Science Unit: *Aquatic Ecosystems*
Lesson 1: *Exploring Marine Objects*

School year:	2006/2007
Developed for:	Collingwood Neighbourhood Elementary School, Vancouver School District
Developed by:	Catriona Gordon (scientist), Lisa Evans and Sean Hughes (teachers)
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:	This lesson requires 1 adult per station for younger children.

Objectives

1. Learn about how much water covers the Earth and the various forms of water (solid, liquid, gas).
2. Learn about the composition of salt water.
3. Learn about the relative percentages of salt, fresh and frozen water on the earth.
4. Learn about the importance of water conservation.
5. Become familiar with marine organisms and gain experience making observations.

Background Information

The Earth has been called the water planet, as water covers 70% of its surface. Water is what makes the Earth look blue from space. Fresh water is found in rivers, lakes, ponds, and groundwater, and also floating above the Earth as clouds. Fresh water is also found, frozen in the icecaps of the Arctic and Antarctic regions and in glaciers (this accounts for 2% of all water). However, the oceans (salt water) account for a staggering 97% of all water on Earth. Seawater contains, on average, about 1 ½ Tbsp of salt per liter of water. Less than 1% of all the Earth's liquid water is fresh water, available for humans, plants and animals.

The seas are home to a wonderfully diverse and colourful collection of plant and animal life. The seashore is where the land meets the sea. Every piece of land on Earth has a shore from the biggest continents to the smallest island. The sea level rises and falls twice a day (tides) making the seashore periodically wet and dry. Seashores and coastlines are continually changing as waves crash against them and winds hit them with incredible force. Seashores are shaped by many factors: tides, winds, currents, waves, salinity, temperature, climate and the type of rock from which the land is made. Every seashore is home to a group of highly-adapted plants and animals.

Vocabulary

Marine:	Of or from the sea, or for use on the sea
Seashore:	Where the land meets the sea
Tide:	The daily rise and fall of sea level along a shore
Seaweed:	Properly known as algae, plants which grow in the sea, and do not have true roots, stems or leaves.

Algae: Plants that do not have true roots, stems or leaves and live in water (fresh or salt) or in damp soil.

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.

Materials

- Basketball
- Roll of masking tape of three colours, preferably dark blue, light blue and white
- Measuring tape that goes to at least 5 m.
- Globe
- 1 litre transparent jar or bottle with wide opening
- salt
- measuring spoons with 1 Tbsp and ½ Tbsp measures
- poster of the water cycle
- large felt pens and paper
- 6-10 opaque tubs and lids or 6-10 shoeboxes with lids
- 6-10 marine objects which may include: kelp, clam shells, oyster shells, mussels, crab shell, seastar, feather, driftwood, seaweed, garbage etc.
- bell or whistle
- numbered labels #1-10 for tables

In the School Gym or Activity Room

Introductory Discussion

1. Brainstorm about where we find water on Earth. (Eg. Rain, tap, ocean, puddles, ponds, clouds, lakes, snow etc.) Is all water the same? Introduce concept of solid water (ice), liquid (most common form of water) and gas (water vapour, steam). Introduce water cycle poster. Does all water taste the same?

    - Demonstrate differences between seawater and freshwater. Using a student helper, add 11/2 Tbsp of salt to 1 liter of water. Stir it up. That's how salty the ocean is.

2. How much water covers the Earth?

    - This basketball will represent our Earth. We will use dark blue tape to represent the oceans or saltwater. How long does my tape have to be if we are cutting it into pieces and covering the Earth with it as if it were oceans? Let students guess and then let them measure out 502 cm (97% of all water on Earth is in the oceans). Students can rip the tape and stick it on to the ball without the tape overlapping, passing the ball to their neighbour so that everyone can have a turn. Now if the white tape represents ice caps and glaciers, how long should it be? Measure out 11 cm (2% of Earth's water is frozen as ice caps). Stick it on to the ball. Now if we use pale blue tape for freshwater how long should the tape be? Measure 3 cm. Less than 1% of all water on Earth if fresh water and usable to plants, animals and you and I. Introduce the importance of water conservation.

