Water Cycle in a Cup

Standards of Learning
Science 2.1, 2.3, 2.6, 2.7, 3.1, 3.9, 3.10, 3.11, 4.1, 4.6, 4.9

Objective
Students will:
- Create a mini-model of the water cycle
- Discuss the importance of water to agriculture and natural resources

Materials
- 2 clear 9-oz. beverage cups
- 1 smaller cup (small, disposable bathroom cups work well)
- 1 rock small enough to fit in the bottom of the 9-oz. cup
- Water in a small container for pouring
- Masking tape
- Ice

Background Knowledge
Review the water cycle – evaporation, condensation, precipitation - with students before making the mini-model. You may want to consider demonstrating each part of the water cycle with its own little activity, if you haven't already done so. The mini-model serves as a good culminating activity to your unit on the water cycle as it pulls all of the components of the water cycle together.

The earth has a limited amount of water. The water that the earth has keeps going around and around and around in a cycle all of the time. This is called the water cycle, which is really made up of five steps: sunlight, condensation, precipitation, evaporation, and accumulation. The sunlight is important because it gives the water cycle the energy it needs to keep going around and around. The sunlight starts the cycle. Evaporation happens when the sunlight heats up the water from the lakes, rivers, and oceans and turns it into vapor or steam. This water leaves the lakes and rivers and goes up into the air. Condensation happens when the water in the air as vapor gets cold and changes back into a liquid for rain or a solid for snow. Clouds are formed during condensation and when the cloud lets the rain or snow go precipitation happens. The cloud is not able to hold the water anymore because so much has condensed so the water falls back to earth. As the water falls to the earth it collects in various lakes, rivers, streams, and oceans in a process called accumulation. Some of the water will remain on the ground and soak into the earth for plants to use. Now that the water is back in the rivers and lakes the cycle can start all over again.

Procedure
1. Distribute the two clear 9-oz. beverage cups and the rock to each student.
2. Have students place the rock and enough water to almost cover the rock in one of the cups.
3. Place the other cup on top of the first cup to create a dome. Seal the two cups together with masking tape. Students should assist each other with this step – one student holds the two cups together as the other student tapes. This may help to prevent spills.
4. Place a small amount of ice into the small, disposable bathroom cup and place this on top of the mini-model.

5. Carefully, move the mini-models to a sunny location, such as a windowsill, to observe what happens.
6. Ask students to relate the parts of their mini-model to the water cycle.
    - What does the rock represent? (land, the Earth)
    - What does the water in the cup represent? (lakes, rivers, the ocean – any body of water from which water molecules can evaporate)
    - Do you observe condensation forming on the inside of your model? What part of the water cycle does this represent? (clouds, fog)
    - What "drives" your water cycle model? (energy from the sun)
7. When concluding this activity, make sure that you discuss water as a natural resource with your students. Is it renewable or nonrenewable? Should we be concerned about conserving and protecting our water supply? Why or why not?

Extension

There are two websites that provide good water cycle diagrams. http://www-k12.atmos.washington.edu/k12/pilot/water_cycle/grabber2.html also provides a collection of activities. A colored diagram of the water cycle can be found at http://ga.water.usgs.gov/edu/watercycle.html. This website is sponsored by the United States Geologic Survey and is worth exploring for additional resources.

What is drought? Has Virginia experienced a drought recently? For answers and discussions on these questions go to http://www.deq.state.va.us/kids/library/drought.html.

References

The Amazing Earth Model Book: Easy-to-Make, Hands-on Models That Teach. Donald M. Silver and Patricia J. Wynne.
A book of models – soil profile, caves, volcanoes - to construct with your students in grades 3-6.

Rain & Hail. By Franklyn M. Branley
This children's book explains in detail what makes rain and hail. It describes and illustrates how water vapor forms as moisture evaporates from the earth and how the vapor condenses to make clouds that bring rain.

This activity was adapted from Physical Science SOLutions, Science Museum of Virginia.