INTRODUCTION

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 Earth’s surface, natural sources of water, and how to represent the shapes and kinds of land and bodies of water on Earth.

Students use simple tools to observe, describe, analyze, and sort solid earth materials and learn how the properties of the materials are suited to different purposes. The investigations compliment the students’ experiences in the Solids and Liquids Module with a focus on earth materials and the influence of engineering and science on society and the natural world. Students explore how wind and water change the shape of the land and compare ways to slow the process of erosion. Students learn about the important role that earth materials have as natural resources.

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.

The NGSS Performance Expectations addressed in this module include:

Earth and Space Sciences
- 2-ESS1-1
- 2-ESS2-1
- 2-ESS2-2
- 2-ESS2-3

Physical Sciences
- 2-PS1-1
- 2-PS1-2

Engineering, Technology, and Applications of Science
- K–2 ETS1-1
- K–2 ETS1-2

NOTE
The three modules for grade 2 in FOSS Next Generation are
- Solids and Liquids
- Pebbles, Sand, and Silt
- Insects and Plants
## Module Summary

<table>
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<tr>
<th>Investigation</th>
<th>Description</th>
<th>Focus Questions</th>
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</table>
| Inv. 1:      | Students are introduced to the mineral portion of the planet on which they live. 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. They also begin to organize a class rock collection. Students learn about the properties of rocks and the colorful minerals they contain. | What happens when rocks rub together?  
What happens when rocks are placed in water?  
How do river rocks move?  
What are the properties of schoolyard rocks?  
How many ways can rocks be sorted? |
| Inv. 2:      | Students investigate a mixture of different-sized river rocks. 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 changes of weathering and erosion to rapid changes due to volcanic eruptions. | 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? |
| Inv. 3:      | 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. | 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? |
| Inv. 4: Soil and Water | Students 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. 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. | What is soil?  
How do soils differ?  
Where is water found in our community?  
How can soil erosion be reduced? |
### Module Matrix

