

# Water Cycle Column

**Overview** When birds and animals drink from lakes, rivers, and ponds, how pure it is? Are they really getting the water they need, or are they getting something else with the water? This is a great experiment to see how water moves through natural systems. We'll explore how water and the atmosphere are both polluted and purified, and we'll investigate how plants and soil help with both of these.

**What to Learn** We'll be taking advantage of capillary action by using a wick to move the water from the lower aquarium chamber into the upper soil chamber, where it will both evaporate and transpire (evaporate from the leaves of plants) and rise until it hits a cold front and condenses into rain, which falls into your collection bucket for further analysis.

## Materials

- three 2-liter soda bottles, empty and clean
- razor with adult help
- scissors
- tape
- ruler
- 60 cm heavy cotton string
- soil
- water
- ice
- plants
- drill and drill bits
- fast-growing plant seeds (radish, grass, turnips, Chinese cabbage, moss, etc.)

## Experiment

1. Cut the bottle #1 below the shoulder. (Start cut with a razor, and finish with scissors)
2. Put the top of bottle#1 inside the other part, and set aside.
3. Get bottles #2 and #3
4. Cut bottle #2 above the hip.
5. Cut bottle #3 above the hip.
6. Put the cap on bottle #3 and drill a hole in it (with adult help).
7. Put the cap on bottle #2.
8. Fold 1 ft of thin rope string in half and put it in bottle #3 cap. Put the folded side through the hole and leave about half of the length out.
9. Tie 10 in of rope string around neck of bottle #2.
10. Put water in the bottom chamber.
11. Use a piece of foil to wrap around cap of bottle #2 to form a small cup. remove foil.
12. Put soil and plants in chamber 2.
13. Put the small foil cup next to the plant.
14. Slide bottle#2 into Bottle #3, cap first, and put the wick on bottle#2 into the foil cup.
15. Draw a complete diagram of your water cycle column, explaining how each section works.
16. Create a Data Table where you track the effect of salt on the plants over a two week period.

# Water Cycle Column Data Table

Date	Amount of Salt Added to Water Supply	Effect on Plants

## Reading

This experiment takes advantage of capillary action by using a wick to move the water from the lower aquarium chamber into the upper soil chamber, where it will both evaporate and transpire (evaporate from the leaves of plants) and rise until it hits a cold front and condenses into rain, which falls into your collection bucket for further analysis.

## Building Tips:

1. Make sure your wicks are thoroughly soaked before adding the soil and plants! You can either add ice cubes to the top chamber or fill it carefully with water and freeze the whole thing solid. If you're growing plants from seeds, leave the top chamber off until they have sprouted.
2. You can add a strip of pH paper both inside and outside your soil chamber to test the difference in pH as you introduce different conditions. You can check out the Chemical Matrix Experiment and the Acid-Base Experiment also!)
3. You can place a bit of moss in the collection bucket to indicate how pure the water is (don't drink it – that's never a good idea).

## Exercises

1. Do you think salt travels with the water?
2. What if you add salt to the aquarium chamber? Will it rain salty water?
3. What happens if you light a match, blow it out, and then drop it in the soil chamber? (Hint – you've just made acid rain!)

**Answers to Exercises: Water Cycle Column**

1. Do you think salt travels with the water? (yes!)
2. What if you add salt to the aquarium chamber? Will it rain salty water? (No – the salt stays in the soil, because only water evaporates.)
3. What happens if you light a match, blow it out, and then drop it in the soil chamber? (You've just made acid rain by simulating the CO, CO<sub>2</sub>, and NO<sub>x</sub> gases.)