- Now try to pass the ball to the person sitting next to you and try to catch it without touching any tape. Try to stay "dry". Can it be done very easily? About 70% of the Earth's surface is covered by water, and most of it is saltwater.
- Alternatively, for younger students, use a globe and look at the relative water and land distribution. Let students spin the globe and with their eyes closed let them try to put their finger on land rather than water. Is it easy?
- Show students a poster of the water cycle, including clouds, oceans, rivers, snow and glaciers. Ask students what type of water is found in each part of the cycle.

3. Most of the Earth's animals and plants live in the ocean. Brainstorm and make a list of all the animals and plants that the students know which live in the ocean. What about the living things on a seashore or beach? Has anyone been to a beach? Or the aquarium?
4. Briefly explain the marine sensory activity that the students will do. We are going to do an observation activity about the seashore using your senses (but not your sight). We have 6-10 shoeboxes with a different seashore object inside each one. Feel the object, (no peeking) and try to draw what it feels/smells/sounds like without looking at it. When everyone in your group has felt it and drawn it, then you can open the box and look at it and draw what it looks like. See how close you were. Do not let other groups see what is inside the box.

Science Activity/Experiment

Use the gym or lunchroom and set up marine sensory stations ahead of time on tables numbered 1-10. This activity can be done with either blindfolds and tubs or shoeboxes with a small circular hole cut in the side and a 'curtain' covering the hole so students cannot see what's inside. Place one marine object in an opaque tub or shoebox and place one tub per table. Students can be divided into groups of 2-3 and each group can start at a different station. Students draw what they think they feel in the corresponding box on the activity sheet. After guessing what the object is they can peek into the tub/shoebox and then draw what they see. Lids are then replaced and the teacher can ring a bell or blow a whistle to signify to students that they may move to the next station. *With younger children it greatly helps to have an adult volunteer at each table to facilitate and to reduce the number of stations. 3-4 stations is manageable in this time frame, or if you prefer to introduce more sensory stations, it is more appropriate for the younger students to spread out this activity over 2 lesson times.

Closure Discussion

Make a circle and reveal the marine objects to students and discuss where the objects came from. What did they like best to feel? What did they not like to feel? What was easy/difficult to guess? What is something new they learned about a marine organism or ecosystem?

References

Nye, Bill. 1999. Bill Nye The Science Guy's Big Blue Ocean. Hyperion Paperbacks for Children. New York. Pp.7-8.

Parker, Steve. 2004. Eyewitness Seashore. Dorling Kindersley. London.

Canadian Wildlife Federation. 1997. Project Wild Activity Guide. Canadian Wildlife Federation. Ottawa. Pp. 50-52.

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

Simonds Mohr, Merilyn. 1995. Fit to Drink: All About Fresh Water. Douglas and McIntyre.

Extensions

Make water cycles with pop bottles or plastic salad tubs.

Draw a water cycle.

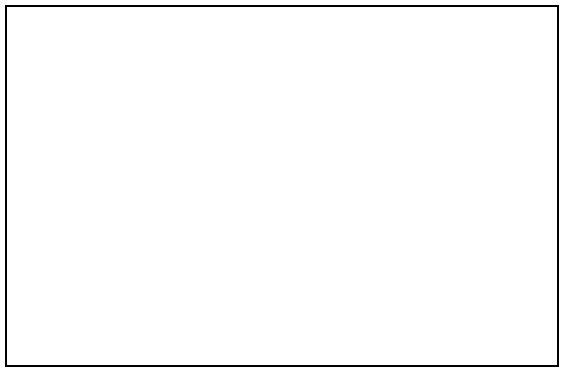
Make a water booklet to list the various places in the world where we can find water.

