BOE Approved 8/18

Cliffside Park Public Schools

Science

Unit Name: Pebbles, Sand, and Silt (Earth Science)

Resource: FOSS Next Generation, Delta Education

Duration: Ten Weeks

Enduring Understandings

First Rocks

• Rocks can be described by their properties.
• Smaller rocks (sand) result from the breaking (weathering) of larger rocks.
• Rocks are the solid material of Earth.
• Rocks are composed of minerals.
• Volcanoes are mountains built up by melted rocks that flow out of weak areas in Earth's crust.

River Rocks

• Rocks are earth materials.
• Rocks can be described by the property of size.
• Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders.
• Weathering, caused by wind or water, causes larger rocks to break into small rocks.
• Some Earth events happen rapidly; others occur slowly over a very long period of time.

Using Rocks

• Earth materials are natural resources.

• The properties of different earth materials make each suitable for specific uses.
• Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth.
• Earth materials are commonly used in the construction of buildings and streets.

Soil and Water

• Earth materials are natural resources.
• Soils can be described by their properties (color, texture, ability to support plant growth).
• Soil is made partly from weathered rock and partly from organic material. Soils vary by location.
• Natural sources of water include streams, rivers, ponds, lakes, marshes, and the ocean. Sources of water can be fresh or saltwater.
• Water can be a solid, liquid, or gas.
• Wind and water can change the shape of land.
• The shapes and kinds of land and water can be represented by various models.

Essential Questions

First Rocks:

- 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?

River Rocks

- 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?

Using Rocks

- How do people use earth materials?
- What does sand do for sandpaper?
- How can we make a sand sculpture?

- What makes clay the best earth material for making beads?
- How are bricks made?

Soil and Water

- What is soil?
- How do soils differ?
- Where is water found in our community?
- How can soil erosion be reduced?

Focus of Standards

Student Outcomes	**Skills**	**Assessments & Modifications**
First Rocks ● I can use tools to observe and compare physical properties of rocks. ● I can compare and sort rocks in different ways, using two or more physical properties. ● I can rub rocks together and observe that they break into smaller pieces. ● I can observe rocks interacting with water. ● **River Rocks** ● I can explore a river-rock mixture containing earth material particles of various sizes and use screens to separate and group river rocks by particle size. ● I can separate sand and silt using water. ● I can explore the properties of dry and wet clay particles. ● I can describe a number of landforms. **Using Rocks** ● I can explore places where earth materials are naturally found and ways that earth materials are used.	● Asking questions ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information ● Developing and using models	● **Formative**: Notebook Entries: ○ Notebook Entries ○ Teacher Observation ○ Anecdotal Records/Notes ○ Science notebook ○ Embedded Assessment Notes ● **Summative Performance** ○ Foss Post-test on Pebbles, Sand, and Silt ○ Vocabulary check ● **Benchmark Assessments**: ○ Investigation Checks ○ Constructing models- formation and breakdown of rocks. ○ Properties of different types of rocks ○ Describing different landforms ○ Comparing/contrasting models- uses of various materials ○ Characteristics different building materials ● **Alternative:**

● I can observe and compare different grades of sandpaper. ● I can use sand to make sculptures and clay to make bead, jewelry, and bricks. ● I can search for earth materials outside the classroom. **Soil and Water** ● I can use screens and water to separate the components in a soil mixture. ● I can find, collect, record, and compare samples of soil outside the classroom. ● I can compare engineering designs to prevent erosion. ● I can compare models of land and water to identify common features and differences.		○ Conferences ○ Diagrams ○ Word Bank for vocabulary ○ Modeling ○ Illustrations of erosion ○ Storybook assembly- grand canyon development

NJ Student Learning Standards: Science
Matter and Its Interactions
2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.*
Earth's Place in the Universe Performance Expectations
2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
2-ESS2 Earth's Systems
2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*
2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.
2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.
K-2-ETS1 Engineering Design
K-2-ETS1-1. 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.
K-2-ETS1-2. 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.
K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Career Ready Practices
CRP 2. Apply appropriate academic and technical skills.
CRP 4. Communicate clearly and effectively and with reason.
CRP 5. Consider the environmental, social and economic impacts of decisions.
CRP 6. Demonstrate creativity and innovation.
CRP 7. Employ valid and reliable research strategies.
CRP 8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP 9. Model integrity, ethical leadership and effective management.
CRP 11. Use technology to enhance productivity.
CRP 12. Work productively in teams while using cultural global competence

ELA: RI.2.1, RI.2.2, RI.2.4, RI.2.5, RI.2.7, RI.2.9
Math: 2.MD.A.1, 2.MD.A.2, 2.MD.D.9, 2.MD.D.10, 2.0A.C.3, 2.0A.C.4

Career Awareness, Exploration, And Preparation
Strand A: Career Awareness
9.2.4.A.3 Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others
8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.
E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming
C. Design: The design process is a systematic approach to solving problems
8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product**.**
E. Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge
8.2.2.E.2 Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.

Core Instructional Materials:
- FOSS Next Generation: Pebbles, Sand, and Silt (2016)

Supplemental Materials: (videos, leveled readers, Readworks, recommended books etc.)

Videos: https://www.fossweb.com/moduledetail?dDocName=G3842595&classId=
Recommended books: https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books
NSTA: https://ngss.nsta.org/Classroom-Resources-Results.aspx?resource=

NJSLS: Science and Engineering Practices

Practice 1. Asking questions (for science) and defining problems (for engineering)

Ask questions based on observations to find more information about the natural and/or designed world(s).
Ask and/or identify questions that can be answered by an investigation.
Define a simple problem that can be solved through the development of a new or improved object or tool.