<table>
<thead>
<tr>
<th>Content Related to Disciplinary Core Ideas</th>
<th>Reading/Technology</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rocks can be described by their properties.</td>
<td><strong>Science Resources Book</strong>&lt;br&gt;“Exploring Rocks”&lt;br&gt;“Colorful Rocks”</td>
<td><strong>Embedded Assessment</strong>&lt;br&gt;Science notebook entries&lt;br&gt;Performance assessment</td>
</tr>
<tr>
<td>• Smaller rocks (sand) result from the breaking (weathering) of larger rocks.</td>
<td><strong>Video</strong>&lt;br&gt;<strong>All about Volcanoes</strong></td>
<td><strong>Benchmark Assessment</strong>&lt;br&gt;Investigation 1 I-Check&lt;br&gt;<strong>NGSS Performance Expectations</strong>&lt;br&gt;2-ESS1-1&lt;br&gt;2-PS1-1</td>
</tr>
<tr>
<td>• Rocks are the solid material of Earth.</td>
<td><strong>Online Activities</strong>&lt;br&gt;“Rock Sorting”&lt;br&gt;“Property Chain”</td>
<td></td>
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<tr>
<td>• Rocks are composed of minerals.</td>
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<tr>
<td>• Volcanoes are mountains built up by melted rocks that flow out of weak areas in Earth’s crust.</td>
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<tr>
<td>• Weathering, caused by wind or water, causes larger rocks to break into small rocks.</td>
<td><strong>Science Resources Book</strong>&lt;br&gt;“The Story of Sand”&lt;br&gt;“Rocks Move”&lt;br&gt;“Landforms”</td>
<td><strong>Embedded Assessment</strong>&lt;br&gt;Performance assessment&lt;br&gt;Science notebook entries</td>
</tr>
<tr>
<td>• Some Earth events happen rapidly; others occur slowly over a very long period of time.</td>
<td><strong>Video</strong>&lt;br&gt;<strong>All about Land Formations</strong></td>
<td><strong>Benchmark Assessment</strong>&lt;br&gt;Investigation 2 I-Check&lt;br&gt;<strong>NGSS Performance Expectations</strong>&lt;br&gt;2-ESS1-1&lt;br&gt;2-ESS2-1; 2-ESS2-2; 2-ESS2-3&lt;br&gt;2-PS1-1</td>
</tr>
<tr>
<td>• Earth materials are natural resources.</td>
<td><strong>Science Resources Book</strong>&lt;br&gt;“Making Things with Rocks”&lt;br&gt;“What Are Natural Resources?”</td>
<td><strong>Embedded Assessment</strong>&lt;br&gt;Science notebook entries&lt;br&gt;Performance assessment</td>
</tr>
<tr>
<td>• The properties of different earth materials make each suitable for specific uses.</td>
<td><strong>Online Activity</strong>&lt;br&gt;“Find Earth Materials”</td>
<td><strong>Benchmark Assessment</strong>&lt;br&gt;Investigation 3 I-Check&lt;br&gt;<strong>NGSS Performance Expectations</strong>&lt;br&gt;2-PS1-1; 2-PS1-2&lt;br&gt;K–2 ETS1-1; K–2 ETS1-2; K–2 ETS1-3</td>
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<tr>
<td>• Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth.</td>
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<tr>
<td>• Earth materials are commonly used in the construction of buildings and streets.</td>
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<tr>
<td>• Earth materials are natural resources.</td>
<td><strong>Science Resources Book</strong>&lt;br&gt;“What Is in Soil?”&lt;br&gt;“Testing Soil”&lt;br&gt;“Where Is Water Found?”&lt;br&gt;“States of Water”&lt;br&gt;“Erosion”&lt;br&gt;“Ways to Represent Land and Water”</td>
<td><strong>Embedded Assessment</strong>&lt;br&gt;Science notebook entries&lt;br&gt;Performance assessment</td>
</tr>
<tr>
<td>• Soils can be described by their properties (color, texture, ability to support plant growth).</td>
<td><strong>Videos</strong>&lt;br&gt;<strong>All about Soil</strong>&lt;br&gt;<strong>All about Landforms</strong></td>
<td><strong>Benchmark Assessment</strong>&lt;br&gt;Investigation 4 I-Check&lt;br&gt;<strong>NGSS Performance Expectations</strong>&lt;br&gt;2-ESS1-1&lt;br&gt;2-ESS2-1; 2-ESS2-2; 2-ESS2-3&lt;br&gt;K–2 ETS1-1; K–2 ETS1-2; K–2 ETS1-3</td>
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<tr>
<td>• Soil is made partly from weathered rock and partly from organic material. Soils vary by location.</td>
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<tr>
<td>• Natural sources of water include streams, rivers, ponds, lakes, marshes, and the ocean. Sources of water can be fresh or salt water.</td>
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<tr>
<td>• Water can be a solid, liquid, or gas.</td>
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<tr>
<td>• Wind and water can change the shape of land.</td>
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<tr>
<td>• The shapes and kinds of land and water can be represented by various models.</td>
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</tbody>
</table>
Water is found everywhere on Earth. Water is part of every living thing. Every plant and animal is made of water. Even you are mostly made of water!

**Fresh water** is found in streams and rivers. Streams can be small like a creek. Rivers are larger streams of water.

Streams and rivers bring water into and out of ponds and lakes.
Fresh water is found in ponds and lakes, too. Ponds are small bodies of water. Lakes are larger and deeper bodies of water.

The water moves slowly in ponds and lakes. Sand and silt settle to the bottom of ponds and lakes.

Fresh water is our most important natural resource. Plants and animals need water to live and grow.
Most of the water on Earth is **salt water**. Salt water is found in seas and the ocean. The ocean is the largest body of salt water. Seas are smaller than the ocean.

People use water to drink, cook, and wash. People use water to grow food and to power factories, too.
Salt water is found in salt marshes. They are muddy places next to seas. Salt marshes have lots of grasses and small plants. Salt marshes have slow-moving water.
Salt water is found in coral reefs. Coral reefs grow in warm, shallow seas. Coral reefs are made from corals. Corals are the hard parts of sea animals.

Salt water is found on sandy beaches and rocky shores, too. You can see the ocean water move back and forth in waves on beaches and shores.
**States of Water**

**Liquid** water is one state of water. We can pour it into a glass to drink. We spray it from a hose to water plants. Liquid water can drip from a fountain.

Where is fresh water found in your community?
Where is salt water found in your community?
What happened to this road? People once drove on this road. During a big storm, waves crashed against the shore. They washed away the soil under the road. Parts of the road were destroyed.

