

In this 5E segment, students will explore and evaluate earth materials. Students will apply their knowledge of earth materials to make a habitat for an earthworm.

Student Science Performance

Grade or course: Kindergarten

Title:

Topic: Earth Materials

What’s Under Your Feet?

Performance Expectation for GSE:

SKE2. Obtain, evaluate, and communicate information to describe the physical attributes of earth materials (soil, rocks, water, and air).

- a. Ask questions to identify and describe earth materials-soil, rocks, water, and air.
- b. Construct an argument supported by evidence for how rocks can be grouped by physical attributes (size, weight, texture, color).
- c. Use tools to observe and record physical attributes of soil such as texture and color.

Performance Expectations for Instruction:

- Students will go outside and observe natural earth materials.
- Students will collect samples and sort them by type of earth material.
- Students will examine a soil sample and observe both the living and non-living objects that compose soil.
- Students will examine and sort rocks based on their physical attributes.
- Students will apply their knowledge of earth materials to make a habitat for an earthworm.

Additional notes on student supports

Materials

An outdoor area with soil and rocks

Trowels, old spoons, buckets, magnifiers, containers of water, droppers, paper, nonstandard measuring tools (such as cubes, paper clips, counters), balance scales, earthworms (can be purchased at a pet store or bait shop), clear containers such as 2-liter bottles with the tops cut off

If the soil in your area does not contain many rocks, you will need to supply some rock samples.

Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.

Engaging Learners

Phenomenon

The materials that come from the Earth have different properties. The earth is made of rocks, soil, air, and water.

Teacher will show students the following video:

[Bucket Wheel Excavator](#)

Teacher will ask students “What do you think we will find if we dig into the Earth outside of our school?” The teacher will make a list of student ideas.

Obtaining

Students will go outside and become “excavators”. Students will be given a bucket and a small hand shovel.

Teacher Notes: Make sure you have permission from the administration to dig in the school yard. Let parents know ahead of time that students will dig in dirt so they can prepare their child for this (clothes, etc.).

Evaluating

Students will explore the bucket full of earth materials that they collected. Have large sheets of newspaper to put on the floor and have students put

	<p>their soil and rocks on the newspaper for sorting. Students will group items that are similar. Students will describe their reasoning for sorting.</p>
<p>Exploring</p>	<p><i>Communicating</i> In their journals, students will draw and label a picture of the items they found while digging in the earth.</p>
	<p><i>Obtaining</i> Students will explore and sort earth materials based on their similarities and differences. Students will sort the earth materials into a pile of soil and a pile of rocks. Have containers for transporting live specimen back outside.</p>
	<p><i>Evaluating</i> Students will use magnifiers to closely observe the particles of the soil. Students will observe that soil is made up of dirt, small rocks, and other natural materials like sticks, leaves, and roots. Have students put a bit of soil on a plate. Students will use a dropper to add water to their soil and observe how the texture of the soil changes. Students will observe how water makes the soil moist. Students will observe that soil contains both living (worms, insects, seeds) and non-living materials.</p> <p>Students will record their observations in their journal. Students should complete the following sentences. Soil looks_____ Soil feels_____ Soil smells_____.</p>
	<p><i>Formative Assessment of Student Learning</i></p>
<p><i>Explaining</i> Finalizing Model</p>	<p><i>Obtaining</i> Students will take the pile of rocks that was sorted from their earth materials bucket in the previous step and examine them closely for similarities and differences.</p>
	<p><i>Evaluating</i> Each student will select a rock from their bucket, closely examine and record the features of their rock.</p> <ul style="list-style-type: none"> ● Students will draw a detailed and accurate picture of their rock including the rock’s color. ● Students will weigh their rock in a bucket balance using a non-standard weight in the opposite bucket. (blocks, teddy bear counters, unifix cubes) ● Students will measure the length of their rock in non-standard measurement. ● Students will rub their rock on a piece of paper to see if it marks the paper.

