



## Advance Preparation

1. Run off the worksheets. **Blackline Master #1.**
2. Assign group numbers for lab activity.
3. Dry soil samples for student use.
4. Cut holes in plastic lid so the cup will fit into the hole and be suspended over a beaker.

## Other Information

### Learning Objective

The learner will:

- Determine how particle size and soil texture control water flow through soil

## Procedure

### **Engage**

1. Have several different containers of soil. (sandy, rocky, or clay)
2. Have students examine these large samples and make some general observations about similarities and differences.

### **Explore**

1. Review lab report (Blackline Master #1) with students.
2. Allow students time to complete the investigation.

### **Explain**

1. How were the soil samples different? (*answers should include color, types, texture, and drainage*)
2. What cup of soil did the students with the fastest rate of percolation have? (*the cup with the mixture*)
3. WHY? (*Has more spaces for water to easily flow through*)
4. What type(s) of soils did the students with the slowest rate of percolation have? (*Clay*)
5. Why? (*Clay is generally more compacted than sand or the mixture*)
6. Are there other variables that could be tested? (Different quantities of gravel, sand, and clay)
7. What is the relationship between how fast the water filtered through the different soil? (*The closer the particles are together the slower the water will filter through.*)
8. What would happen if you mixed gravel with clay soil? (*Speed up the rate of filtration. Would allow for better drainage.*)
9. Why? (*Because the particles would not be as tightly packed together.*)

### **Expand**

1. Have students pick three soil samples brought in by their classmates. Prepare the same experimental setup using the three soil samples as in the lab. Have students predict which of the samples will have the least infiltration of water and explain why they made that choice. Allow the water to pass through the setup for 10 minutes.
2. Compare the predictions with the results of the experiment.

### **Evaluate**

1. Have students answer the following questions on a sheet of loose-leaf or in a science journal.
  - a. How does the rate at which water flows through soil affect erosion?

## **Blackline Master**

1. **Dirt lab report**

## **Supplementary Resources**

### **Types of Soil**

This site contains details about what soil is, soil formation, and soil composition.

<http://library.thinkquest.org/J003195F/newpage4.htm>



**Enchanted Learning: Soil Layers**

Details on types of types, and characteriscis of soil.

<http://www.enchantedlearning.com/geology/soil/>

**The Great Plant Escape**

This site contains details about soil types and why they are important.

<http://www.urbanext.uiuc.edu/gpe/case2/c2facts2.html>

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class Hour: \_\_\_\_\_

### Dirt Lab Report

**Problem/Purpose:** How much water will soil, clay or sand hold?

**Hypothesis:** \_\_\_\_\_

**Materials:** \_\_\_\_\_

**Procedure:**

1. Remove some of the soil for later examination.
2. Punch the same number of holes in the bottom and around the lower part of each cup.
3. Label each cup A, B, or C.
4. Cover the holes in each cup with a square of cheesecloth and secure with a rubber band.
5. Place each cup in a coffee can lid and place the lid over a beaker.
6. Fill cup A half full of dry sand. Fill cup B half full of dry clay. Fill cup C half full with equal parts of clay, gravel and sand.
7. Use a graduated cylinder to **pour 100mL** of water into cups. Start stopwatch when all the water is in the cup. Stop the stopwatch when the water first drips from the cup.
8. Allow water to **drip for 25 minutes**, then measure and record the amount of water in each beaker
9. While waiting for time to expire, examine the soil samples.
10. Describe the color of the soil.
11. Spread some of the sample on paper and examine it with a hand lens.
12. Name or describe some of the different particles you see.
13. Place some of the soil in your hand and rub it between your fingers. Describe the texture (How does it feel?).



**Data table:**

	Cup A dry sand	Cup B dry clay	Cup C clay, gravel, sand
Amount of water in beaker	_____ mL	_____ mL	_____ mL
Difference in starting and ending mL	_____ mL	_____ mL	_____ mL

**Analysis:**

On a separate sheet, graph the amount of water in each beaker and difference in the starting and ending amounts of water. Do you see a pattern in your data? If so, describe it:

**Conclusion:**

1. Was your hypothesis supported or not? \_\_\_\_\_

2. Why? \_\_\_\_\_

3. What did you learn by doing this experiment? \_\_\_\_\_

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