PRELIMINARY ACTIVITY FOR

Soil Moisture

Soil moisture is water that is held in the spaces between soil particles. Dry soil is made up of minerals and air pockets, called *pore spaces*. A typical volumetric ratio would be 55% minerals and 45% pore space. As water is added to the soil, the pore spaces begin to fill with water. Soil that seems damp to the touch might now have 55% minerals, 35% pore space and 10% water. This would be an example of 10% volumetric water content. The maximum water content in this scenario is 45% because at that value, all the available pore space has been filled with water. This soil is referred to as being saturated, because at 45% volumetric water content, the soil can hold no more water.

Soils collect, store, and release water. Collection occurs as water enters the soil through surface pores in a process called infiltration.When forces of retention within soil are greater than removal forces water storage is possible. Water release takes place when plant uptake, drying, or gravitational forces overcome retention.

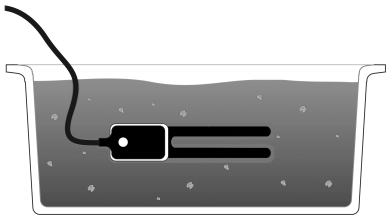
In the Preliminary Activity, you will gain experience using a Soil Moisture Sensor and learn soil moisture measuring technique as you determine the volumetric soil water content of a soil sample.

After completing the Preliminary Activity, you will first use reference sources to find out more about soil moisture and factors that affect it before you choose and investigate a researchable question dealing with soil moisture. Some topics to consider in your reference search are:

- soil
- soil moisture (soil water content)
- soil texture
- soil composition
- water infiltration
- unsaturated flow
- compost
- mulch

PROCEDURE

1. Connect a Soil Moisture Sensor and the data-collection interface.
2. Obtain a soil sample.
3. Position the Soil Moisture Sensor. **Note:** The long axis of the sensor should be placed horizontally, with the short axis or "blade" oriented vertically as shown in the figure.



   a. Use a thin implement such as a flat-bladed trowel to cut a slot in the soil.
   b. Place the sensor into the hole, making sure the entire length of the sensor is covered.
   c. Press down on the soil along either side of the sensor with your fingers. Continue to compact the soil around the sensor by pressing down on the soil with your fingers until you have made at least five passes along the sensor. This step is important, as the soil adjacent to the sensor surface has the strongest influence on the sensor reading.

4. Start data collection. When the soil moisture reading stabilizes, record the displayed value (in %).
5. When removing the sensor from the soil, **do not pull it out of the soil by the cable!** Doing so may break internal connections and make the sensor unusable.

QUESTIONS

1. What was the soil moisture value (in %) for the soil sample you tested in the Preliminary Activity?

2. How is soil moisture important?

3. List at least one researchable question for this experiment.