

## Activity #6:

# “The Water Cycle”

Because the earth is basically a closed system containing all the water we will ever have, we note that water moves in a continuing pattern known as the water cycle. The form of water changes as it moves through this cycle. The sun heats surface waters and causes evaporation. Plants release water vapor in the process of transpiration. Thus, water moves as a liquid from lakes and oceans into the atmosphere as vapor and eventually falls back to earth as rain, snow, sleet or hail. This cycle has continued for millions of years. The water cycle can be demonstrated in this activity using two-liter soft drink bottles and other materials. Water will move up the wick into the soil. From there, it evaporates and becomes water vapor in the central bottle unit. Water vapor exits from plants through transpiration caused by evaporation from the leaves. The water vapor is cooled by the ice above, which causes it to condense on the cool surface of the inverted bottle. Precipitating water then collects in the film canister just as falling rain collects in ponds, lakes and oceans.



## Social Studies Lesson #1

**Objective:** Upon completion of this activity, the student will be able to describe the hydrologic cycle and explain its component parts.

NEVADA SCIENCE STANDARDS 13:8.3, 13:12.3

**Time:** Two to four class periods

**Materials:** 1 L or 2 L bottles (three for each group), string or cord for wicks,  
35 mm film canisters (one per group), potting soil, seeds, ice

### **Procedure:**

A. Remove labels from bottles. Re-label bottles as “A,” “B” and “C” for each group. Cut bottle “A” just below the curve at the top so a straight edge remains on the bottle.