Waves are moving water that cause erosion on a coast. Ocean waves often erode the shore during storms. Coastal erosion can damage roads and buildings. Waves can also wash away all the sand on a beach.
Where else do we find moving water? Water flows downhill in rivers and streams. Heavy rain causes the water in streams and rivers to flood their banks. Fast flowing water erodes the banks.

Engineers designed a strong barrier for the bank of this river. The barrier will protect the road and buildings from erosion caused by flowing water.

It will block rainwater from the road. It will stop the river from flooding the road.
Look for different ways that people protect the edges of waterways from erosion. Some design solutions use heavy objects to cover soil and hold it in place.

Bundles of sticks can protect riverbanks from moving water. Another good way to protect banks against erosion is to grow water plants, like cattails, along the banks.
Moving water is not the only force that causes erosion. Moving air can cause erosion, too. Powerful winds can remove topsoil from a farm. The winds lift the valuable topsoil into the air and carry it far away.

Beaches can be eroded by wind, too. Strong winds that blow across a beach can lift sand onto nearby land.
People have learned how to slow down erosion of topsoil and beach sand. Farmers plant rows of trees or shrubs to block the wind near their fields.

People put low wooden fences on the beach to slow the blowing sand. The wind piles the sand up by the fences and makes dunes. Once dunes form high on the beach, beach grass can grow. The grass on the dunes slows erosion even more.
These two roads have problems. What problems can you see? What might have caused the erosion? What would you suggest as a solution for the problem?

How would you describe your classroom to your grandparents? You could tell them it has eight tables, each with four chairs. You could tell them what the furniture looks like. You could show them a photograph, but a photograph might not show everything.
You could draw a picture to represent the classroom. The drawing might show the size, design, and location of some of the furniture.

You could also provide a map of the classroom. A map could show where all the tables and chairs are in the room. A map is a view from directly overhead.

These ways to represent a room are also good ways to represent Earth’s surface. You can use photographs, drawings, and maps to show the location, size, and kinds of land and water in an area.
This photograph shows Crater Lake in Oregon. It is the deepest lake in the United States, 594 meters deep.

A map is a different way to represent Crater Lake. The map shows the shape of the lake. It shows roads and other nearby features surrounding the lake.

A drawing is a different way to show Crater Lake.
This photograph shows Mount Shasta. Mount Shasta is a volcano in Northern California. It is very tall, 4,322 meters.

A drawing is another way to show Mount Shasta.

This map shows a topographic view of Mount Shasta. The lines show how high the land is. You can think of them as steps. The steps go up to the very top of the mountain. Water, streams, and ice appear in blue. Areas with trees are green. Maps can show a lot of information.
This photograph shows the Scioto River flowing through the city of Columbus, Ohio. This part of the river bank has a park. The park is called Scioto Mile.

This drawing is a different way to show the park.

A map of the park shows how big the park is and where it is in Columbus.
This photograph shows a small part of the Great Plains in the United States. The circles and squares are fields of grain and other crops. The crops are watered from the Ogallala Aquifer. The Ogallala Aquifer is huge. It holds water in the ground underneath eight states.

This drawing shows the pattern of crops above the Ogallala Aquifer.

This map shows how big the aquifer is. It is located under parts of Oklahoma, Texas, New Mexico, Colorado, Kansas, Nebraska, Wyoming, and South Dakota.
This image of Earth shows the location of North America. Can you find the United States on the North American continent?

This map shows part of the United States, outlining 48 states. It also shows highways that connect the states, and large waterways (lakes, rivers, and the ocean).

Here is a drawing showing the outline of the United States.
A River Story 2nd Grade Cross-curricular Enrichment Project

Activity: Recreating the Mud Pony

Objective: Students will observe and explore the properties of soil, sand, and clay. Students will predict and then mix materials to try to achieve the best mixture to make a sculpture.

