

## PRELIMINARY ACTIVITY FOR

# Water Cycle Column Investigations

In this experiment, you will use a Water Cycle Column and probeware as you investigate the hydrologic cycle and related concepts.

In a typical three-bottle Water Cycle Column, water moves up a wick from a pool of water in the bottom chamber to soil in the middle chamber by capillary action. Water in the soil can *evaporate* and become *water vapor* in the middle chamber. *Transpiration*, the loss of water vapor from the aerial surfaces of plants, is an additional source of water vapor in the middle chamber.

If a third bottle is inverted above the middle chamber and is filled with ice water, water vapor in the middle chamber will *condense* onto the cold surface of the inverted bottle to form drops of liquid water. These drops of water can run down the bottle and flow through an attached string as *precipitation*.

Conductivity Probes, CO<sub>2</sub> Gas Sensors, Light Probes, Relative Humidity Sensors, pH Sensors, Soil Moisture Sensors, Temperature Probes, and other sensors can be used to collect meaningful data in Water Cycle Column investigations.

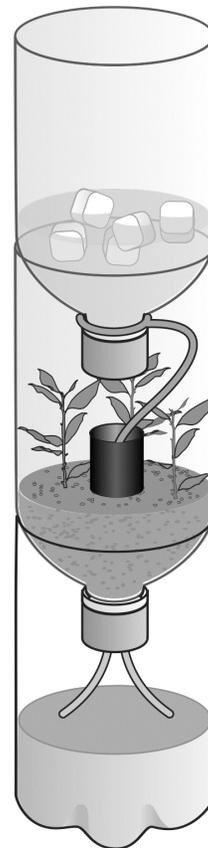
In the Preliminary Activity, you will gain experience using a pH Sensor and learn pH measuring technique as you determine the pH of a water sample. **Note:** You may or may not choose to use a pH Sensor as you later investigate your researchable question.

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

- Hydrologic cycle
- Water Cycle Column
- Acid deposition
- Salinity
- Salinization
- Soil
- Transpiration

## PROCEDURE

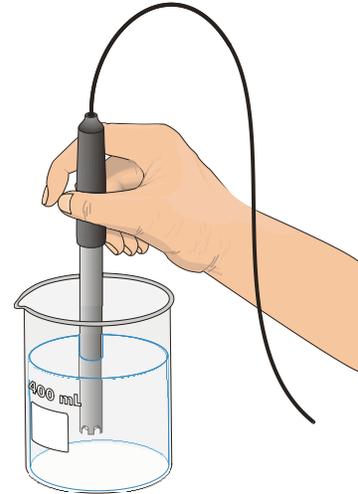
1. Connect the pH Sensor and the data-collection interface. **Important:** For this experiment, your teacher already has the pH Sensor in pH soaking solution in a beaker; be careful not to tip over the beaker when connecting the sensor to the interface.
2. Rinse the pH Sensor with distilled water.
3. Measure the pH of a water sample.
  - a. Place the tip of the pH Sensor into the water sample being tested. Make sure the glass bulb at the tip of the sensor is covered by the water. Stir gently.



## ***Experiment 17***

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- b. Continue gentle stirring. Note and record the pH value when the reading stabilizes.
4. Rinse the pH Sensor with distilled water and return it to the soaking solution.
5. Practice the use of Conductivity Probes, CO<sub>2</sub> Gas Sensors, Light Probes, Relative Humidity Sensors, Soil Moisture 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 are the three major processes of the hydrologic cycle?
3. What is transpiration? How does transpiration benefit the environment?
4. List at least one researchable question for this experiment.