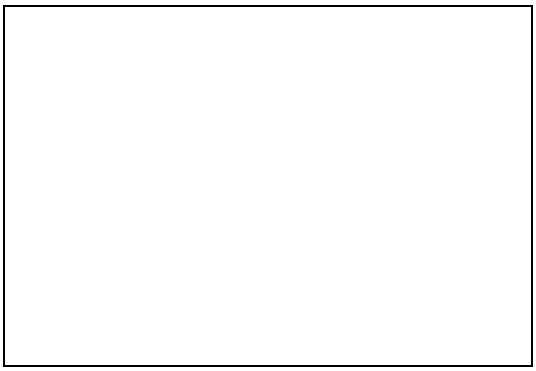
Make a water booklet to include the different uses for water.

Marine Objects

Name of Scientist_____

1





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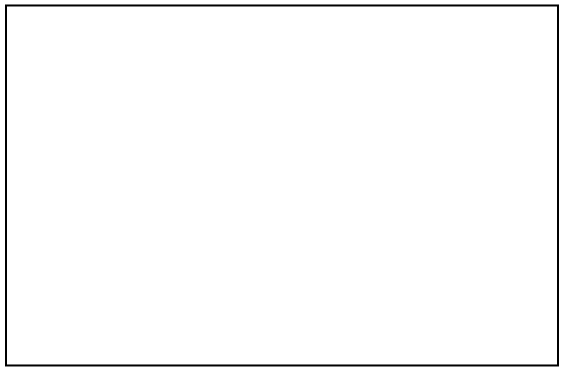

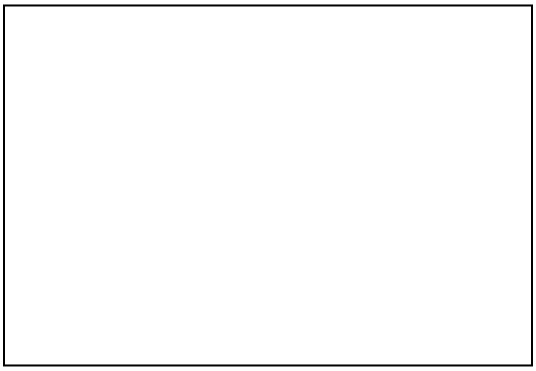

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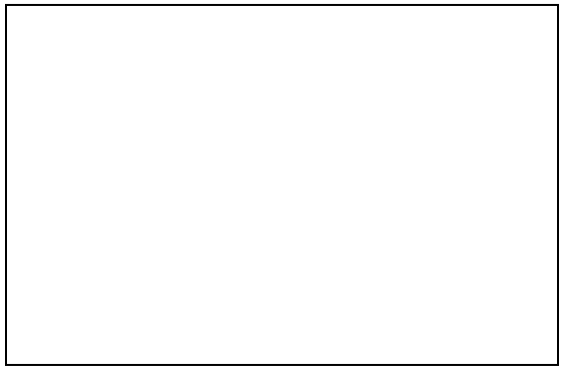

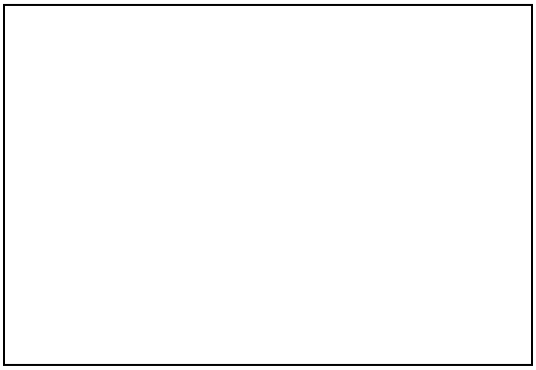

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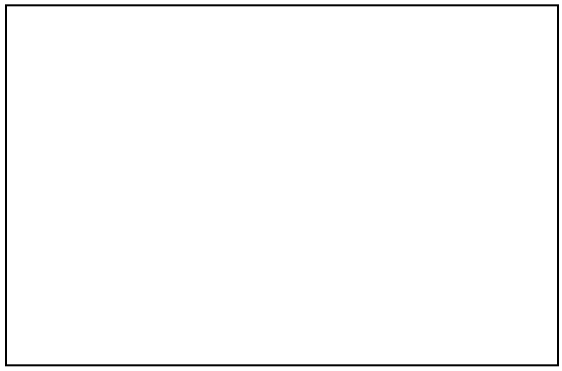

