

Make a Watershed Model

Grades: K-7

Subject, Science

Time required: 30-60 minutes
& 45 minutes sand play

Key Concepts:

A watershed is the area of land that drains into a lake, stream or other water body.

Objectives:

Students will predict where water will flow in watersheds and understand the impact of water flow in their school yard and home.

Key Words:

Watershed, streams, lakes, rivers, wetlands, estuary, pollution

Skills:

Gathering information, organizing, discussion, analyzing, interpreting

Background:

Watersheds are local, recognizable places for understanding the dynamics of ecosystems.

A watershed is the area of land in which precipitation all drains into one outlet. This outlet can be a lake, a stream, a river, or the ocean. The analogy of a huge deciduous tree may be helpful in explaining the concept of watersheds. When rain falls, one drop may join with others to form a rivulet. These rivulets join together (streams), which then join along branches (rivers), then trunk of the tree (large river leading to the ocean).

Watersheds are drainage basins and the separation between drainage basins is called a drainage divide. Watersheds are interesting because of the interaction between the physical landscape of the area (rock and soil formations), the climate, the ecosystems, and the human presence in that area. All of these components work together in order for the watershed to function.

The physical characteristics of the land are the very base of a watershed. They define in which direction water will flow. Physical characteristics are: rocks, soils, sediments and of course, water. In all of its forms it touches everything in the watershed.

Watersheds contain ecosystems that vary depending on location and climate. These ecosystems play an important role in



Materials:

- Chalk
- Popsicle sticks, bread tags or tokens
- Sand pile, sponges, watering can, plastic sheet, digging tools
- Rocks (optional)



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Background continued:

maintaining the health of a watershed.

A watershed is a close to home example of the water cycle; we all live in one. In a watershed everything is connected, the upper watershed impacts the lower watershed and the lower watershed impacts the upper watershed. Since watersheds are local, recognizable places, understanding the impacts of human actions are more visible and more accessible to everyone living in the watershed. A healthy watershed provides the people living in it with food, clean water, timber, and plenty of opportunities for recreational activities.

The Squamish watershed encompasses all the land from the Pemberton Icefield down to Howe Sound. All of the Squamish Nation traditional territory (Sk̓w̓x̓wú7mesh-ulh Temíxw) is within this watershed.

The Squamish River originates at the Pemberton Icefield and it flows until it reaches its mouth into Howe Sound. The river is approximately eighty kilometers long, and although it is a relatively short river in BC, it is very large. It drains an area of 3,328 square kilometers. The Squamish River flows south from its source and collects the water from several other glacial streams. The Squamish River and the Elaho River meet about 21.8km southwest of its source. The Elaho River is one of the Squamish River's two largest contributors. The river then flows 24.8km southeast where the Ashlu River joins. The Cheakamus River joins the Squamish River another 16.4km along and then Mamquam River joins 4.7km farther to the south. From this point it is only six kilometers to its mouth in Howe Sound.

Did You Know?

- Five rivers drain into the Squamish Watershed (Elaho, Squamish, Ashlu, Cheakamus, Mamquam Rivers);
- Much of area was carved by glaciers during the last ice age approximately 10,000 - 25,000 years ago;
- Glaciers are still present as part of the headwaters of the Squamish and Cheakamus Rivers;
- The Squamish River watershed is the source of 90% of the fresh water that enters Howe Sound.

For the purposes of teaching the watershed concept, it is recommended to focus on a small watershed – play in a sand watershed model. Or, you can do a rainy day hike on the school grounds to investigate the flowing water into a puddle. Be sure to dress for the weather!

Procedure:

1. Use chalk to draw a large tree-like structure on a paved area of the school playground. (See diagram). Make sure there are enough “twigs” for each student at the tip of the “tree.”
2. Give each student a blue chip/token or a bread tag. The tokens represent a water drop.
3. Ask students to walk down their twigs onto the nearest branch where they will join with other students. They should link hands. Like a grand march, keep joining

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the groups together until they are groups walking down the trunk of the tree.