Practice 2. Developing and using models

Compare models to identify common features and differences.
Develop a simple model based on evidence to represent a proposed object or tool.

Practice 3. Planning and carrying out investigations

Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.
Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.
Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
Make predictions based on prior experiences.

Practice 4. Analyzing and interpreting data. Record information (observations, thoughts, and ideas).

Use and share pictures, drawings, and/or writings of observations.
Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.
Compare predictions (based on prior experiences) to what occurred (observable events).
Analyze data from tests of an object or tool to determine if it works as intended.

Practice 5. Using mathematics and computational thinking

Mathematical and computational thinking in K–2 builds on prior experience and progresses to recognizing that mathematics can be used to describe the natural and designed world(s).

Use counting and numbers to identify and describe patterns in the natural and designed world(s).
Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem.
Generate and/or compare multiple solutions to a problem.

Practice 7. Engaging in argument from evidence

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

Identify arguments that are supported by evidence.
Distinguish between explanations that account for all gathered evidence and those that do not.

Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument.
Construct an argument with evidence to support a claim.

Practice 8. Obtaining, evaluating, and communicating information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new

Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s).
Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea.
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 and/or supporting a scientific claim.
Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas

21st Century Themes

- **Global Awareness:** students come to understand that humans use natural resources for everything they do and that people affect the world around them.
- **Environmental Literacy:** students will explore the origins of materials and resources that we use everyday (paper, fabric, wood.) Students will learn that these resources are finite and explore strategies for conserving natural resources (recycling.)

21st Century Skills

Creativity and Innovation

- Critical Thinking and Problem Solving
- Communication and Collaboration
- Students engage in science and engineering practices by asking questions, participating in collaborative investigations, observing, recording and interpreting data to build explanations.

Interdisciplinary Connections

NJSLS for ELA are introduced, developed, and practiced in the context of learning science content and engaging in the science and engineering practices.

ELA

- Read and comprehend science texts related to their prior experience and knowledge
- Write informational/explanatory texts, arguments to support claims, and narratives about experience in science
- Engage in collaborative discussions about science
- Learn new vocabulary and language structures in context

Math

- Participate in active investigations and apply mathematics during data gathering and analysis
- Interdisciplinary Extensions at the end of each investigation usually include a math problem of the week
- Analyze hypothetical data related to the context of the investigation

Mathematical Practices
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics
- Use appropriate tools strategically.
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

Differentiation/Accommodations/Modifications ***(Alternate Modes of Instruction and Support)***		
Modifications to Support Gifted and Talented Students	**Modifications to Support English Language Learners**	**Modifications to Support Our Learners (Students with IEPs/504s and At-Risk Learners)**
Newsela article: *Landforms- valleys* Lexile: 420L Recommended non fiction books https://www.fossweb.com/additional-resources-books-xslt?dDocName=G4292315#non-fiction-books	Newsela article: *Landforms- valleys* (Spanish version) Equipment photo cards (spanish and english) Modeling erosions	Newsela article: *Landforms- valleys* Lexile: 420L Or *Landforms- plateaus* Lexile: 380L Storyboard- cycle of landform-from volcanoes to sediments

Independent research- How does new land develop? Mapping Landforms and Water bodies Make Your Own Erosion! - #sciencegoals Debate / Compare and contrast- Different landforms and their origins Provide appropriate challenge for wide ranging skills and development areas. Participate in inquiry and project-based learning units of study Assigning roles within partnerships Differentiated supports: content, process, product, environment	Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Vocabulary log- Pronunciation/translation assistance https://dictionary.cambridge.org/us/ Vocabulary builder Thesaurus- https://www.thesaurus.com/ Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) Pair visual prompts with verbal presentations Front Load and immerse students in literacy and language experiences related to content Provide students with visual models, sentence stems, concrete objects, and hands-on materials. Model procedures for life skills. Collaboration between ELL and general education teacher to maximize learning	Sand Dune Erosion in a Box Break Down of Erosion Creating a Landform Yakit Making a Landform Model Building into landscapes- architecture into landscapes Equipment photo cards Visual cues- image gallery https://www.fossweb.com/additional-resources-image-galleries-xslt?dDocName=G4292315#image-galleries Word walls Review student individual educational plan and/or 504 plan. Establish procedures for accommodations and modifications for assessments as per IEP/504. Establish procedures for modification of classwork and homework as per IEP/504. Modify classroom environment to support academic and physical needs of the students as per IEP/504. Provide appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team. Differentiation through content, process, product, environment Provide Title I services to students not meeting academic standards in ELA and/or Math. Provide instructional adaptations and interventions in the general education classroom.

		Modify classroom environment to support student needs. Differentiated instruction Basic Skills Intensive individual intervention

Sources

NJSLS Science Standards (2017): http://www.nj.gov/education/cccs/2016/science/
NJ: 2014 SLS: Technology: http://www.state.nj.us/education/cccs/2014/tech/8.pdf
NJSLS-S: Science and Engineering Practices: http://www.nj.gov/education/cccs/2016/science/3-5-ETS1.pdf
21st Century Life and Careers: http://www.state.nj.us/education/cccs/2014/career/9.pdf
Career Ready Practices: http://www.state.nj.us/education/cccs/2014/career/9.pdf
2015 FOSS Next Generation: www.FOSSweb.com
NSTA: https://ngss.nsta.org/