Unit 1: Pebbles, Sand, and Silt

Content Area: **Science**
Course(s): **Science**
Time Period: **Marking Period 1**
Length: **9 Weeks**
Status: **Published**

Unit Overview

This module provides grade 2 students with earth science core ideas dealing with the observable structures and properties of earth materials (rocks, soil, and water), weathering and erosion of the Earth's surface, natural sources of water, and how to represent the shapes and kinds of land and bodies of water on Earth.

Throughout the Pebbles, Sand, and Silt Module, students engage in science and engineering practices to collect and interpret data to answer science questions, develop models to communicate interactions and processes, and define problems in order to compare solutions. Students gain experiences that will contribute to understanding of crosscutting concepts of cause and effect; scale, proportion, and quantity; energy and matter; and stability and change.

Standards

Disciplinary Core Ideas (DCI's)

2-PS1-1	Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
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.
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.
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.
2-PS1-4	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.

Crosscutting Concepts (CC's)

	Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
CCC.2.1	students learn that events have causes that generate observable patterns. They design simple tests to gather evidence to support or refute their own ideas about causes.
	In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
CCC.3.1	students use relative scales (e.g., bigger and smaller; hotter and colder; faster and slower) to describe objects. They use standard units to measure length.
CCC.4.1	students understand objects and organisms can be described in terms of their parts; and systems in the natural and designed world have parts that work together.
	Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
CCC.5.1	students observe objects may break into smaller pieces, be put together into larger pieces, or change shapes.
CCC.7.1	students observe some things stay the same while other things change, and things may change slowly or rapidly.
SCI.K-2.2.2	Simple tests can be designed to gather evidence to support or refute student ideas about causes.
SCI.K-2.4.2	Systems in the natural and designed world have parts that work together.
SCI.K-2.7.2	Things may change slowly or rapidly.

Science and Engineering Practices (SEP's)

SEP.1	Asking Questions and Defining Problems
SEP.2	Developing and Using Models
SEP.3	Planning and Carrying Out Investigations
SEP.4	Analyzing and Interpreting Data
SEP.5	Using Mathematics and Computational Thinking
SEP.6	Constructing Explanations and Designing Solutions
SEP.8	Obtaining, Evaluating, and Communicating Information

Essential Questions

Investigation 1: 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?

Investigation 2: 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?

Investigation 3: 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?

Investigation 4: Soil and Water

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

Application of Knowledge: Students will know that...

- Earth materials are natural resources
- Erosion can change the shape of land
- Rocks are the solid material of the earth composed of minerals
- Rocks can be described by their properties
- Soils can be described by their properties
- The properties of different earth materials make each suitable for specific uses
- Weathering causes larger rocks to break into small rocks

Application of Skills: Students will be able to...

- Analyzing and interpreting data based on observations of pebbles, sand, and silt
- Asking questions ad defining problems
- Constructing explanations and designing solutions
- Developing and using models
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information about pebbles, sand, and silt
- Planning and carrying out investigations using pebbles, sand, and silt

Assessments

Investigation 1: First Rocks

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Survey, Investigation 1 I-Check

Investigation 2: River Rocks

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Investigation 2 I-Check

Investigation 3: Using Rocks

- Formative Assessment: Science notebook entries, Performance assessment
- Benchmark Assessment: Investigation 3 I-Check

Investigation 4: Soil and Water

- Formative Assessment: Science notebook entry, Performance assessment
- Benchmark Assessment: Investigation 4 I-Check

Suggested Activities

Investigation 1: First Rocks

Part 1: Three Rocks

- Focus Question: What happens when rocks rub together?
- Students will observe and compare a set of six rocks.
- Plan and carry out investigation
- Science notebook entry

Part 2: Washing Three Rocks

- Focus Question: What happens when rocks are placed in water?
- Students will observe how water changes rocks
- Plan and carry out investigation
- Video: All About Volcanoes
- Science notebook entry

Part 3: First Sorting

- Focus Question: How are river rocks the same?
- Students are introduced to river rocks, describe their properties and compare and sort them.
- Plan and carry out investigation
- Performance Assessment

Part 4: Start a Rock Collection

- Focus Question: What are the properties of schoolyard rocks?
- Students will collect, observe and describe schoolyard rocks.
- Read: Exploring Rocks
- Science notebook entry

Part 5: Sorting Activities

- Focus Question: How many ways can rocks be sorted?
- Students will compare and sort river rocks.
- Read: Colorful Rocks
- Online Activities: Rock Sorting and Property Chain
- Benchmark Assessment: Investigation 1 l-Check

