

Earth & Space Science

—— Grade 3 ——

Written by Tracy Bellaire

The activities in this book have two intentions: to teach concepts related to earth and space science and to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

The experiments in this book fall under twelve topics that relate to three aspects of earth and space science: **Exploring Soils in the Environment, Rocks and Minerals,** and **Stars and Planets.** In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.



Tracy Bellaire is an experienced teacher who continues to be involved in various levels of education in her role as Differentiated Learning Resource Teacher in an elementary school in Ontario. She enjoys creating educational materials for all types of learners, and providing tools for teachers to further develop their skill set in the classroom. She hopes that these lessons help all to discover their love of science!

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Learning Intentions

	Types of Soil	Soils in Your Environment	Growing in the Garden	Living in the Soil	At Work in the Soil	Erosion	Rock Types	Exploring Minerals	Fun with Rocks	Our Solar System	The View from Earth	Constellations
Knowledge and Understanding Content												
Identify the four components of soil and explore the different types of soil using the senses	•											
Identify and describe the components that are in soils by exploring sieving and sedimentation techniques		•										
Recognize and describe how different types of soil affect the growth of plants			•									
Describe how living things are interdependent with the soil they live in				•								
Describe the benefit of earthworms in making nutrient rich soil, and how composting provides nutrients to soil					•							
Determine the effects of water on soil						•						
Describe the three different rock types and discover the types that are in the neighborhood							•					
Identify minerals and describe them according to their properties; conduct a rock study								•				
Determine the presence of carbonates, and how rocks become eroded									•			
Identify and describe the unique features of each planet in our solar system										•		
Describe and demonstrate the positions of the sun, Earth, and its moon in our solar system											•	
Identify the constellations in our night sky; retell the myth behind a constellation												•
Thinking Skills and Investigation Process												
Make predictions, formulate questions, and plan an investigation			•	•	•	•			•		•	
Gather and record observations and findings using drawings, tables, written descriptions	•	•	•	•	•	•	•	•	•	•	•	•
Recognize and apply safety procedures in the classroom	•	•	•	•	•	•	•	•	•	•	•	•
Communication												
Communicate the procedure and conclusions of investigations using demonstrations, drawings, and oral or written descriptions, with use of science and technology vocabulary	•	•	•	•	•	•	•	•	•	•	•	•
Application of Knowledge and Skills to Society and the Environment												
Assess ways humans can positively affect the quality of soils in the environment					•	•						

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AT WORK IN THE SOIL

LEARNING INTENTION:

Students will learn about the benefit of earthworms in making nutrient rich soil, and how composting provides nutrients to soil.

SUCCESS CRITERIA:

- describe where earthworms live, their purpose, and how they make nutrient rich soil
- create an earthworm farm
- make and record observations about earthworm activity
- make and record a conclusion about the benefit of having earthworms in gardens
- create a composter filled with organic matter
- make and record observations of the decomposition over time
- explain the uses and importance of compost
- make a connection to the environment by identifying nature's composting methods

MATERIALS NEEDED:

- ask each student to bring in a large wide-mouthed glass jar with a lid
- a copy of "Getting the Dirt on Earthworms!" Worksheet 1 for each student
- a copy of "A Home for the Earthworms" Worksheet 2 and 3 for each student
- a copy of "Classroom Composting" Worksheet 4, 5, and 6 for each student
- soil such as sand and loam or topsoil (enough to fill large jars for each student)
- a hammer and a nail, masking tape, a jug of water, a few small cups
- earthworms (2 or 3 per student)
- vegetable or fruit scraps
- large sheets of black construction paper (2 per student)
- pencils
- a large plastic bin with a lid

- garden soil
- vegetable and fruit scraps, egg shells, leaves, grass clippings, used coffee grinds or tea bags, or other organic material
- a garden shovel, a drill, a long stick for stirring
- access to water

PROCEDURE:

***This lesson can be done as one long lesson, or be divided into two shorter lessons.**

Composting should span over a two month period.

1. Using Worksheet 1 do a shared reading activity with the students. This will allow for reading practice and learning how to break down word parts in order to read the larger words in the text. Along with the content, discussion of certain vocabulary words would be of benefit for students to fully understand the passage.

Some interesting vocabulary words to focus on are:

- | | |
|------------|--------------|
| • moist | • nutrients |
| • castings | • burrows |
| • digest | • vegetation |

2. Explain to students that they will create their own earthworm farms. Give them Worksheets 3 and 4, and the materials to create the farms. Read through the question, materials needed, and what to do sections on Worksheet 3 with the students to ensure their understanding of the task. Students will make and record observations of the earthworm farms as they are created and again 24 hours later. They will make a conclusion about the purpose earthworms have in creating nutrient rich soil.