	<ul style="list-style-type: none"> ● Students will submerge their rock into a small container of water to see if it floats and if the color changes when it is wet. ● Students will observe the texture of their rock (smooth, bumpy, rough, etc.).
	<p><i>Communicating</i> Students will work in a small group with 3-4 other students and compare their rock to other students' rocks. Each student will explain the physical attributes of their specific rock and what makes their rock unique.</p> <p>Have students put a small piece of tape on the bottom of their rock with their initials. Give out the student drawn pictures and information about the rock to random groups and see if they can locate the rock. Have them challenge the original rock "owners" to revise details of their information for better accuracy.</p>
<p>Elaborating Applying Model to Solve a Problems</p>	<p>Phenomenon Teacher will show students an earthworm and explain that it was found on the sidewalk after a rainstorm. Teacher will ask students what they can do to help the worm survive. Teacher should lead the students to the idea of designing a habitat for the worm so that they can monitor the worm and make sure that it survives.</p> <p>How to set up a worm bin</p> <p><i>Obtaining</i> Teacher will read an informational text about worms to help students understand the food, water, and shelter aspects of worm survival. Students will make a list of earth materials that worms will need to survive. Students will go outdoors and collect the needed materials. Teacher will provide a clear container for the students to use to house the habitat, such as a 2-liter plastic soda bottle with the top third of the bottle cut off and label removed.</p> <p><i>Evaluating</i> Students will assemble the remaining materials and construct the worm habitat.</p> <p><i>Communicating</i> Students will label the earth materials found in their worm habitat and explain why these materials are necessary for the worm to survive.</p>
<p>Evaluation</p>	<p style="text-align: center;">Assessment of Student Learning</p>
	<p>Students will draw a picture of their habitat. Students will label the earth material components of their habitat.</p>
<p><i>SEP, CCC, DCI</i></p>	<p style="text-align: center;">Science Essentials</p>
<p>Science and Engineering Practices</p>	<ul style="list-style-type: none"> ● Asking questions ● Engaging in argument from evidence ● Obtaining, evaluating and communicating information
<p>Crosscutting Concepts</p>	<ul style="list-style-type: none"> ● Patterns ● Energy and Matter ● Structure and Function
<p>Disciplinary Core Ideas</p>	<p>From A Framework for K-12 Science Education:</p>

	<p>ESS2.B Earth's Systems</p> <ul style="list-style-type: none">● Rocks, soils, and sand are present in most areas where plants and animals live. <p>ESS2.C Roles of Water</p> <ul style="list-style-type: none">● Water is found in the ocean, rivers, lakes and ponds. It carries soil and rocks <p>ESS2.E Biogeology</p> <ul style="list-style-type: none">● Plants and animals (including humans) depend on the land, water, and air to live and grow. <p>ESS3.A Natural Resources</p> <ul style="list-style-type: none">● Living things need water, air, and resources from the land, and they try to live in places that have the things they need. Humans use natural resources for everything they do...
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Additional Supports for struggling learners:

The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student’s Individualized Education Program.

General supports for the following categories:

<u>Reading:</u>	<u>Writing:</u>	<u>Math:</u>
<ol style="list-style-type: none"> 1. The teacher can have students match letters prior to reading to remind them of the alphabet. 2. The teacher can have students identify words that they know in the text as the class reads. 3. The teacher should remind students to use strategies when they are reading. 	<ol style="list-style-type: none"> 1. The teacher can provide practice for students in the area of writing both in context and practicing just letters. 2. The teacher can provide a sentence starter for the students. 3. The teacher should continually give encouragement to the students. 4. The teacher can provide constructive positive feedback during the writing process to help students understand the expectations. 	<ol style="list-style-type: none"> 1. Provide students with opportunities to interact with numbers. 2. The teacher can provide manipulatives to allow the students to count and interact with materials.

Supports for this specific lesson if needed:

Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.

Engage:

1. The teacher should ask students if they have ever seen soil being excavated or someone digging a hole in real life.
2. The teacher should elicit ideas from students about what might be in the soil.
3. The teacher should show students to how to use the tools to dig in the soil and provide guidelines of how and where the tools should be used.

4. If permission is not given to dig on school campus, then the teacher can consider making a dirt mixture themselves. The teacher can use potting soil, some red dirt, some rocks and some organic matter gathered from outside (this can be leaves, broken up sticks, pine straw, etc.).
5. The teacher should provide students a template to draw and write their observations.

Exploring:

1. The teacher should give students directions of where to put soil and where to put rocks.
2. The teacher should give students a place to draw their observations and then a place to complete the sentences.
3. The teacher should give students words to use to label the things that they find in the soil.
4. The teacher may need to explicitly show students what they are looking for a seeing in the soil.

Explaining:

1. The teacher should have students make observations about what they notice in the bucket of rocks.
2. The teacher can then lead a discussion about the characteristics and make a class list of what they see.
3. The teacher should provide an organizer to students so that students can record their observations in the form of pictures and words as appropriate.
4. The teacher will need to explicitly show students how to weigh and measure the rocks. This may, also, require some assistance from the teacher as the students move through this part of the lesson.
5. The teacher should provide clear and consistent guidelines for group work.
6. The teacher should have students provide each other feedback on the description of the rocks and what needs to be added to make it easier to identify the rock.

Elaborating:

1. The teacher should ask questions like:
 - Where do worms live?
 - What do worms need to survive?
 - What do worms eat or drink?
2. The teacher should consider using other guiding questions to help students develop an idea for a worm habitat.
3. The teacher should have students sketch their ideas for the habitat prior to them getting more information.
4. The teacher can have students connect the idea of survival to themselves by asking what they need to stay healthy.
5. The teacher should have students revise their habitat based on information about worms and their ideas about how they need to stay healthy. The teacher can then check the work on the students prior to allowing them to continue making their habitats.
6. The teacher will allow students to assemble their habitat and then ensure that it will work for the earth worms.

Evaluating:

1. Students may need additional time to complete their assignment.
2. Students may wish to view other habitats and then revise their idea as needed.