Investigation 2: River Rocks

Part 1: Screening River Rocks

- Focus Question: How can rocks be separated by size?
- Students will separate a river rock mixture using a set of three screens.
- Plan and carry out investigation
- Rock Graph
- Performance assessment

Part 2: River Rocks by Size

- Focus Question: How else can rocks be sorted by size?
- Students will use squares of three sizes to separate rock particles of sand, gravel and pebbles.
- Develop and use models
- Read: The Story of Sand
- Science notebook entry

Part 3: Sand and Silt

- Focus Question: Is there an earth material smaller than sand?
- Students will closely observe sand and separate sand from silt particles using water.
- Plan and carry out investigation
- Sand and Water Drawing
- Science notebook entry

Part 4: Exploring Clay and Landforms

- Focuus Question: What earth material is smaller than silt?
- Students investigate the properties of clay. Students will also learn about weathering and erosion.
- Develop and use models
- Plan and carry out investigation
- Read: Rocks Move
- Read: Landforms
- Video: All About Land Formations

- Benchmark Assessment: Investigation 2 l-Check

Investigation 3: Using Rocks

Part 1: Rocks in Use

- Focus Question: How do people use earth materials?
- Students learn how people use rocks as natural resources to construct objects and make useful materials.
- Plan and carry out investigation
- Read: Making Things with Rocks
- Science notebook entry

Part 2: Observing Sandpaper

- Focus Question: What does sand do for sandpaper?
- Students observe sandpaper and it's effect on objects.
- Plan and carry out investigation
- Science notebook entry

Part 3: Sand Sculptures

- Focus Question: How can we make a sand sculpture?
- Students will construct sand sculptures after determining the best mixture.
- Plan and carry out investigation
- Science notebook entry
- Performance assessment

Part 4: Clay Beads

- Focus Question: What makes clay the best earth material for making beads?
- Students will use clay to make decorative beads.
- Plan and create bead
- Online activity: Find Earth Materials
- Science notebook entry

Part 5: Making Bricks

- Focus Question: How are bricks made?
- Students will make clay bricks from a mixture that they create and then build a structure.
- Plan and create bricks
- Plan and build structure
- Read: What Are Natural Resources?
- Benchmark Assessment: Investigation 3 l-Check

Investigation 4: Soil and Water

Part 1: Homemade Soil

- Focus Question: What is soil?

- Students will observe soil samples by doing investigations and collecting data.
- Plan and carry out investigation
- Performance assessment

Part 2: Local Soil

- Focus Question: How do soils differ?
- Students will collect soil samples in different locations and observe and compare.
- Plan and carry out investigation
- Read: What is in Soil?
- Read: Testing Soil?
- Video: All About Soil
- Science notebook entry

Part 3: Natural Sources of Water

- Focus Question: Where is water found in our community?
- Students will learn about sources of water.
- Develop and use models
- Design solutions
- Read: Where is Water Found?
- Read: States of Water
- Science notebook entry

Part 4: Land and Water

- Focus Question: How can soil erosion be reduced?
- Students compare a variety of solutions to slow down the effects of wind and water erosion on land. They will identify common features and differences of land and water that they have actively investigated throughout the unit.
- Read: Erosion
- Read: Ways to Represent Land and Water
- Video: All About Landforms
- Benchmark Assessment: 4 l-Check

Activities to Differentiate Instruction

Differentiation for special education:

- General modifications may include:
    - Modifications & accommodations as listed in the student's IEP
    - Assign a peer to help keep student on task
    - Modified or reduced assignments
    - Reduce length of assignment for different mode of delivery
    - Increase one-to-one time
    - Working contract between you and student at risk
    - Prioritize tasks
    - Think in concrete terms and provide hands-on-tasks

    - Position student near helping peer or have quick access to teacher
    - Anticipate where needs will be
    - Break tests down in smaller increments
- Content specific modifications may include:
    - Provide multiple means of representation. Give learners various ways to acquire information and knowledge. (ex. leveled books, i-Pads, magazines)
    - Provide multiple means of action and expression. Offer students alternatives for demonstrating what they know. (ex. drawings, dictation)
    - Provide multiple means of engagement. Help learners get interested, be challenged and stay motivated.