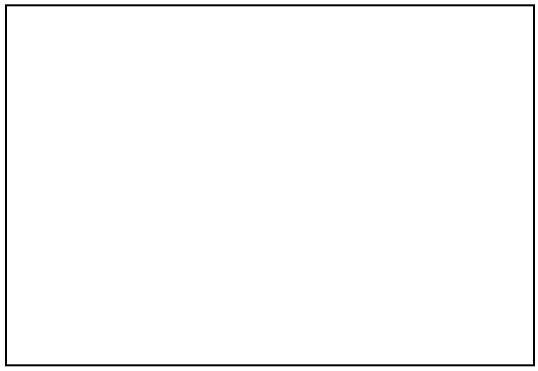

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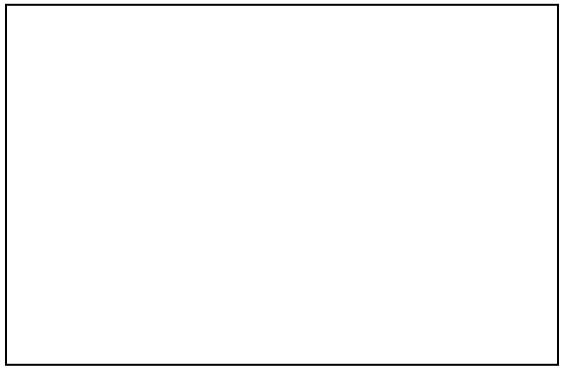

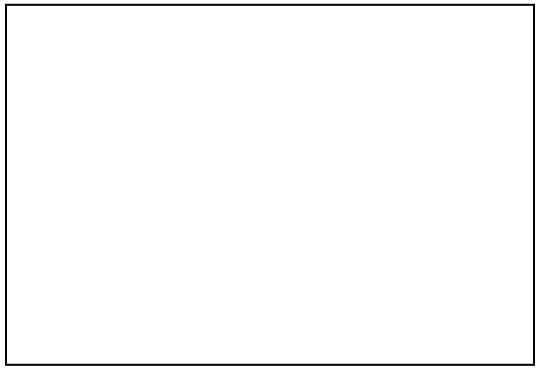

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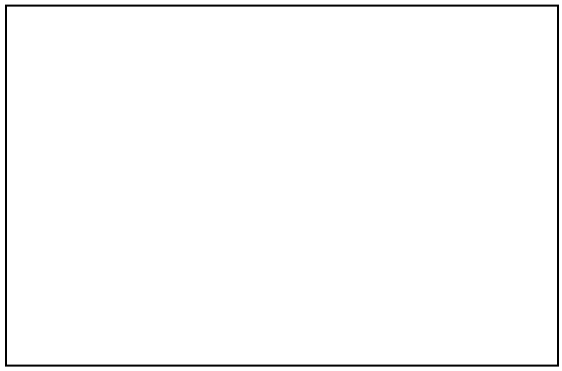

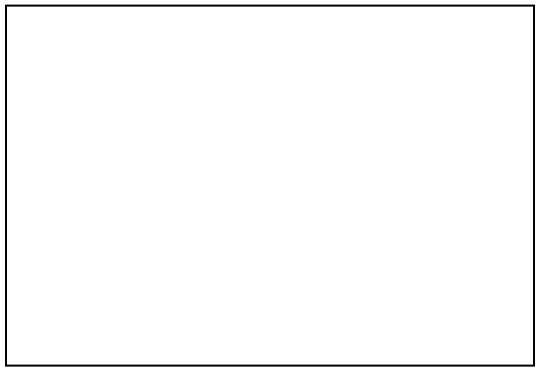

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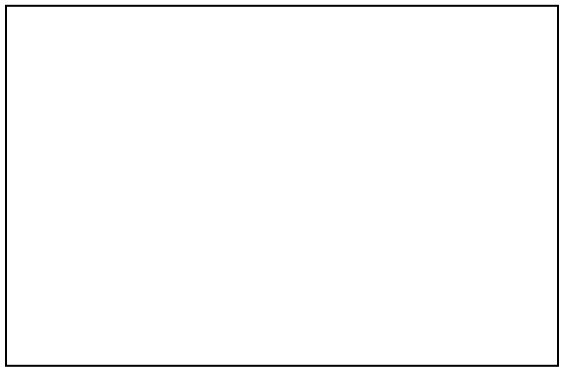

