

Observations of a Sample of Earth Material

Making observations is a fundamental part of the study of any science. An **observation** is any information gained directly by using your senses. Everyone makes observations based on what they see, smell, taste, and touch. In this laboratory, you will take note of the way in which you use your senses to make observations. Scientists also use **instruments** to extend their senses. Instruments make it possible for you to use your senses to their full advantage and to quantify your observations with measurements. Scientists also record their observations by taking notes and making sketches.


Lab Skills and Objectives

- To **observe** and **describe** a sample of soil
- To **measure** and **record** data about the soil sample
- To **hypothesize** about the source of the soil sample
- To **compare** and **contrast** individual soil measurements with class measurements

Materials

- safety goggles
- 20 to 30 g of dry soil
- magnifying glass or hand lens
- graph paper, ruled with 1- or 2-mm spacing
- balance
- 10-mL graduated cylinder
- toothpick
- watch glass
- 2 50-mL beakers
- eyedropper

Procedure

1.  **Put on your safety goggles.** Fill a 50-mL beaker with soil provided by your teacher.
2. Place about one fourth of the soil sample on the watch glass. Use the magnifier to carefully examine the different particles that make up the soil sample. Describe the appearance of the soil in Analysis and Conclusions question 1.
3. Place a small portion of the soil in the palm of your hand. Rub the soil between your fingers. Is the soil moist or dry, gritty or smooth? Are the particles loose or difficult to separate? Record observations in Analysis and Conclusions question 2.
4. Fill about half of the second 50-mL beaker with water. Using the eyedropper, add one drop of water at a time to the soil on the watch glass. Observe how the sample changes and any odor it emits. Record this information in Analysis and Conclusions questions 3 and 4.
5. Measure the size of each grid square on your graph paper so that you can use the paper to determine the size of the soil particles. Spread about one fourth of the dry soil sample on the graph paper so that the lines on the paper are visible through the sample. Break up any soil clumps into individual grains. Using the magnifier, estimate the size range of the soil particles and record them in Analysis and Conclusions question 5.
6. In Analysis and Conclusions question 6, draw a sketch of the soil as it appears when magnified on the graph paper. Include any identifiable particles such as organic matter, oddly-shaped grains, or particles that seem to be made of combined materials.
7. Use the balance to find the mass of the soil remaining in the beaker. First, determine the mass of an empty 10-mL graduated cylinder. Record all measurements in Figure 1.1. Carefully fill the cylinder to the 10-mL mark with dry soil. Press the soil into the cylinder as compactly as possible using the eraser end of a pencil. Determine the mass of the cylinder and the soil. Compute the mass of 1 mL of soil from the mass of 10 mL of soil.



Data Table			
Mass of Empty Graduated Cylinder	Mass of Cylinder + 10 mL of Soil (g)	Mass of 10 mL of Soil (g)	Mass of 1 mL of Soil (g)

Figure 1.1**Analysis and Conclusions**

1. What is the general appearance (color, how loose or compact it is, kind of particles, and so forth) of the original soil sample?

2. What does the sample feel like? Describe it in as much detail as possible.

3. Was there any change in the soil as water was added?

4. Describe any odor given off by the wet soil.

5. What is the range in size of the individual particles (not soil clumps) in the soil?

6. How does the soil appear when magnified? On a separate piece of paper, draw a sketch of your observations.

7. Based on your observations, where do you think the soil sample came from? Explain.

8. What senses did you use in doing this laboratory? Give an example for each sense.

9. What senses did you not use?

10. What instruments did you use to extend your senses?