4. Explain that they started as individual water drops and they then joined with others into streams and rivers to form the water flow in their watershed.
5. When students have completed this exercise, ask them to summarize the general pattern of water flow through the watershed. If possible, point out local mountains where the rain drops start and then local streams and rivers where the drops eventually collect.
6. Repeat the procedure but give students in one branch a Popsicle stick or other (non-blue) token. These tokens represent pollution such as an oil spill. Have students do the Grand March of the raindrops one more time. What do students think happens when pollution is added to the watershed?
7. For the second part of this activity, gather students in the sand area of your school playground. (Extra sand may have to be delivered prior to completing this activity. Sand should be left in a pile or piled up to make a “mountain” prior to beginning.)
8. Ask students to guess where on the sand “mountain” the watershed “twigs and “branches” might be located. Point out that the smaller twigs (streams) are located in the uppermost areas of the mountain and the larger branches (rivers) are like the trunk of the tree which leads to the ocean. The ocean is located at the base of the mountain.
9. Have students dig out the streams and rivers of the watershed. Rocks may be placed for added dimensions. Wetlands, lakes and ponds can be added using

sponges to represent them (water is stored in wetlands, lakes, and ponds similar to a sponge).

10. When students are satisfied with their watershed, carefully lay a plastic sheet over the watershed. Tuck plastic into the created streams & rivers. Sponges should be transferred to on top of the sheet. Rocks can be placed around the sheet to keep it in place (optional).
11. Ask students to predict what will happen when water is poured onto the watershed. Pour water from the watering can onto the watershed beginning at the mountain top and discuss what happens.
12. Repeat the exercise as many times as you have time for, changing the features of the watershed.

Extensions:

1. Add pollution to the watershed by placing food colour in a small sponge at a location in the watershed prior to pouring on the water. Have students predict what will happen to the pollution. How can we clean up pollution in the watershed?
2. Go on a rainy day hike around your school yard. Have students work in small groups to investigate sites of flowing water on the school grounds. They should observe water colour and which way water is flowing. Children can use natural material (twigs and the like) to make tiny “boats” to float down the “river” to the ocean (puddle).

Evaluation:

Have students:

1. Compare their ideas about watersheds from before and after the activity;

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2. Draw their idea of local watershed using a local river like the Mamquam River as a focus. Students can draw features from the mountains to the estuary and Howe Sound;
3. Discuss reasons why their watershed and school grounds must be kept clean.

Community Connections:

1. Invite a member of a local Streamkeeper group or fish and wildlife club to tell about the fish of the Squamish River Watershed.

Taking It Home:

1. Ask students to bring home the Squamish River Watershed Worksheet and ask their family if they can find all the major rivers that are in the watershed and colour them in.

Resource:

This activity has been adapted from “Making a Watershed Model” from Water Stewardship (1995).

References:

Blair-Whitehead, D.G. and W. Husby. 1996. *Water for Tomorrow: A Guide to Watershed Stewardship in the Howe Sound Basin*. Wild BC, Victoria.

Environment Canada. 2000. *A Primer on Fresh Water, 5th Edition*. Environment Canada, Ottawa

Jacobs, Peter. 2009. Personal Communication. Squamish Nation Language Technologist

McClaren, Milton. 1995. *Water Stewardship*. Ministry of Environment, Lands, and Parks. Victoria, BC.

