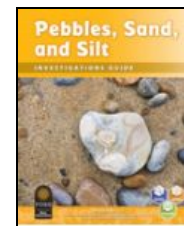


Investigation 1 - First Rocks

Students are introduced to the phenomenon that rocks are not all the same. They investigate several kinds of volcanic rocks and begin to understand the properties of rocks. Students observe rocks (using hand lenses), rub rocks, wash rocks, sort rocks, and describe rocks. After rubbing two samples together, students find that rock is hard but also susceptible to weathering. Students also begin to organize a class rock collection.



Standards - 2-ESS1-1, 2-PS1-1

Investigation 1	Summary of Lesson	Priority
Part 1: Three Rocks	<p>Students investigate and sort a set of six rocks. They gather information about the rocks by observing and comparing, then rub them together to simulate weathering.</p> <p><i>FQ - What happens when rocks rub together?</i></p>	<p>High</p> <p>Introduction to concepts of rocks and content vocabulary.</p>
Part 2: Washing Three Rocks	<p>Students wash their rocks to see how they change when they are wet, and to see what happens to the wash water. Students are introduced to the names of these volcanic rocks (tuff, scoria, basalt) and view a video on volcanoes to find out how they formed.</p> <p><i>Video, "All About Volcanoes"</i></p> <p><i>FQ - What happens when rocks are placed in water?</i></p>	<p>High</p> <p>Introduction to new content vocabulary</p>
Part 3: First Sorting	<p>Students are introduced to river rocks, describe their properties, and compare and sort them into groups based on one property at a time.</p> <p><i>FQ - How are river rocks the same?</i></p>	<p>High</p> <p>This lesson teaches directly about structures and properties of matter, PS1.A, DCI (Disciplinary Core Idea) of NGSS.</p> <p><i>**This lesson can be combined with Part 2.</i></p>
Part 4: Start a Rock Collection	<p>Students take a field trip to collect and observe schoolyard rocks. They describe the properties of the various rocks.</p> <p><i>Read, "Exploring Rocks"</i></p> <p><i>FQ - What are the properties of schoolyard rocks?</i></p>	<p>Low</p> <p>This lesson could be skipped as a formal lesson. You could have a short discussion about how rocks look the same or different than the ones in the kit. The important piece will be the reading.</p>
Part 5: Sorting Activities	<p>Students use sorting mats to compare and sort the river rocks.</p> <p><i>Read, "Colorful Rocks"</i></p> <p><i>FQ - How many ways can rocks be sorted?</i></p>	<p>Medium</p> <p>This activity reinforces the ideas of properties of matter, PS1.A, however, you could condense the lesson if needed.</p>
Assessment	i-Check	

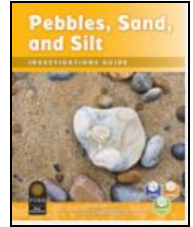
Investigation 1 cont. - First Rocks

2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Investigation 2 - River Rocks

Students investigate a mixture of different-sized river rocks as a phenomenon. They separate the rocks using a series of three screens to identify five sizes of rocks: large pebbles, small pebbles, large gravel, small gravel, and sand. They add water to a vial of sand to discover silt and clay. Students learn how sand is formed and compare slow landform changes of weathering and erosion to rapid landform changes due to volcanic eruptions.