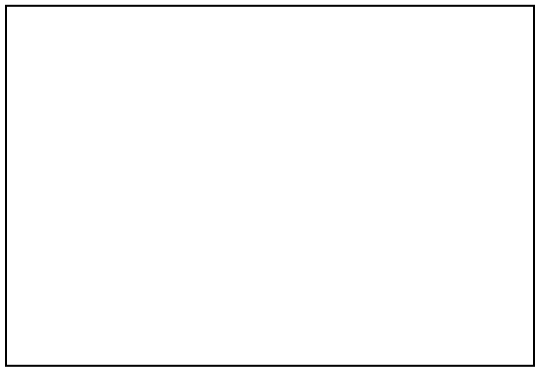

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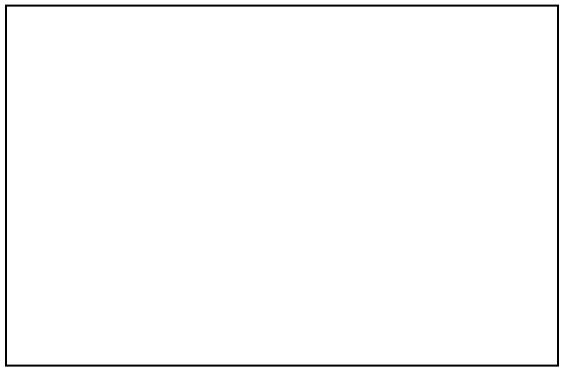

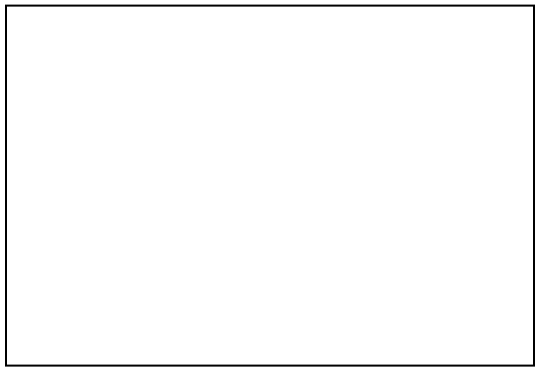

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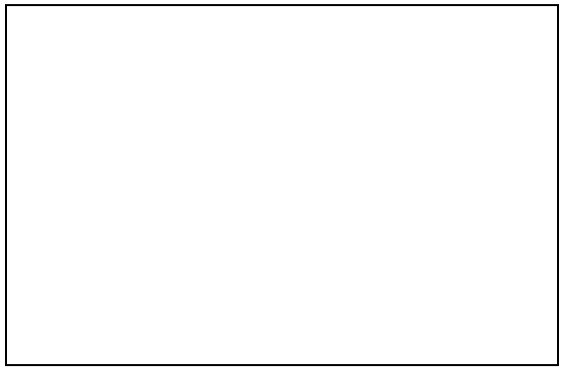

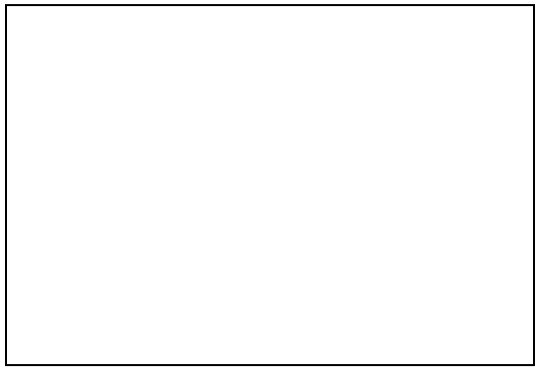

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