

## THE PLANT KINGDOM: THE WATER CYCLE

### Material:

- The Water Cycle Nomenclature
- The Water cycle Model
- Water
- Ice
- Heat Source (lamp with a clamp)
- Tables

### Presentation 1: Key Experience

1. Say, "Today we are going to learn about the water cycle. Does anyone know where water comes from?" Group discussion. "Does anyone know a part of the water cycle?" Group discussion.
2. Say, "We are going to set up this water cycle model on the table. First we pour some water into the representation of the ocean." Put the lid on the model.
3. "Next we place some ice cubes in the clouds and cover them with the cloud. Why would we place some ice cubes in the clouds?" Group discussion.
4. "Then we place the model on its stand to give elevation to the mountains."
5. "This lamp represents the sun. It will shine on the clouds." Attach the lamp by its clamp to a small table sitting on top of the large table or to a shelf.

6. “We will observe this water cycle model for the rest of the day. What do you think is going to happen?” Group discussion.
7. Discussion: The lamp representing the sun melted the ice in the clouds. Condensation droplets formed under the clouds and on the underside of the lid. The droplets were much larger under the clouds. The droplets got bigger and bigger until they rained on the mountains. The water ran down the mountains, into the rivers, and into the ocean.
8. Discussion: Water evaporated from the ocean and condensed onto the underside of the lid. The large droplets under the clouds were condensation droplets formed when the hot lamp (sun) shone on the cold ice cubes. When the condensation droplets became large enough, they precipitated (rained) onto the mountains. The rain became runoff in the rivers and into the ocean. “What else happens to the water?” “Plants and animals use it.” Discussion.
9. This model shows the stages of the water cycle: evaporation, condensation, precipitation, and runoff.

\*If you do not have this water cycle model, there are many experiments that can be done to show the same concept. An easy one is to boil water in a pot while holding a pan containing ice cubes above the boiling water. The steam (evaporation) will condense on the underside of the lid when it contacts the cold lid, and form precipitation when the water droplets become large enough.

### Presentation 2: Nomenclature

1. Review the key experience. “What are some of the parts of the water cycle?”  
“Evaporation, condensation, precipitation, runoff.” “Define each of the parts.”
2. Discuss the parts of the water cycle.
  - A. **Chemical Nutrients** - Chemical nutrients in an ecosystem are used over and over again. The changing uses of the chemical nutrients are called cycles. Among the nutrients cycled in an ecosystem are oxygen, carbon, nitrogen, and water. These cycles are named the carbon cycle, the nitrogen cycle, and the water cycle. The chemical nutrients go through an inorganic phase and an organic phase in their cycles.
  - B. **The Water Cycle** - The water cycle follows the changes and movement that water goes through over time. Water changes over time from being a part of the nonliving environment to being part of living organisms. Water moves over time from being in the air to being in the ocean, seas, rivers, and earth where it sometimes becomes a part of living organisms. Water then returns to the air again.
  - C. **Rain Clouds** - Rain clouds are located in the air. Rain clouds contain water in its gaseous form called water vapor. The water vapor molecules build up in the rain clouds until they are so closely packed together that they move from the gaseous state of water to the liquid state of water. This is called condensation.

- D. **Precipitation** - Precipitation occurs in rain clouds when gaseous water vapor becomes so dense that the water molecules return to the liquid state of matter. Water then falls to the earth in the form of rain, hail, sleet, or snow.
- E. **Ground Water** - Ground water is formed on the earth from precipitation from rain clouds. Ground water (runoff) flows downward to form streams, rivers, lakes, seas, and oceans on the surface of the earth. Ground water also flows downward below the surface of the earth to moisten the soil and to form underground pools of water.
- F. **Plant Absorption** - Plants absorb water from the soil through their roots. The water moves from the roots through the stem to the leaves.
- G. **Plant Transpiration** - Plant transpiration is the release of water vapor from the plant. The water in the leaves is used in photosynthesis to make food for the plant. The unused water in photosynthesis is released as water vapor through the stomata on the underside of the leaf. This process is called plant transpiration.
- H. **Animal Respiration** - Animal respiration releases some water vapor during breathing.
- I. **Animal Excretion** - Animals drink water, and eat plants and animals that contain water. The unused water is excreted. The excreted water evaporates into the air as water vapor.

- J. **Evaporation from the Land and the Water** - The heat of the sun warms both the land and the water on earth. Water in the soil vaporizes and is then released into the air as water vapor. Water on the surface of the earth vaporizes and is then released into the air as water vapor. This process is called evaporation.
  - K. **Water Vapor** - Water vapor collects from the land and the water on the earth and floats upward into the air.
  - L. **Clouds** - Clouds form from the water vapor in the air. This process is called condensation.
3. Encourage the children to repeat the definitions of the parts of the water cycle.
  4. Allow the children to draw the water cycle and label and define the parts.

### **Presentation 3: The Nomenclature**

1. Review the parts of the water cycle from the first presentation of the nomenclature.
2. Lay out the pictures, in order, from left to right.
3. Distribute the labels for the children to match to the pictures.
4. Distribute the definitions for the children to read and to match to the pictures.
5. Display the wall chart.
6. Check the definitions with the booklet.
7. Place the water cycle nomenclature, the booklet, and the wall chart on the shelf.

**8. Follow-Up Work:**

- A. Match the picture and the label (simple nomenclature).
- B. Match the picture, the label, and the definition cards (classified nomenclature).
- C. Make a booklet of the water cycle. The children write the definitions in their own words.
- D. Make a chart of the water cycle.
- E. Research the water cycle.
- F. Visit a water treatment plant.
- G. Research the changes in the water cycle when man modifies the environment.
- H. Do further experimentation with the water cycle. For example, build a closed system in a terrarium with plants, soil, etc.

# The Water Cycle