Differentiation for ELL's:

- General modifications may include:
    - Strategy groups
    - Teacher conferences
    - Graphic organizers
    - Modification plan
    - Collaboration with ELL Teacher
- Content specific vocabulary important for ELL students to understand include:
    - Investigation 1: First Rocks
        - basalt, bubble, color, data, dull, earth, material, flat, geologist, granite, group, mineral, pattern, pointed, property, rock, rough, round, sand, scoria, shape, sharp, shiny, size, smooth, sort, texture, tuff, weathering
    - Investigation 2: River Rocks
        - beach, boulder, butte, canyon, clay, cobble, delta, erosion, gravel, layer, mesa, mixture, model, particle, pebble, plain, plateau, sand, sand, dune, screen, separate, settle, shake, silt, sink, valley, volcano
    - Investigation 3: Using Rocks
        - asphalt, brick, build, coarse, concrete, engineer, fine, harden, matrix, medium, mortar, natural resources, sandpaper, sculpture, sidewalk
    - Investigation 4: Soil and Water
        - decay, fresh water, gas, humus, lake, liquid, ocean, pond, retain, river, salt water, soil, solid, stream

Differentiation to extend learning for gifted students may include:

- Integrate language arts instruction to enhance science learning
- Label diagrams, pictures and science notebook recordings.
- Utilize the Math extension problems and Science extensions provided in Foss Teacher Manual

Integrated/Cross-Disciplinary Instruction

When reading scientific texts, students need to be able to gain content knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students read purposefully and listen attentively to gain scientific expertise. The interdisciplinary approach to literacy is backed by extensive research establishing the need for students to be proficient in reading complex informational text independently in a variety of content areas.

Examples:

- Read Exploring Rocks in Pebbles, Sand, and Silt. Connect the text to your own experience by discussing with your classmates rocks you have seen or found. Make a chart to compare and contrast rocks you've found and those described in the text.
- After reading The Story of Sand in Pebbles Sand, and Silt, line up with a group of your classmates to show the relative sizes of earth materials from smallest to largest.
- Before reading Making Things with Rocks, in Pebbles, Sand, and Silt, discuss which earth materials the photographed structures are made out of and why. Compare your observations to what the text tells you.
- Compare If You Found a Rock with Pebbles, Sand, and Silt. Discuss each author's purpose for writing the book and what you learned from each.

Writing is a key means for students to express what know about a subject. Science notebooks are critical and essential components of science learning whereby students record observations, data, visual representations, and thinking about their learning. They are excellent tools for formative assessment purposes as well as for formal writing.

Examples:

- Write informative/explanatory texts telling how you sorted earth materials with screens and why the different sizes of the screens were important.
- Explain through writing and drawings with labels what happens to rocks when they are put in water, explaining what they look like before and after getting wet.
- Participate in shared research and writing projects (e.g., How is adobe used as an important building material in the Southwest both in the past and present?).
- From the point of view of the third little pig, write a letter to a new pig in the neighborhood urging him/her to build a house out of adobe. Include reasons based on the properties of adobe. Students may also learn about different types of engineers and their tasks for building structures.

LA.RL.2.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
LA.RI.2.2	Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.
LA.RI.2.4	Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
LA.RI.2.5	Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
LA.RI.2.6	Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
LA.RI.2.7	Explain how specific illustrations and images (e.g., a diagram showing how a machine works) contribute to and clarify a text.
LA.RI.2.9	Compare and contrast the most important points presented by two texts on the same topic.

LA.W.2.1	Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a conclusion.
LA.W.2.2	Write informative/explanatory texts in which they introduce a topic, use evidence-based facts and definitions to develop points, and provide a conclusion.
LA.W.2.5	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
LA.W.2.6	With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
LA.W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
LA.SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
LA.SL.2.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.

Resources

www.FOSSweb.om - Teacher-user account

Investigation 1:

- **Science Resources Book**
- “Exploring Rocks”
- “Colorful Rocks”
- **Videos**
- *All about Volcanoes*
- **Online Activity**
- “Rock Sorting”
- "Property Chain"

Investigation 2:

- **Science Resources Book**
- “The Story of Sand”
- “Rocks Move”
- "Landforms"
- **Videos**
- *All about Land Formations*

Investigation 3:

- **Science Resources Book**
- “Making Thing with Rocks”
- “What are Natural Resources?”
- **Online Activity**

- “Find Earth Materials"

Investigation 4:

- **Science Resources Book**
- “What is in Soil?”
- “Testing Soil”
- "Where is Water Found?"
- "States of Water"
- "Erosion"
- "Ways to Represent Land and Water"
- **Videos**
- *All about Landforms (review)*

Student Rock Center Activities and More

How Fossils Are Formed
Rocks & Minerals - BrainPopJr
Types of Land
OneGeology.org
What is Soil? - Teacher Password Only
Fossils - BrainPopJr
The Magic School Bus: Rocks and Rolls

21st Century Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.