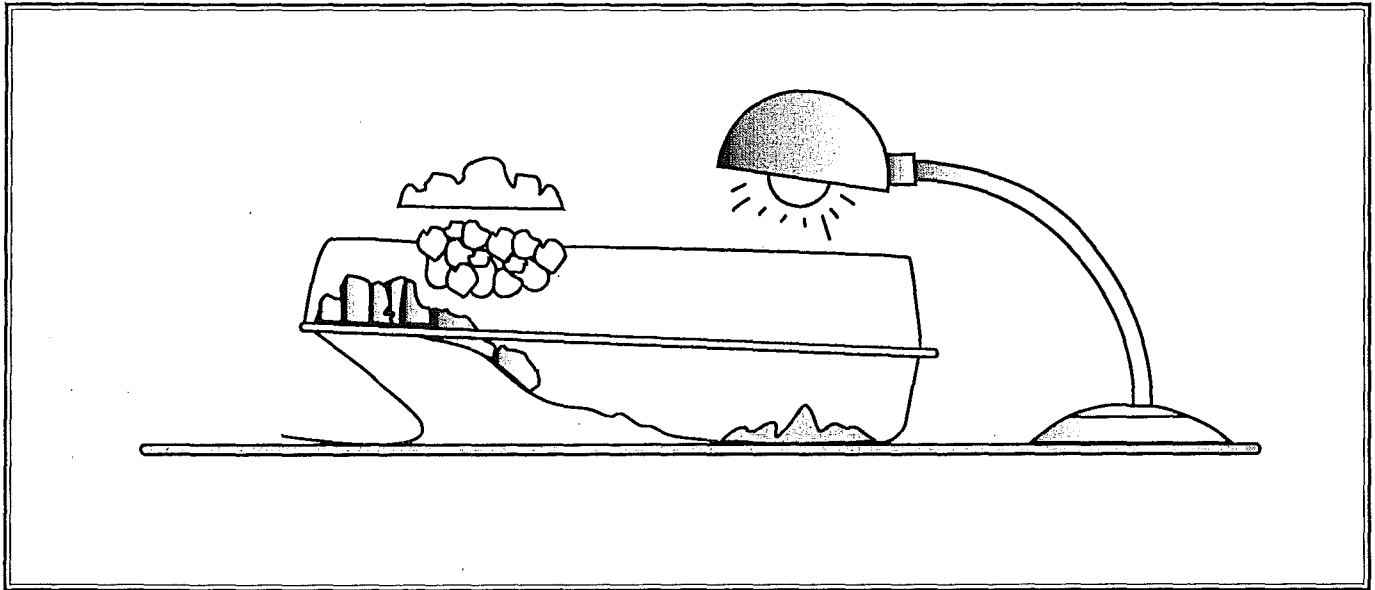


Water Cycle Model

Model #8884



American Educational Products LLC
TEACHING TOOLS FOR UNDERSTANDING OUR WORLD



Overview

Our water supply is related to an overall series of events often referred to as the water cycle. In this context, the word "cycle" is used to mean a continuous repetition of like events - the movement of water molecules from bodies of water, the land, and living things on the land into the air and back again. To illustrate this process, two modes of presentation are used: a model and a series of study cards.

Focus For This Activity

- ☑ Appreciating the cyclical relationship of materials in the environment
- ☑ Visualizing the continuous nature of the steps in the natural water cycle
- ☑ Recognizing the sources of water
- ☑ Using the inquiry skills of observing, describing, comparing, translating, inferring, and applying.
- ☑ Practicing critical thinking skills associated with explaining, defending, and answering why questions.
- ☑ Emphasizing the three environmental themes:

- *interrelationships of environmental components*
- *cyclical nature of processes*
- *finiteness of resources*

Lesson Sequence

During this activity, each person should:

- *observe and describe the demonstration of the water cycle*
- *relate and associate the demonstration of the water cycle to the natural water cycle*

Set up the following demonstration: Pour about an inch and a half of water into a 400 ml beaker and color the water light blue with food coloring. Place the beaker on a hot plate so that the blue water is boiling as you begin the lesson.

Introduce the activity by pointing to the beaker of boiling water and asking:

When we boil water it all goes away after awhile. Where does it go?

Let's see if we can find out where it goes.

Place a second 400 ml beaker over the first (caution: the first beaker will be hot), and tape the two beakers together with masking tape so that the pouring spouts are together, leave the spouts untaped.