B. Cut bottles “B” and “C” just around the black bases so bottles have straight sides.

C. Put a hole in one cap on “B”. Insert a loop of string (about 40 cm) so that 5 cm hangs down from the cap.

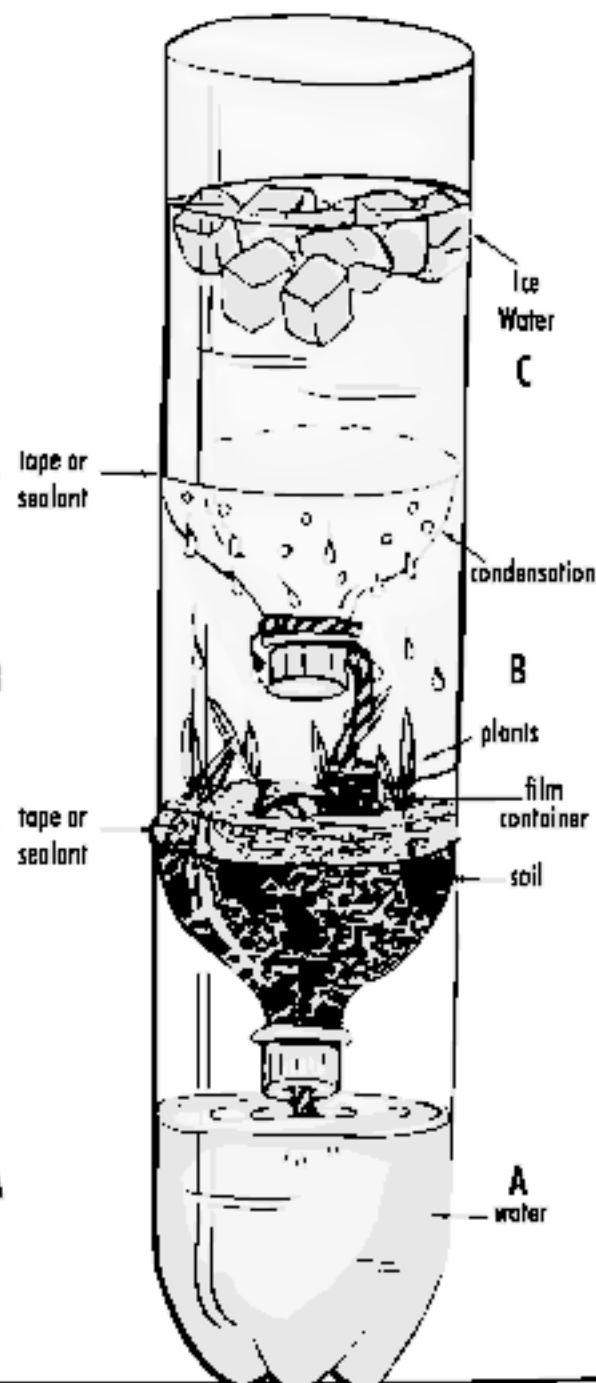