3. Working as a large group, have students participate in creating and contributing to a classroom composter. Give students Worksheet 4. Read through the materials needed and what to do sections with them to ensure their understanding of the meaning of composting and the task they are required to participate in. Gather your materials and start building!
4. Give students Worksheets 5 and 6. They will illustrate the composting layers at the start of the project, and make observations of the decomposition of the organic matter over time on Worksheet 5. After a period of 8 weeks, students will illustrate the compost, and respond to questions on Worksheet 6. Emphasis should be made on the positive effects composting has on our soils and for our environment.

*An activity to enhance the learning about the importance of composting and necessity of decomposition, show students *The Magic School Bus* episode called “Meets the Rot Squad”.

DIFFERENTIATION:

Slower learners may benefit by working as a small group with teacher direction to create their earthworm farms. It may also be beneficial for these learners to have another opportunity to re-read the information on Worksheet 1 in a small group. An additional accommodation is to work in a small group with teacher guidance to *orally respond* to the questions on Worksheet 6.

For enrichment, faster learners could create a graphic text about the adventures of their earthworms in the jar. An option is to use computer software to create it. A great computer program to assist with this is Comic Life. This is available on both PCs and Macs.

Getting the Dirt on Earthworms!

Where Do They Live?

Earthworms make their homes in soil. Some earthworms live in the roots of grass under the lawn and others live in gardens among the vegetables. Some earthworms make their burrows under leaves among tree roots.

The earthworm's burrow is long, dark, and narrow. They stay in their burrows, where it is dark and moist, for most of the time. They come out at night to feed on leaves and grass, or other vegetation.

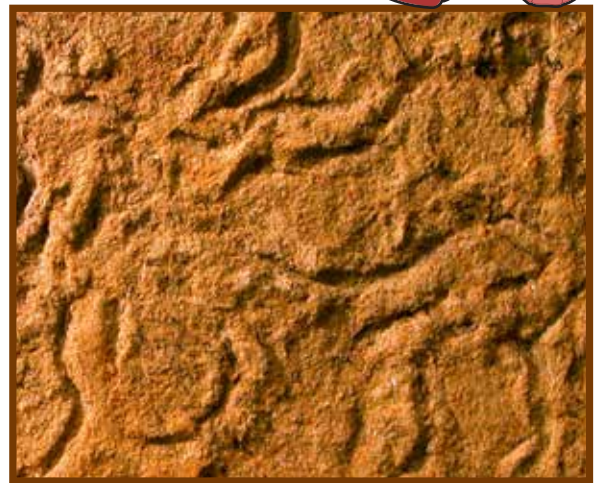
Worms help water flow through the soil!



What Do They Do?

The earthworm is like “nature’s plow” because their burrowing of tunnels brings air to the roots of plants. They make the earth crumbly so that water can get into the soil easily.

When an earthworm eats and then digests its food, its castings add nutrients to the soil that plants need in order to grow.



Did You Know?

Farmers find earthworms very useful. They help to get air and water to the roots of their crops in the fields. Also, the earthworms’ castings add nutrients to make the soil rich.



A Home for the Earthworms

Some people make worm farms in order to make rich soil to add to their gardens at home. Let's give this a try!

You'll need:

- a large jar with a lid
- soil (a mix of loam and sand)
- masking tape
- vegetable or fruit scraps
- 2 or 3 earthworms
- a small cup of water
- a hammer and a nail
- 2 large sheets of black construction paper

What to do:

1. Fill the jar until it is three-quarters full of loam soil. Add a thin layer of sand to the top of the soil.
2. Throw some vegetable or fruit scraps on top of the sand.
3. Moisten the soil with a little bit of water. Then add the earthworms.
4. Using the hammer and a nail, **your teacher** will make some holes in the lid of the jar. Put the lid on the jar to close it.
5. On Worksheet 4, draw your observations of the jar and its contents.
6. Cover the sides of the jar with black construction paper so that no light can get in. **Worms like the dark!**
7. Leave the jar for a day.
8. The next day, remove the paper. Observe the changes in the jar. Record them on Worksheet 4.

Let's Observe

Draw your observations of the jar and its contents.

This is what it looked like in the jar before it was covered up:	This is what it looked like in the jar after it was left for one day:

Let's Conclude

Explain the changes in the jar. What did the earthworms do?