Length of activity: 90 minutes

Standards addressed: Observe and describe the difference between sand and silt. NJCCCS: 5.1.4.B.1, 5.4.2.C.1, 5.4.4.C.1, 5.4.4.C.2
Investigate the properties of clay. NJCCCS: 5.1.4.B.1, 5.4.2.C.1, 5.4.4.C.1, 5.4.4.C.2 NGSS: 2-ESS1-1, 2-ESS2-2, 2-ESS2-3, 2-PS1-1
Use earth materials to create a new product. Determine the best amount of sand to mix with other materials to achieve the desired result. NJCCCS: 5.1.4.B.1, 5.4.2.G.4, NGSS: 2-PS1-1, 2-PS1-2, K-2 ETS1-1, K-2 ETS1-2, K-2 ETS1-3

Common Core State Standards Connections:
ELA/Literacy —
RI.2.1 Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1)
W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1), (K-2-ETS1-3)
Mathematics —
MP.2 Reason abstractly and quantitatively. (K-2-ETS1-1), (K-2-ETS1-3)
MP.4 Model with mathematics. (K-2-ETS1-1), (K-2-ETS1-3)
MP.5 Use appropriate tools strategically. (K-2-ETS1-1), (K-2-ETS1-3), (K-2-ETS1-3)
Materials needed:
- plastic teaspoon
- 2 or 3 buckets with water for handwashing and hand towels.
- 1 small paper plate for each of the following: a handful of sand, a handful of soil, and 1 teaspoon of clay (total of 3 plates per group)

From the Science FOSS Kit:
- 1 tub per group
- 1 bag of dry clay, 2-3 bags of sand, 1 bag of soil
- 1 container (1/4L) and 1 plastic cup (250mL) per group
- Picture cards: clay, sand, soil, cup, container
- To teacher’s discretion and choice: toothpicks, wire (the kind for arts n crafts), chopsticks, Bamboo Skewers.

Procedure:
1. Read Comprehension book “The Mud Pony” by Caron Lee Cohen. (Previous Lesson)
2. Direct students to page 2 in the book and discuss the materials the boy uses to shape the pony out of mud (wet earth, white clay).
3. Share the picture cards of soil, sand, and clay with students. Discuss what we know about these materials when mixed with water. It may be necessary to explain clay holds materials together.
4. Divide the class into groups. Four students per group is a good number.
5. Each group will receive one worksheet and three small plates with a handful of soil, sand, and a teaspoon of clay.
6. Students will explore the qualities of the three materials. Students will have one person write the group’s findings. As a suggestion, give students a set amount of time for the investigation and then move on to the next step.
7. After students complete the exploration of materials, groups receive scrap paper, to write their “recipe,” one tub, one container, and one plastic cup.
8. The teacher explains to students that they will explore these materials and mix them to create a mixture similar to the mixture the boy in our story to create his pony.
9. Groups will write down on the scrap piece of paper the amount of water, soil, sand, or/and clay they wish to have to create their mixture. Teacher gives students the requested materials.
10. Groups mix the ingredients and, if they wish, they may ask for more. As a suggestion, give students a set amount of time for the investigation and then move on to the next step.
11. Students are encouraged to try to sculpture a horse. At this time, students may realize they need connectors to hold the sculpture up (skeleton). If that is the case, toothpicks and other materials can be suggested.
12. The last step to this lesson is the reflection part. Have students write the final result of the recipe on the back of the worksheet and complete the rest of the observations.
13. Students present their findings to the class. Was the amount of ingredients they used appropriate to mold a sculpture? Would they want to change the amount of ingredients they used? Is there a recipe that seems to be best? Why? No recipe is wrong because we learned from all of the different explorations!

Possible modifications: The worksheet has suggested describing words to help students with adequate vocabulary words. Directions include the sequence words to help with the writing process. Picture cards help with the correct name of materials

Teachers are welcome to suggest possible extensions to this lesson.
Explorers ______________________________________________  Team  __________

Our goal is to mix materials that will hold together to make a sculpture.
We will **observe**, **feel**, and **mix** the following:

[Images of Soil, Sand, Powdered Clay]

**Describe what the material look and feel like.**
This word bank includes some suggested words. We can also add our own words to describe our exploration of materials.

|----------|----------|---------|-----------|----------|----------|----------|-----------|-----------|

<table>
<thead>
<tr>
<th>Looks like</th>
<th>Feels like</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>Soil</td>
</tr>
<tr>
<td>Sand</td>
<td>Sand</td>
</tr>
<tr>
<td>Powder Clay</td>
<td>Powder Clay</td>
</tr>
</tbody>
</table>
MIXTURE RECIPE

INGREDIENTS:

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

DIRECTIONS: (First, Second, Third, Finally,)

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OUTCOME:

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DID THE MATERIALS HOLD TOGETHER TO MAKE A SCULPTURE? EXPLAIN.