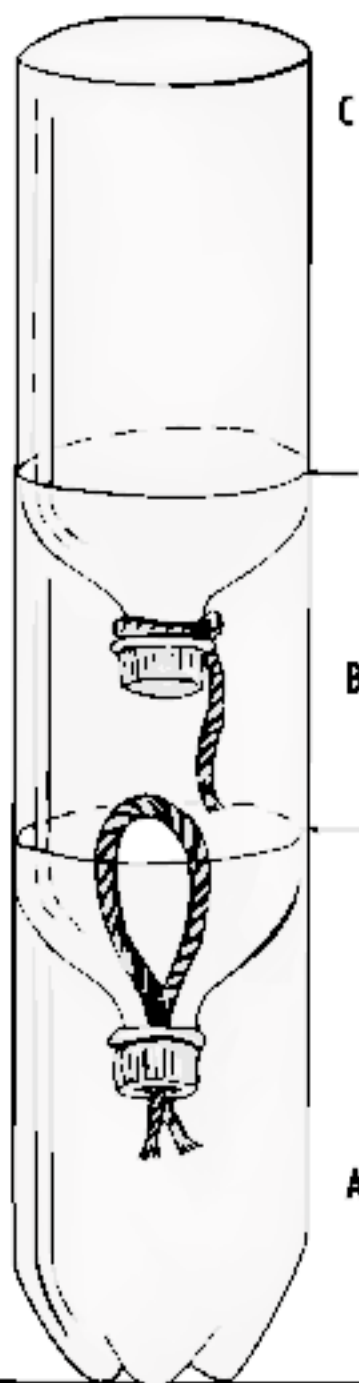
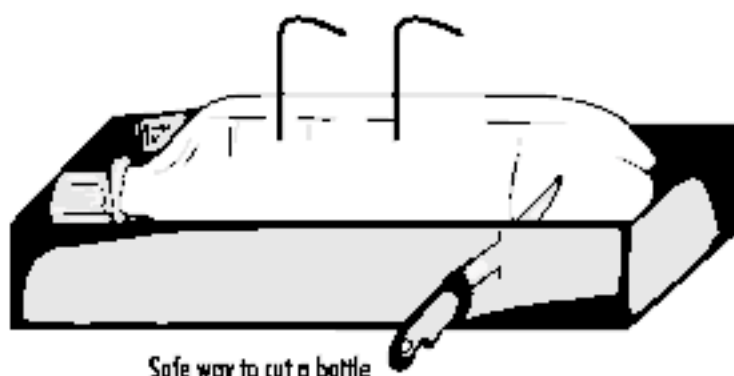
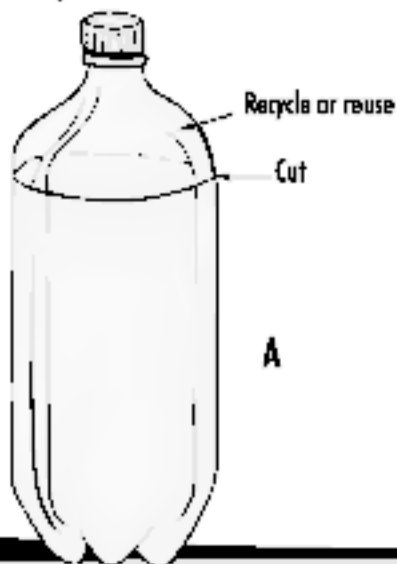
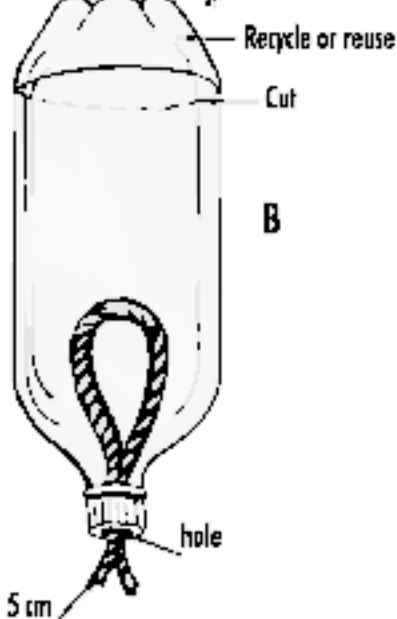
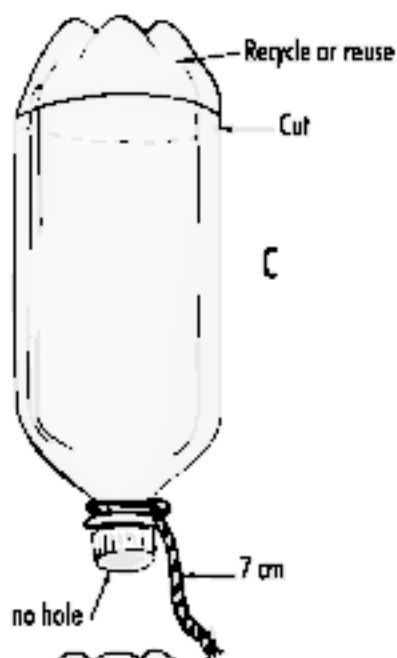
D. Place a cap with no hole on bottle “C”. Tie about 20 cm of string