Standards - 2-ESS1-1, 2-ESS2-1, 2-ESS2-2, 2-ESS2-3, 2-PS1-1

Investigation 2	Summary of Lesson	Priority
Part 1: Screening River Rocks	<p>Students separate a river-rock mixture, using a set of three screens. They discover five sizes of materials; large pebbles, small pebbles, large gravel, small gravel, and sand.</p> <p><i>FQ - How can rocks be separated by size?</i></p>	<p>High</p> <p>Students are practicing SEP, Science and Engineering Practices, Planning and Carrying out Investigations. Students are also learning important content vocabulary.</p>
Part 2: River Rocks by Size	<p>Students use squares of three sizes as a tool (instead of screens) to separate rock particles into sand, gravel, and pebbles.</p> <p><i>Read, "Story of Sand".</i></p> <p><i>FQ - How else can rocks be sorted by size?</i></p>	<p>Medium</p> <p>This lesson could be skipped as students have already separated rocks by size, using larger rocks. The important piece will be the reading.</p>
Part 3: Sand and Silt	<p>Students take a close look at sand and separate sand particles from silt particles, which are smaller than the sand, by mixing the sand with water and allowing the particles to settle. They observe that the sand settles to the bottom and the silt forms a layer on top of the sand.</p> <p><i>FQ - Is there an Earth material smaller than sand?</i></p>	<p>High</p> <p>Students are reinforcing the DCI, that Earth processes can happen slowly or quickly.</p>
Part 4: Exploring Clay and Landforms	<p>Students investigate the properties of the smallest rock particles, clay. They read about and view a video about ways that wind and water move and shape the land. Students compare the time it takes to change the surface of the land.</p> <p><i>Read, "Rocks Move" and "Landforms".</i></p> <p><i>Video, "All about Land Formations"</i></p> <p><i>FQ - What Earth material is smaller than silt? And How does water and wind change landforms?</i></p>	<p>Low</p> <p>This activity could be done in 2 sessions and not 5. The work with clay should be the focus as well as the reading. The concepts of erosion and landforms will be revisited at 4th grade, and is a big DCI, ESS2-1.</p> <p>** This Part is very similar to Part 3 and could be skipped.</p>
Assessment	i-Check	

Investigation 2 cont. - River Rocks

2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

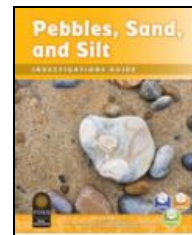
2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

2-ESS2-2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.

2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Investigation 3 - Using Rocks

Students learn how people use earth materials to construct objects. They make rubbings from sandpaper, sculptures from sand, decorative jewelry from clay, and bricks from clay soil. They go on a schoolyard field trip to look for places where earth materials occur naturally and where people have incorporated earth materials into building materials. Students discover that rock as a resource is a natural phenomenon occurring in predictable locations all over Earth's surface.



Standards - 2-PS1-1, 2-PS1-2, K-2 ETS1-1, K-2 ETS1-2, K-2 ETS1-3

**** The purpose of the lesson is to investigate the ways that the properties of rocks of different sizes can be used to make useful objects, if pressed for time, this entire Investigation could be skipped.**

Investigation 3	Summary of Lesson	Priority
Part 1: Rocks in Use	<p>Students learn how people use rocks as natural resources to construct objects and to make useful materials. They start by looking outside the school building for places where earth materials can be found naturally or as building materials.</p> <p><i>Read, "Making Things with Rocks".</i></p> <p><i>FQ - How do people use earth materials?</i></p>	<p>Medium</p> <p>The observations in this part could be done on a quick walk back from recess, then results could be shared in the classroom. The important piece is the reading.</p>
Part 2: Observing Sandpaper	<p>Students observe sandpaper and compare it to sand. They make and compare rubbings of three grades of sandpaper. Students compare the effectiveness of each grade of sandpaper in sanding a stick and make a claim from evidence.</p> <p><i>FQ - What does sand do for sandpaper?</i></p>	<p>Low</p> <p>This lesson could be skipped.</p>
Part 3: Sand Structures	<p>Students mix sand with a cornstarch matrix to make durable sand sculptures. They monitor the mixing process to determine the best amount of sand to mix with a given amount of matrix and analyze the results.</p> <p><i>FQ - How can we make a sand structure?</i></p>	<p>Low</p> <p>This lesson could be skipped.</p>
Part 4: Clay Beads	<p>Students use clay to make beads or something decorative, which they paint and keep as a memento of their investigation of clay.</p> <p><i>FQ - What makes clay useful in making objects like beads?</i></p>	<p>Low</p> <p>This lesson could be skipped.</p>
Part 5: Making Bricks	<p>Students make adobe clay bricks with a mixture of clay soil, dry grass or weeds, and water. After the bricks dry, they can be used to build a class wall.</p>	<p>Low</p> <p>This lesson could be skipped. The important piece of this lesson is the reading</p>

