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# The Water Cycle and the Environment

**Purpose**

The purpose of this lab is to simulate the water cycle and evaluate the effect of environmental changes.[[1]](#endnote-2)

**Background Information**

All of the earth’s water goes through a cycle in which the water changes its location or physical state through different processes. In accordance with the law of conservation of matter, water is not created or destroyed. It just changes form. Water can be found in all three states of matter during the cycle: solid (ice caps), liquid (lakes) and gas (water vapor).

There are five processes by which water moves through the cycle. Water in oceans and lakes evaporates into the air. Cool air in the atmosphere causes this water vapor to condense into a cloud. Precipitation from the cloud falls to the ground as rain, sleet, or snow. The water on the ground percolates through the soil and some of it is absorbed by plants. As the plants go through photosynthesis (converting sunlight, water and carbon dioxide for their own food), they absorb water from the soil and release some of it back into the air through transpiration.

These patterns of change can vary, but the cycle occurs continuously. Water has been cycling by means of these processes since time began.

**Procedure**

** Materials**

1. 2-L plastic bottles (3) with caps
2. Water (Warm, room temp, ice)
3. Marker or crayon
4. Scissors
5. Push pin
6. Yarn (60cm)
7. Soil (1 cup or 225 mL)
8. Bean seeds

**Sequence of Steps**

**Set-up**

1. Remove labels from your 2 liter bottles (three total) by filling them with very warm water to warm the label’s glue.
2. Draw a line with a marker or crayon just below the “shoulder” of bottle A, keeping the line at the same height on the bottle all the way around. (An easy way to do this is by laying the bottle on its side and slowly turning the bottle while you hold the marker tip against it.) Then cut the bottle along this line using scissors. Using the same method, cut bottles B and C just above the “hips”.
3. Poke a hole in one cap using a push pin. The hole should be just large enough to thread your string through it. Place that cap on bottle B.
4. Cut a 40 cm length of yarn. Fold the yarn in half and insert the folded end through the cap hole to make a loop inside the bottle. Leave at least 5 cm of each end of the string hanging down from the cap.
5. Place a cap with no hole in it on bottle C. Tie 20 cm of string around the bottle’s neck so that one end hangs down about 7 cm.
6. Assemble the containers into a column: B inserts into A; C inserts into B. These three parts of the model will be referred to as “chambers” for the rest of the lab.

**Process**

1. Wet both strings thoroughly. Add 150 ml of water to chamber A. This will be the water source for your cycle.
2. Fill chamber B with enough moist soil to cover the loop of string (about 1 cup or 225 ml). The string should run up into the soil and not be pressed against the side of the column.
3. Plant several bean seeds in the soil around the sides of chamber B.
4. Leave chamber C off when you are running the water cycle to let air circulate and help the seeds grow.
5. Place the third bottle cap on top of the soil at the center of chamber B so that the end of string tied to chamber C hangs into the cap. This is your rain collector.
6. Place chamber C back on chamber B and fill C with ice water.

**![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]() Observations**

1. What do these three parts in your model represent in the water cycle?
* The water & ice in chamber C =
* The cap in chamber B =
* The water in chamber A =
1. **E**xplain how the following processes are demonstrated in your water cycle column.
* Evaporation =
* Transpiration =
* Condensation =
* Precipitation =
* Percolation =
1. Pretend you added acid to the water in chamber A. Does water in other parts of the cycle become acidic? Why?
2. What process would be represented in chamber B if the acid was to move through the water?
3. Name two other environmental changes, in either chamber A or C, which could affect the growth of the plants in chamber B.

1. Prescott, Diane (2008). Water Cycles’ Environment. *Atwater High School Ag Dept.* [↑](#endnote-ref-2)