Develop a line of questioning to focus on the formation of tiny droplets of colorless condensed water on the sides of the upper beaker, and perhaps a small stream of mist escaping from the spout.

Then say:

As you can see, we have caused some of the blue water to evaporate.

Can you think of some examples of evaporation in your everyday life?

After learners have recalled such things as puddles drying up, wet clothes drying, hair drying, lawns drying out, and plants withering, develop the idea that evaporated water in the air may re-form as mist, fog, or clouds by asking:

What happens to water in the air after it has evaporated?

When water falls back down to earth out of the clouds, what are some of the different forms it can take?

After such things as rain or snow or hail reach the ground, and after the snow and hail melt, where do they go?

Continue the discussion, reinforcing the conclusions and inferences already established (i.e., water from lakes, oceans, rivers, and plants goes into the air; forms clouds; leaves the clouds in various forms of precipitation; and returns to the bodies of water). Then display the components of the water cycle model.

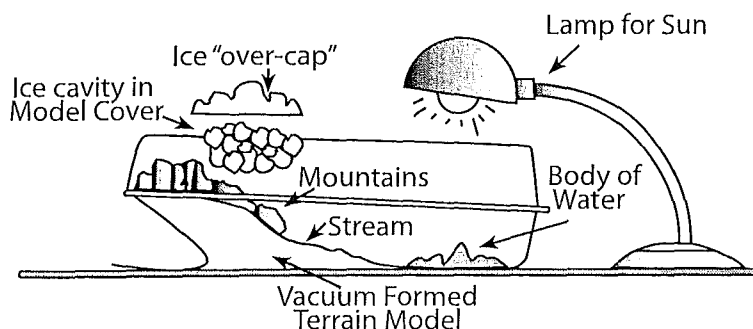
Say:

We should now be able to put together a small model of the water cycle.

The water cycle model is designed so that the processes of evaporation and condensation of water are confined within a closed plastic box. The source of heat (light bulb) and cold (ice cubes) are applied to the water (about one cup) representing the Earth's oceans and lakes; a landform depicting mountains and rivers; a small lamp representing the sun; and a bag of ice cubes to represent the cooling of the upper atmosphere. As pictured in the diagram, the model is designed on a slant so that the water is confined to one end (about one-third of the bottom area).

The warm air, heated by the lamp and carrying the moisture from the "ocean," will rise to the upper end of the chamber, where it will be chilled by the ice. As the air is chilled by the ice, the moisture in the air will condense and form droplets on the area of the lid that is underneath the ice. When these droplets fall, it will "rain." The model should be washed before use. This will saturate the dry surfaces and reduce the length of time it takes for the model to work. The model will operate most effectively if the bag of ice is covered with the ice "over-cap". This will confine the cold and keep the ice from melting.

Place a sheet of white paper under the "ocean," and the lamp will reflect heat in that area. Again, this will reduce the time it takes for the model to work.



When the condensation begins to drop (rain) from the area of the ice trough, ask such questions as:

What do you see happening?

What did the ice do to the water that went into the air?

What happened to the water in the air after it cooled?

Where did the drops of water (rain) go?

Have learners compare the components of the model (“ocean”, “sun,” etc.) to the environmental components in their actual surrounding. Ask such questions as:

How was the water in our model heated?

What heats water in the real oceans and lakes?

What did our lamp represent?

The idea of a decrease in temperature as altitude is increased can be developed by discussing how it snows in the mountains while it rains below, or how airplanes need to be heated, or pilots need to wear warm clothing.

What happened to the water in the air when it reached the cold top with the ice on it?

What happens to the ocean water when it evaporates into the air and reaches the colder air found higher in the sky?

Conclude by saying:

What we have just observed and described is called the water cycle. A water cycle is the constant repetition of the steps of evaporation and condensation that water goes through.

Now ask various learners to point to the model or pictures and describe each step in the water cycle. Then summarize by pointing to the corresponding pictures and saying:

Water evaporates, which means it goes into the air and makes clouds.

The clouds rise to the cold upper air, where they form rain or snow. This is called condensation.

The rain or snow falls back to the earth and runs into our rivers, oceans and lakes. This is called precipitation.

The water cycle is the source of all our water, and that water goes through the cycle over and over again.

Upon completion of this activity, each learner should, as a minimum:

- ☒ have observed the operation of the water cycle model
- ☒ have associated the operation of the model with the natural water cycle; and
- ☒ have described the water cycle in their own words as they referred to either the picture set of the model.