	<p><i>Read, "What are Natural Resources".</i></p> <p><i>FQ - How are bricks made?</i></p>	
Assessment	i-Check	

Investigation 3 cont. - Using Rocks

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.

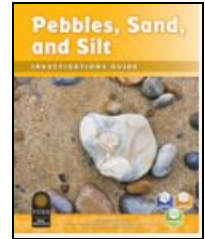
K-2 ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

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.

Investigation 4 - Soil and Water

Students first investigate a common phenomenon on the surface of Earth—soil. They put together and take apart soils. They are introduced to humus as an ingredient in soil. Homemade and local soils are compared, using techniques introduced in Investigation 2, including water. Students read about sources of natural water, sort images of water sources, both fresh and salt, and discuss where water is found in their community. Students compare different solutions presented in readings to slow the effects of wind and water erosion. They learn about different ways to represent landforms and bodies of water.



Standards - 2-ESS1-1, 2-ESS2-1, 2-ESS2-2, 2-ESS2-3, K-2 ETS1-1, K-2 ETS1-2, K-2 ETS1-3

Investigation 4	Summary of Lesson	Priority
Part 1: Homemade Soil	<p>Students put together and take part soils. They are introduced to humus, an important soil ingredient. They mix together homemade soil containing sand, gravel, pebbles, and humus. They shake some of the soil on a paper plate and observe what happens. They use screens to separate the homemade soil. They shake soil and water together in a vial and draw what they observe.</p> <p><i>FQ - What is soil?</i></p>	<p>Medium</p> <p>This lesson is important in meeting the DCIs of Engineering Practices. To save time, you could model the beginning part as a whole group, then have students try and separate the materials that have already been premade.</p>
Part 2: Local Soil	<p>Students go on a schoolyard field trip to collect soil samples. They try to find soil in as many places as possible; next to sidewalks, near trees, and in landscaped areas. Students study their schoolyard soils samples. They shake vials with the soil and water, then draw the results. They compare the vials and drawings of their schoolyard samples with the vials and drawings of the homemade soil.</p> <p><i>Read, "Changes in the Sky".</i></p> <p><i>FQ - How do soils differ?</i></p>	<p>Medium</p> <p>This could be modified and done as a whole group, rather than individual students finding soil. Students could identify the soil and one sample could be collected, then viewed as a whole class.</p>
Part 3: Natural Sources of Water	<p>Students read about sources of natural water, sort images of water sources, both fresh and salt, and discuss where water is found in their community.</p> <p><i>Read, "Where is water found?" and "States of Water".</i></p> <p><i>FQ - Where is water found in our community?</i></p>	<p>High</p> <p>This lesson is 1 of 2 lessons that focus on the standard 2-ESS2-3. Most of the lesson is the reading and holding a discussion of the reading.</p>
Part 4: Land and Water	<p>Students compare a variety of solutions to slow down the effects of wind and water erosion on land. They go out on the schoolyard to look for erosion. They end the module by studying a variety of images, representing different landforms and bodies of water, and identify common features and differences.</p> <p><i>Read, "Erosion" and "Ways to Represent Land and Water".</i></p> <p><i>FQ - How can soil erosion be reduced?</i></p>	<p>High</p> <p>This lesson is 2 of 2 lessons that focus on the standard 2-ESS2-3. Most of the lesson is the reading and holding a discussion of the reading.</p>
Assessment		

Investigation 4 cont. - Soil and Water

2-ESS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

2-ESS2-1 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

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 ETS1-1 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.