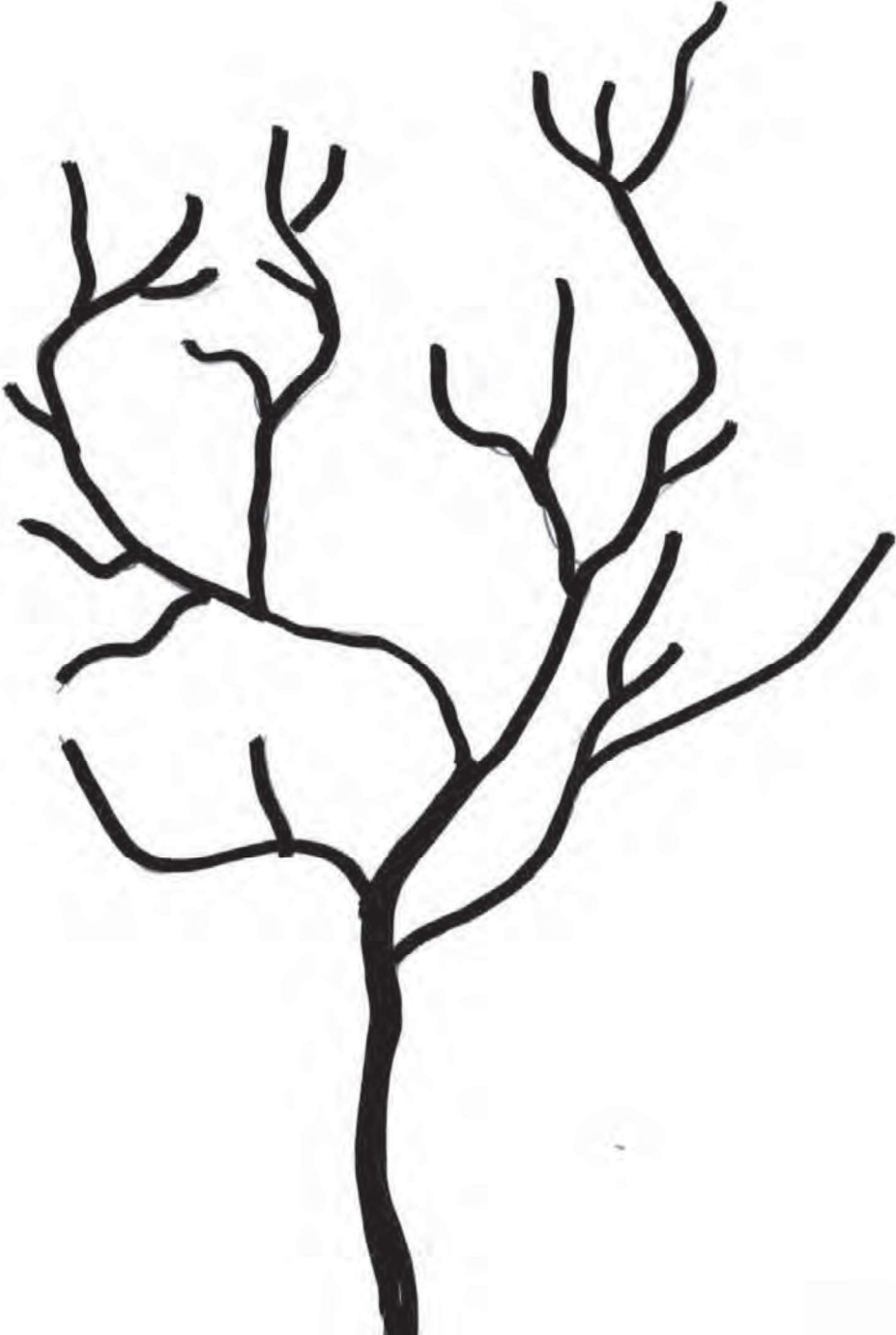
U.S. Geological Survey. <http://water.usgs.gov/>

