to compose a writing piece, either independently or collaboratively with peers, using digital tools to produce and publish their writing. Students should describe connections between Earth events and the changes they cause, and they should include photographs, videos, poems, dioramas, models, drawings, or other visual displays of their work, when appropriate, to clarify ideas, thoughts, and feelings.

	Mathematics Students have multiple opportunities to reason abstractly and quantitatively as they gather information from media sources. Students can organize data into picture graphs or bar graphs in order to make comparisons. For example, students can graph rainfall amounts. Students can use the data to solve simple addition and subtraction problems using information from the graphs to determine the amount of change that has occurred to local landforms. For example, a gulley was 17 inches deep before a rainstorm and 32 inches deep after a rainstorm. How much deeper is it after the rainstorm? Students must also have an understanding of place value as they encounter the varying timescales on which Earth events can occur. For example, students understand that a period of thousands of years is much longer than a period of hundreds of years, which in turn is much longer than a period of tens of years. In addition, teachers should give students opportunities to work with large numbers as they describe length, height, size, and distance when learning about Earth events and the changes they cause. For example, students might write about a canyon that is 550 feet deep, a river that is 687 miles long, or a forest that began growing about 200 years ago.

What will students be able to do as a result of the learning in this unit?	*Students who understand the concepts are able to:* •Make observations from several sources to construct an evidence-based account for natural phenomena. •Use information from several sources to provide evidence that Earth events can occur quickly or slowly. *(Assessment does not include quantitative measurements of timescales.)* Some examples of these events include: volcanic explosions, earthquakes and erosion of rocks. •Compare multiple solutions to a problem.

	•Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. Examples of solutions could include: different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land. •Ask questions based on observations to find more information about the natural and/or designed world. •Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. •Define a simple problem that can be solved through the development of a new or improved object or tool. •Develop a simple model based on evidence to represent a proposed object or tool. •Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.