

**Curriculum-Embedded Performance Task**  
**Middle School Science**  
Content Standard 6.1, 6.2 or 6.4



# **DIG IN!**

## **Student Work**

**Connecticut State Department of Education**  
**2011 Edition**

NAME: \_\_\_\_\_

## Dig In!

### A Guided Exploration of How Water Moves Through Soil

When you think of soil, you may think of just plain dirt. Look again at the picture of the soil on the cover or the actual soil sample you have. Can you see some things that are mixed in with the soil? Are there other materials that are mixed in that are not so easily seen?

Imagine that your class will be planting a vegetable garden as part of a study about ecosystems. You need to choose the best location for the garden, and one of the important factors is the type of soil.

**Observe** the different soil samples with and without a magnifier. Notice different properties such as color, texture, clumpiness, or materials mixed in.

**Record** your observations in the partially completed chart below:

#### SOIL SAMPLE OBSERVATIONS

	Without Magnifier				With Magnifier			
<b>SOIL A</b>								
<b>SOIL B</b>								
<b>SOIL C</b>								
<b>SOIL D</b>								

What factors do you think affect how much water a soil can hold? Review the observations you collected and brainstorm ideas with your partners. Factors that might affect water absorption might include:

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Choose one factor from your list to investigate and write a scientific question on the lines below:

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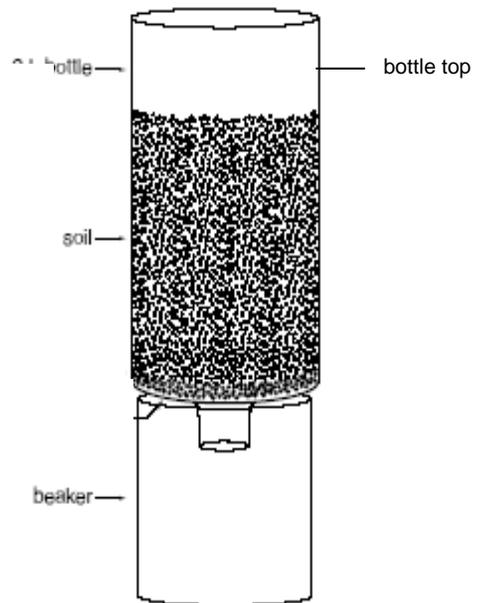
### Experiment 1 – Relationship Between Soil Properties and Water Absorption

To conduct your experiment, you can make a soil-testing device like the one in the diagram:

Cut the plastic bottle across the middle. Remove the labels and the caps. The bottle top will hold the soil, and the beaker (or the bottle bottom) will catch the water.

Position the mesh near the bottle neck so it will keep the soil in the bottle top.

Rest the bottle top, neck down, on the bottle bottom so that water poured through the soil in the bottle top will flow into the bottle bottom.



**INVESTIGATION 1 – FACTORS AFFECTING WATER ABSORPTION.** Design a procedure to explore a soil property that may affect its ability to hold water. In this experiment, the dependent variable is “water absorption.” Describe how you will change the independent variable, measure the dependent variable, and keep the other factors constant in your experiment. Include enough detail so that you or someone else could repeat your experiment and get similar outcomes. Repeat trials to gain confidence in your results.

DEPENDENT VARIABLE: \_\_\_\_\_

INDEPENDENT VARIABLE: \_\_\_\_\_

CONSTANTS: \_\_\_\_\_

PREDICTION: \_\_\_\_\_

I predict this because I think that

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**Experiment #2 – How Fast Does Water Pass Through Soils?**

This property is known as the soil’s “**percolation rate**.”

**Observe** the different soils again. **Record** your observations in a chart below:

**SOIL SAMPLE OBSERVATIONS**

What factors do you think affect how fast water moves through soil? Does water move faster through some soils? Consider your observations, your research and your findings in Experiment 1. Then brainstorm ideas with your partners. Factors that might affect water percolation might include:

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Choose one factor from your list to investigate and write a scientific question on the lines below:

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**INVESTIGATION 2 – FACTORS AFFECTING WATER PERCOLATION THROUGH SOIL.** Design a procedure to explore how quickly water moves through soils. In this experiment, the dependent variable is “water percolation.” Describe how you will change the independent variable, measure the dependent variable, and keep the other factors constant in your experiment. Include enough detail so that you or someone else could repeat your experiment and get similar outcomes. Repeat trials to gain confidence in your results.

DEPENDENT VARIABLE: \_\_\_\_\_

INDEPENDENT VARIABLE: \_\_\_\_\_

CONSTANTS: \_\_\_\_\_

PREDICTION: \_\_\_\_\_

I predict this because I think that







NAME: \_\_\_\_\_

### **Applying Your Findings To Solve A Problem**

Imagine that you are going to plant a vegetable garden at your school or at home. You need to know what type of soil you have so you can select the right plants and know how much or how often you will need to water them. Use what you've learned through your experiments and your research to describe the type of soil in the school or home sample you have tested.

### **Communicate Your Conclusions:**

Make a recommendation to the school principal about where the garden should be planted and how much watering it will need. Write an expository report that includes the following:

- an introduction that summarizes your research questions and findings;
- a description of the different soils you observed and how they were tested;
- a description of the school soil type and how it is similar to or different from the other samples you tested;
- a recommendation about whether the school garden should be planted in the area from which you took your test sample; and
- a conclusion that suggests areas for further research needed before planting the school garden.