around the bottle neck so one end hangs down about 7 cm.

E. Explain and demonstrate -

1. Assemble bottles by placing "C" upside down in "B" and "B" upside down in "A" (see diagram).
2. Thoroughly wet both string wicks. This will bring water to plant roots. Add about 150 ml of water to "A". This is the water source for the cycle. Fill "B" with enough moist soil to cover the loop of the string.
3. Plant two or three seeds of a fast growing plant in the soil around the perimeter of "B". When "C" isn't in use, leave it off bottle "B" so that air circulates and seeds can sprout and grow.
4. Place a clear film canister on top of the soil in center of "B" so that the wick from bottle "C" hangs into it.
5. Fill bottle "C" with ice water or fill it with water and then freeze it.
6. Observe over next 2-3 days. Students may wish to test the water for pH, turbidity, minerals, dissolved oxygen, etc., if water analysis test kits are available.

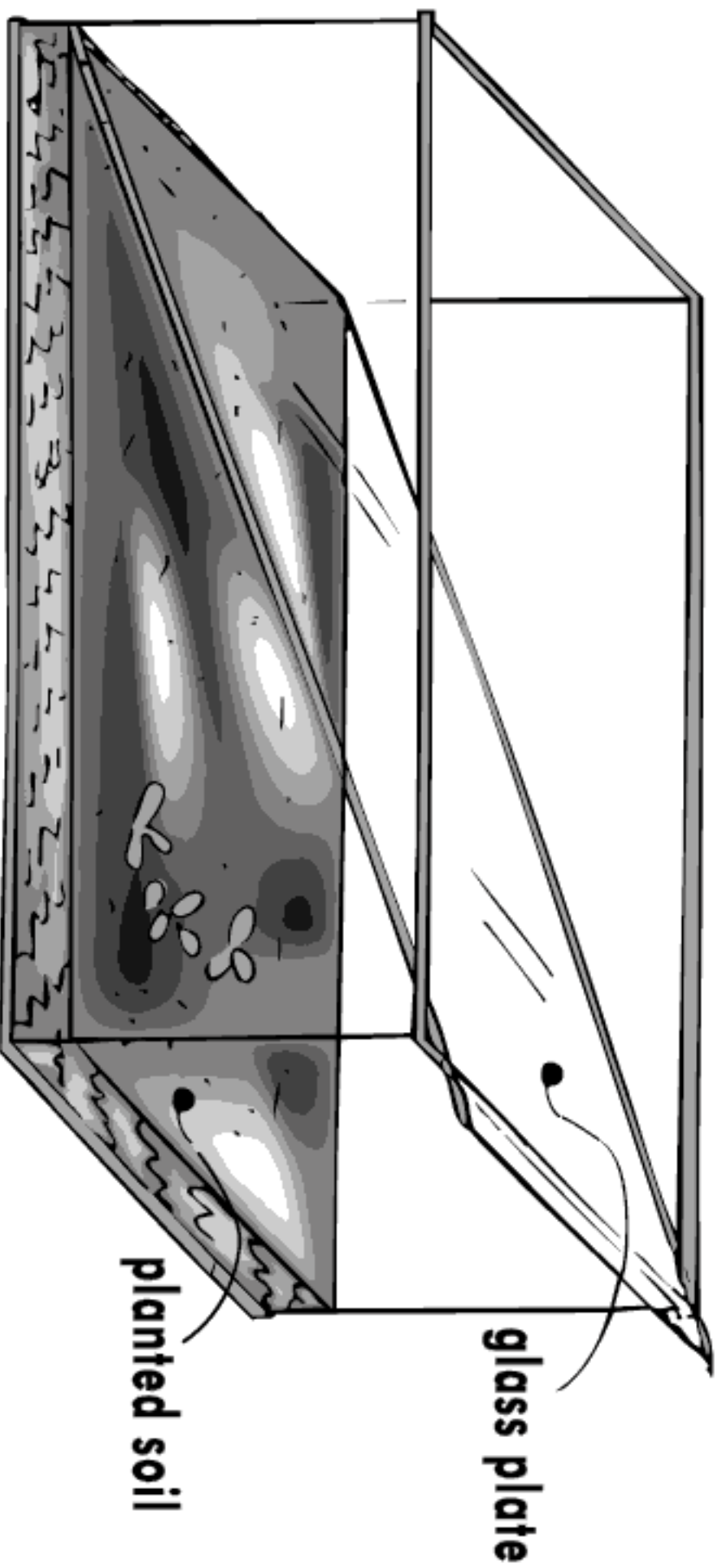
# MODEL ASSEMBLY DIRECTIONS



F. Another way to set up a hydrologic cycle would be in an aquarium.

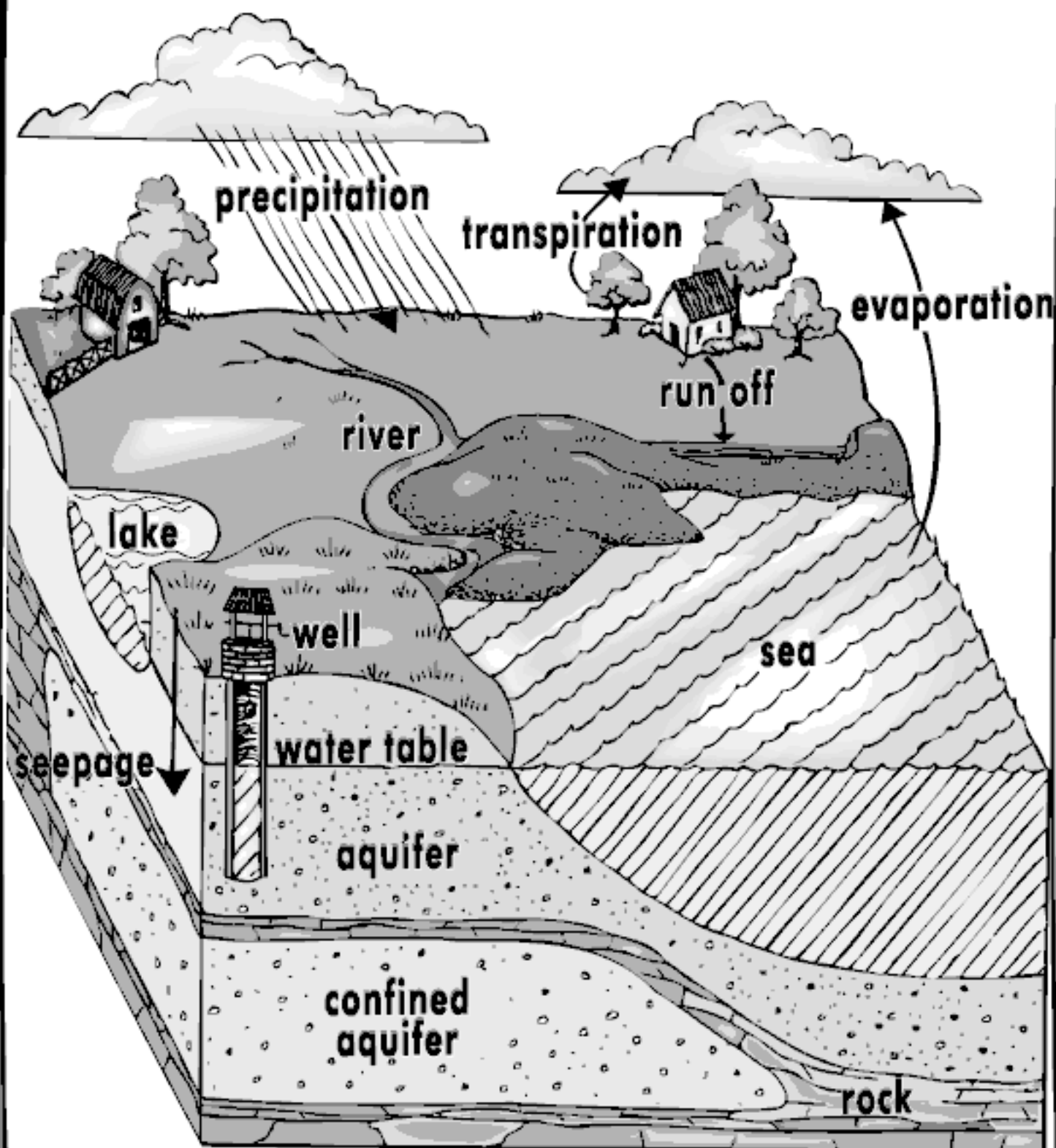
1. In a clean, dry aquarium, place a soil mixture in one end so it slopes towards the other end of the aquarium.
2. Tilt the aquarium so the soil is elevated about 10 cm. Place something under the high end to maintain this position for the entire time.
3. Pour two liters of water into the other end so that a pool is formed.
4. Plant moss or liverworts in the soil end and mist well with a sprayer to dampen the plants and the soil.
5. Place a piece of Plexiglas so that it rests on the soil and is flush against one end of the aquarium. The other end will rest against the top of the aquarium. (see diagram)
6. Set this near a window that receives indirect sunlight or use a small growlight placed over the top of the aquarium.
7. Allow this aquarium, which now is a terrarium, to exist for two or three days. Mark the level of water in the pool. Observe condensation on the Plexiglas and the water that accumulates and runs down as precipitation. Some water will eventually run into the pool -- as surface waters run to the oceans.
8. This can be left in the classroom for several weeks to see if streams begin to form naturally in the soil.

# WATER CYCLE AQUARIUM MODEL



# THE HYDROLOGIC CYCLE

TEACHER SHEET



# THE HYDROLOGIC CYCLE

## STUDENT SHEET