District of Squamish. <http://squamish.ca/>

Tourism Squamish
<http://www.tourismsquamish.com/map>



Watershed Drainage Pattern

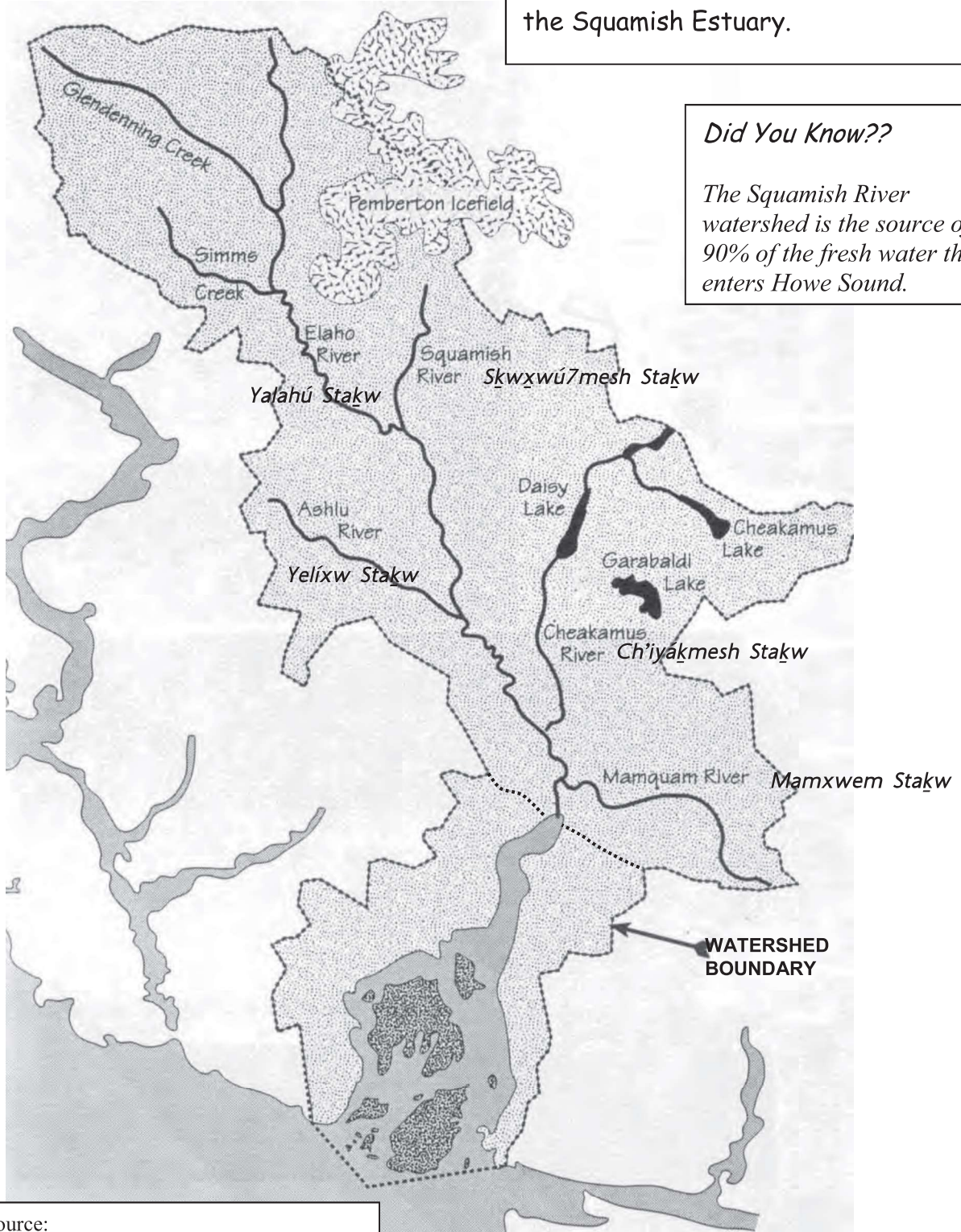


Taking It Home...

Name: _____

Squamish River Watershed Map

Find and colour in the rivers from the top of the watershed...downstream to where the rivers meet Howe Sound at the Squamish Estuary.



Did You Know??

The Squamish River watershed is the source of 90% of the fresh water that enters Howe Sound.

Source:
Water for Tomorrow (1995)