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________

______________________________________________________________________________________
SMILE, PLEASE

Careful observation of the smallest details can lead to new discoveries and a deeper understanding of the natural world.

Increasing and refining observation skills is an important first step in the scientific process.

Each habitat or natural community has distinctive characteristics. By observing rock types and landforms along with identifying plant and animal species, one can learn a great deal about the area. Recognition of these individual components and how they fit together within the habitat leads to a broader vision of the whole.

BASIC CONCEPTS

- Natural areas and specific locations can be identified by carefully observing their components.
- Good research depends on precise observation.

PROCESS SKILLS

Communicating, using time and space, observing, classifying, inferring, predicting, interpreting data, formulating hypotheses.
MATERIALS

- camera and film or digital camera
- at least 10 or 12 photographs of an outdoor study area
- oaktag or cardboard for mounting pictures (optional)
- three pictures of famous locations: e.g., Grand Canyon, Epcot Center, local school

PREPLANNING

1. Select a natural site on the school grounds that is available for the students to use. (courtyard, playground, field, woods)

2. Photograph special locations within the study area that show a variety of natural objects and landform configurations (examples: tree trunk with special markings, a pile of rocks, part of a wall, exposed roots, etc.) Take photographs from different perspectives: ground-level, eye-level, panorama, close-up.

3. Mount the photos and number them.

MOTIVATIONAL ACTIVITY

Show pictures of famous locations to the students. Ask the students to tell how they were able to recognize the locations. Discuss shape, arrangement, landform, landmark, and personal experience.

PROCEDURE

1. Divide the class into groups of two.

2. Give a photograph to each pair. Show the students the designated study area and explain that they are to find the exact location of what is shown in the photograph.

3. Allow each pair time to find the location. [Analyzes data and relates it to practical situations.]

4. Ask each pair to describe the features and relationships that helped them identify the exact location of the photograph's site. [Justifies conclusions.]

5. Repeat the activity by giving each pair a new photograph.
Putting It All Together

? What special features in the photograph helped you locate the area in your photograph? [Analyzes data.]

? How did you know your location was identified correctly? (The shapes and arrangement of the actual objects matched the objects in the photograph.) [Integrates data into a plan for problem solving.]

? Display the pictures from the activity. What was the best representation and why? [Supports evaluation.]

? Create a checklist of important steps or pieces in identifying an area. [Analyzes and evaluates relevancy of data.]

Take Another Step

✓ Discuss map making. Have students create a Habitat Map and include one of the sites from the photographs as the focal point. (see p. 258)

✓ Pretend you are a bird flying from Central America to New Jersey. How would you find your way without the help of a printed map? (Discuss what landmarks they may use for guidance: mountain ranges, coastlines, position of the stars, the sun, and the moon.)

✓ Have a photography display of school-site locations. Encourage other students to locate the exact sites.

✓ Repeat the activity in a different habitat. Make a collage of photographs from different habitats.

✓ Allow students to take the pictures and challenge their classmates.
Silt, Sand, Clay – Soil Investigation

Grade Level: 4 to 8

Objectives:
The students will:
- Describe the variety of particle sizes present in soil.
- Observe differences in soil type.
- Predict the influence of particle size on water movement.
- Discuss why different plants prefer different soil types.

Background:
Soil particles come in many different sizes and weights. This occurs because some rocks and minerals are harder than others. The harder materials do not break apart as easily as do the softer rocks or minerals.

Most soils contain some mixture of different sized particles that can be placed in three basic categories: sand, silt and clay. Sand is the coarsest or largest-grained particle, and the finer-grained silt follows. Clay has the smallest particles, so small they can easily become suspended in water. Particle size affects how well the soil holds water for plants and how readily water moves through the soil.

For example, very sandy soil does not hold water very well; it will usually pass right through relatively quickly. A soil made up of mostly clay, on the other hand, may keep water from passing through at all so it may pool or run off. Different plants are suited to different soil compositions, though most require some kind of combination of all three particle sizes.

