



Science Unit: *Aquatic Ecosystems*

Lesson 7: *Water Cycle and Ecosystems*

School year: 2006/2007

Developed for: Collingwood Neighbourhood Elementary School, Vancouver School District

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Grade level: Presented to grades K and 3; appropriate for grades K-7 with appropriate modifications.

Duration of lesson: 1 hour and 20 minutes

Notes: Boiling/hot water should be handled by adults only! This activity was completed with Kindergarten and Grade 3 classes together so older students could assist and supervise younger students.

Objectives

1. Learn about the water cycle.
2. Review knowledge of marine and freshwater ecosystems learned to date.

Background Information

The water cycle describes the presence and movement of all water on earth, and above it, in the atmosphere. The earth has a limited amount of water and it is constantly changing states from liquid (water) to vapour (gas) to solid (ice) and back again. Most of the water on earth is found in the oceans. When the sun heats up the top layer of water in the oceans (or lakes or rivers), some of it evaporates as water vapour and is dispersed in to the air. This water vapour rises until it hits cooler air and then it begins to condense into clouds. The cloud water droplets grow bigger by colliding with other droplets, until, when conditions are right, the droplets will fall back to earth as rain or snow. It is the sun's energy which drives the water cycle via evaporation.

Vocabulary

Water cycle: Describes the existence and movement of water on, in and above the Earth.

Solid: A substance that has its own shape (keeps its form); a solid usually feels firm; the shape of solids can change but the solid material takes up the same amount of space.

Liquid: A substance that flows easily and takes the form of its container; liquids take up the same amount of space regardless of the size and shape of the container.

Gas: A substance that does not have its own shape; it can expand indefinitely or be contained in a container.

Evaporation: the process by which a substance (water) is changed from liquid to a gas (vapour)

Precipitation: the release of water in liquid or solid state (rain, snow, hail) from the atmosphere on to the earth.

Condensation: the process by which a substance (water) is changed from a gas to a liquid.



Materials

- Plastic rectangular salad containers with lids (such as Earthbound Farms)
- Large styrofoam bowls such as instant noodle soup bowls.
- Ice cubes
- Masking tape
- Electric kettle
- Cookie tray, cooled in freezer
- Large Poster Boards for a giant Venn Diagram
- Pictures of plants and animals found in the sea and in ponds
- Blue self-adhesive putty or tape
- The Water Cycle (video available at VSB Media Services: VIT 25-02.0654889371)

Introductory Discussion

Review the water cycle and the three states of water (liquid, ice, water vapour). Ask students if they have seen water in its three states eg. A frozen puddle, an ice cube, frost on the windows, a steamy bathroom, a glass of water. Ask them to try to fog up their classroom windows with their breath. What is the fog made of? Show students a steaming kettle. Ask them what is coming out of the spout? Hold a cold cookie tray over the steam and let them observe water droplets forming on the underside of the cookie tray (condensation). Remind students of the evaporation experiment, when the water “disappeared” from their pie plates.

Science Activity/Experiment

1. Briefly describe the activity of making a water cycle. Using a large transparent plastic salad box, place a styrofoam bowl (the sea) on one end and tape a folded cardboard ramp (a river) from the other end and pointing downward, into the bowl. On the top of the lid of the box, make a small square using masking tape. This will be where an ice cube (cloud) will be placed. (The masking tape will prevent the melting ice from sliding around.) **Warn students that the boiling water can burn and to be very careful when handling their water cycle boxes.**
2. Fill the bowl with boiling water from an electric kettle and quickly put the lid back on the salad box.
3. Place 2-3 ice cubes in the masking tape square on the top of the lid, and observe. Record observations at beginning of experiment on response sheet.
4. Condensation will be taking place, with droplets of water forming on the inside of the box. While students are waiting for the water droplets to grow, they can begin the summary of the fresh and marine ecosystems.
5. Giant Venn Diagram: Students will each be given one or two pictures of organisms which live in both or either of the marine and freshwater habitats. Students may work in pairs, with an older buddy helping a younger buddy. Pairs will receive a blank index card and they must come up with a descriptive word for one or either of the habitats and write in on their card. Descriptive words may include smells, sounds, sights, tastes, or feel of the habitat or an organism in that habitat. Students will each be given an opportunity to place their pictures and words in the correct habitat.
*To make it more challenging, for a student to take his/her turn, they must be able to make a connection between the last picture/word and their own picture (ie. As in a food chain, their organism needs the last picture/word or the last picture/word needs them, for food, shelter, habitat etc.
6. Return to the water cycle experiment. Make observations. Discuss results. Record observations at the end of experiment on response sheet.



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Closure Discussion

Make a circle and ask students to talk about their observations and experiences. Review vocabulary and let students give examples of parts of the water cycle.

References

<http://ga.water.usgs.gov/edu/watercyclesummary.html>

www.kidzone.ws/science/index.htm

Purstow, Frances. 2006. The Water Cycle: Science Matters. Weigl Publishers. New York.

Shaw McKinney, Barbara. 1998. A Drop Around the World. Dawn Publications. Nevada City.


Rosinsky, Natalie, M. 2003. Water, Up, Down and All Around. Picture Window Books. Minneapolis.

Note: Another lesson on the water cycle can be obtained from the Scientist in Residence Program website; See: Water unit, Lesson 1, *Water Cycle*, <http://www.scientistinresidence.ca>.

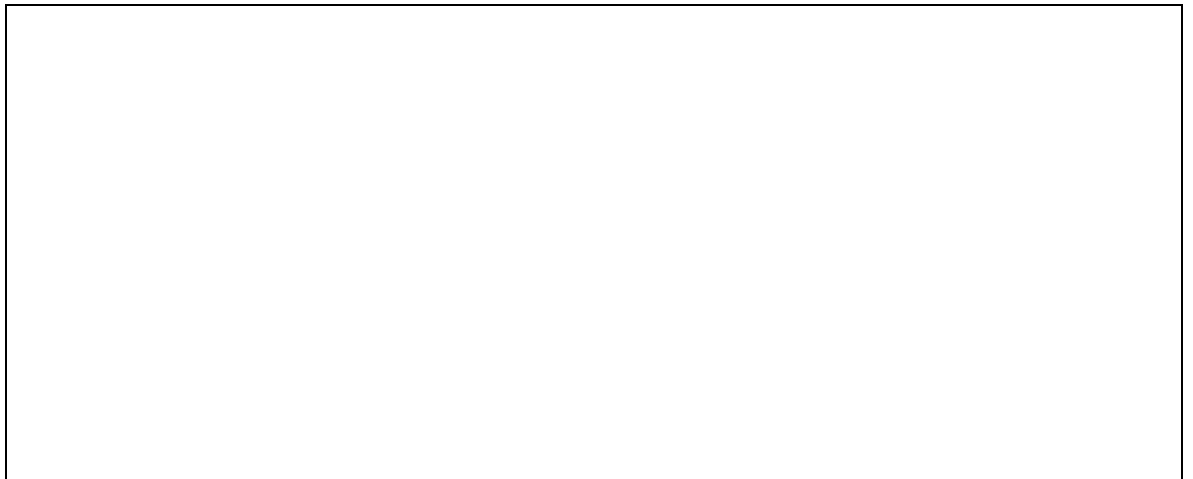
Water Cycle Experiment

Name of Scientist _____

Draw your water cycle box at the start of the experiment and label.



Draw your water cycle box at the end of the experiment.



Observations:

Discussion: What happened and why?
