

PRELIMINARY ACTIVITY FOR Ecocolumn Investigations

An ecosystem can be defined as a community of organisms along with their physical environment. An Ecocolumn is a model of an ecosystem on a small scale, and generally includes a terrestrial habitat, with a compost unit, and an aquatic habitat.

Many ecosystem concepts can be investigated using an Ecocolumn and probeware. Conductivity Probes, CO₂ Gas Sensors, Light Probes, Relative Humidity Sensors, Soil Moisture Sensors, Temperature Probes, and other sensors can be used to collect meaningful data.

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. Depending on your previous use of the sensors listed above, you may also want to gain experience with one or more of them during the Preliminary Activity. **Note:** You may or may not choose to use a Soil Moisture Sensor as you later investigate your researchable question.

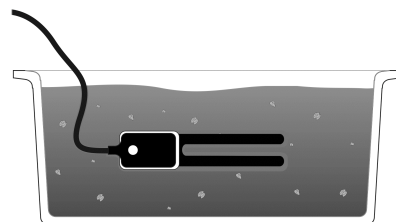
After completing the Preliminary Activity, you will first use reference sources to find out more about ecosystem concepts before you choose and investigate a researchable question dealing with ecosystems. Some topics to consider in your reference search are:

- Ecosystems
- Ecocolumn
- Carbon cycle
- Cellular respiration
- Composting
- Decomposers
- Energy flow
- Hydrologic cycle
- Nutrient cycling
- Photosynthesis
- Plant growth
- Soil



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.
 - 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.



Experiment 19

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.
6. Practice the use of Conductivity Probes, CO₂ Gas Sensors, Light Probes, Relative Humidity Sensors, Temperature Probes, and other sensors as directed by your teacher.

QUESTIONS

1. What did you measure in the Preliminary Activity? What results did you obtain?
2. What role does photosynthesis play in an ecosystem? Write an equation for photosynthesis.
3. What are the three major processes of the hydrologic cycle?
4. List at least one researchable question for this experiment.