In addition to the abiotic components in soil – silt, sand and clay – soil has biotic components. Humus is the biotic component found in true soils. Humus is decaying plant and animal material found, generally, on the surface. Compost is a form of humus and is not a true soil unless sand, or other abiotic element, is added.

Vocabulary:
- **Particle**: Each individual piece of soil material.
- **Sand**: The largest and heaviest soil particle. Most sand is made of quartz.
- **Silt**: A soil particle whose size is between sand and clay and whose mineral origin is quartz and feldspar.
- **Clay**: The smallest and lightest soil particle. Clay can be made of many different types of minerals.
- **Humus**: Organic matter which is stable; meaning it cannot be broken down any further. Compost and manure are types of humus.
- **Texture**: Refers to the size of the particles that make up the soil. The terms sand, silt, and clay refer to relative sizes of the soil particles. Sand, being the larger size of particles, feels gritty. Silt, being moderate in size, has a smooth or floury texture. Clay, being the smaller size of particles, feels sticky.
- **True Soil**: A true soil contains both abiotic minerals (sand, silt, clay) as well as organic matter (humus).

*Making New Jersey a better place for people and wildlife since 1897*
Figures and Tables:

The Size of Sand, Silt and Clay

<table>
<thead>
<tr>
<th>Name</th>
<th>Particle Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>below 0.002mm</td>
</tr>
<tr>
<td>Silt</td>
<td>0.002mm to 0.05mm</td>
</tr>
<tr>
<td>Very fine sand</td>
<td>0.05mm to 0.10mm</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>0.10mm to 0.25mm</td>
</tr>
<tr>
<td>Medium Sand</td>
<td>0.25mm to 0.5mm</td>
</tr>
<tr>
<td>Course Sand</td>
<td>0.5mm to 1.0mm</td>
</tr>
<tr>
<td>Very course sand</td>
<td>1.0mm to 2.0mm</td>
</tr>
<tr>
<td>Gravel</td>
<td>2.0mm to 75.0mm</td>
</tr>
<tr>
<td>Rock</td>
<td>Greater than 75.0mm (~2 inches)</td>
</tr>
</tbody>
</table>

Comparative Size of Sands, Silt and Clay
If clay was the size of a dot on the page, silt and sands would be a comparative size.

The soil texture triangle gives names associated with various combinations of sand, silt and clay. A coarse-textured or sandy soil is one comprised primarily of medium to coarse size sand particles. A fine-textured or clayey soil is one dominated by tiny clay particles. Due to the strong physical properties of clay, a soil with only 20% clay particles behaves as sticky, gummy clayey soil. The term loam refers to a soil with a combination of sand, silt, and clay sized particles. For example, a soil with 30% clay, 50% sand, and 20% silt is called a sandy clay loam.

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Soil Observation

Materials

- 1 – 8 ounce jar with a lid
- 1 – 2 ounce soil sample
- 5 ounces of water
- 1 white index card

Directions

1. Fill your jar with 2 ounces of garden soil.
2. Add 5 ounces of water.
3. Tighten the lid.
4. Shake your sample for 1 minute.
5. Let your sample stand for 15 minutes. Do not shake or move your sample.
6. Complete these questions while you wait.
7. What color is each soil? Use words from the word bank if you need to.
   - Sand
   - Silt
   - Clay
   - Garden

8. How does each soil feel? Use words from the word bank if you need to.
   - Sand
   - Silt
   - Clay
   - Garden

9. Can you feel each grain of soil? Write yes or no for each soil.
   - Sand
   - Silt
   - Clay
   - Garden

10. Are the grains: BIG, MEDium, or small? Circle one for each soil.
    - Sand
    - Silt
    - Clay
    - Garden

Word Bank

- grey
- red
- tan
- orange
- brown
- grainy
- fresh
- silky
- stinky
- smooth
- no smell
- powdery
- good
- rough
- organic
- soft
11. How does each soil smell? Use words from the word bank if you need to.

<table>
<thead>
<tr>
<th>Sand</th>
<th>Silt</th>
<th>Clay</th>
<th>Garden</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

12. Put a few drops of water on each soil and paint in the box.

<table>
<thead>
<tr>
<th>Sand</th>
<th>Silt</th>
<th>Clay</th>
<th>Garden</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>

13. Hold a white index card behind your sample. Draw and label your sample.

14. Based on our observations, what types of soil make up our garden soil?