

Session 2  
**Wading In**  
Educator's Guide



*Learners will be taking some time to think about water as a mysterious, yet essential substance in our Earth's biosphere, and how water moves as cyclical systems through geo-physiological pathways known as watersheds.*



## The Big Question: What is a watershed?

The aim of this session is to get learners curious about this unusual substance called water, and how it moves through our lives and our world.

Some interesting facts about water that learners will encounter in their Session 2 Learner's Guide include:

- › The human body is made up of about 60-65% water
- › 71% Of the earth's surface is covered in water
- › The oceans hold about 96.5% Of all earth's water
- › There is very little water in comparison to the surface and mass of the earth itself
- › Water is an alien and weird substance: all the water in our biosphere arrived here from asteroids after earth formed, and it defies many laws of physics
- › Water can exist in all three forms of matter (liquid/gas/solid) at normal temperatures found on earth
- › The water cycle is continuous, traveling in watershed systems, which also include the human body and all living matter
- › Life forms, such as salmonids, are particularly dependent on the flow of watershed systems, and in turn the watershed system is dependent on them as nutrients for trees and soil life

### Indigenous Knowledge Element

Learners will be introduced to the fact that Indigenous cultures have a long history of knowledge and understanding about local ecological systems such as the watershed. They will learn and practice the local Indigenous word for water. If possible, a guest Elder or Knowledge/Culture-Keeper will visit the class during this session.

### Preparation

For this session you will want to have your multimedia system set up with the link to the *Water is Weird* video ready to go.

- › *Water is Weird* BBC video (3 min): <https://www.bbc.com/ideas/videos/why-water-is-one-of-the-weirdest-things-in-the-uni/p06y2c9k>

For Activity 1, you will also need:

- › Chart paper and markers
- › As many resources you can find that are grade-appropriate level for your learning group (e.g., dictionaries, encyclopedias, Geography and/or Earth Science textbooks)

Learners will benefit from online access to research their group's words and terms.

## Learning the Content

Watch the short video about the weirdness of water to pique the learner's interest and curiosity about water.

Students will explore the content during the inquiry-based Activity 1, and reinforce their knowledge by sharing what they have learned with their peers.

## Words and Terms

- Aquatic Invertebrate** small animals, such as insects, crustaceans, mollusks, and worms that live in water. Most invertebrates are found living in the stream bottom among the rocks and gravel.
- Aquifer** underground area that becomes saturated with water within the local watershed.
- Ground water** watershed flow that has infiltrated the ground, has entered the area below the water table, or has been discharged into a stream channel, or springs and seepage water. Groundwater is stored in, and moves slowly through, the layers of soil, sand, and rocks in aquifers.
- Indigenous** People, plants, and other biological species originating, occurring naturally, or for a long-time (beyond human memory or recorded history) in a specific place.
- Indigenous knowledge** refers to the local understandings and philosophies developed by societies with long histories of interaction with their natural surroundings.
- Indigenous territory** historically different Indigenous groups lived in certain large areas that we now consider their territory. Different Indigenous groups can have overlapping traditional territory.
- Salmonid** a family of ray-finned fish which includes salmon, trout, chars, freshwater whitefishes, and graylings, which collectively are known as the salmonids. All salmonids spawn in freshwater, but in many cases, the fish spend most of their lives at sea, returning to the rivers only to reproduce. This lifecycle is described as anadromous. They are predators, feeding on small crustaceans, aquatic insects, and smaller fish.
- Surface water** any water that collects on the surface of the earth. This includes oceans, seas, lakes, rivers, or wetlands.
- Traditional local language** the language of the Indigenous culture of the local area.
- Tributary** a river or stream flowing into a larger river, lake, or water body.
- Water table** the upper-most level of an underground area (aquifer) that is saturated (filled) with water.
- Watershed** an area of land that catches and collects rain and snow, draining and seeping it through a network of marshes, creeks, streams, and groundwater into a common body of water (such as a river, lake, or ocean).

## Evaluating the Learning

### Watershed Wiz Quiz Game

This is an optional activity. For instructions, see the Session 2 Activity Plan (page AP2-3)

### Watershed Reflection

The “Watershed Reflection” activity gives learners the opportunity to process what they have learned and make connections to their own life and experience. Reviewing this component of their Learner’s Guide is a valuable way to help you assess the level of learning and comprehension in your group, and provide some guidance towards ideas you may want to revisit through the rest of the projects and beyond.

There are several key learning outcomes to look for within the reflection component of this session. Students will be able to:

- › Define the term ‘watershed’
- › Explain the role of slope, shape, and physiography in a watershed
- › Identify three features of a riparian ecosystem
- › Learn and practice the local Indigenous word for ‘water’

### Sharing Circle

This valuable exercise involves taking a few moments to sit in a circle, and invite participants to share something from their “Watershed Reflection”.

## Wading In: Grade Curriculum and Competency Connections

For detailed information visit <https://curriculum.gov.bc.ca/curriculum/science>

Grade Level and Subject	Content Connections	Curricular Competencies
Grade 9 Science	<ul style="list-style-type: none"><li>• Matter and energy cycles</li><li>• Sustainability of systems</li><li>• First Peoples knowledge of interconnectedness and sustainability</li></ul>	<ul style="list-style-type: none"><li>• Questioning and predicting</li><li>• Planning and conducting</li><li>• Processing and analyzing data and information</li><li>• Evaluating</li><li>• Applying and innovating</li><li>• Communicating</li></ul>
Grade 9 Social Studies	<ul style="list-style-type: none"><li>• Physiographic features of Canada</li></ul>	<ul style="list-style-type: none"><li>• Use Social Studies inquiry processes and skills to ask questions; gather, interpret, and analyze ideas; and communicate findings and decisions</li></ul>

Grade Level and Subject	Content Connections	Curricular Competencies
<b>Grade 11 Earth Science</b>	<ul style="list-style-type: none"> <li>• The distribution of water and its influence on weather and climate.</li> <li>• Water as a unique resource</li> <li>• First Peoples knowledge and perspectives of water resources and processes</li> </ul>	<ul style="list-style-type: none"> <li>• Questioning and predicting</li> <li>• Planning and conducting</li> <li>• Processing and analyzing data and information</li> <li>• Evaluating</li> <li>• Applying and innovating</li> <li>• Communicating</li> </ul>
<b>Grade 11 Environmental Science</b>	<ul style="list-style-type: none"> <li>• Energy of water flow through ecosystems</li> <li>• First Peoples ways of knowing and doing</li> </ul>	<ul style="list-style-type: none"> <li>• Questioning and predicting</li> <li>• Planning and conducting</li> <li>• Processing and analyzing data and information</li> <li>• Evaluating</li> <li>• Applying and innovating</li> <li>• Communicating</li> </ul>
<b>Grade 11 Science for Citizens</b>	<ul style="list-style-type: none"> <li>• Scientific processes and knowledge inform our decisions and impact our daily lives</li> <li>• Scientific understanding enables humans to respond and adapt to changes locally and globally</li> </ul>	<ul style="list-style-type: none"> <li>• Questioning and predicting</li> <li>• Planning and conducting</li> <li>• Processing and analyzing data and information</li> <li>• Evaluating</li> <li>• Applying and innovating</li> <li>• Communicating</li> </ul>
<b>Grade 12 Environmental Science</b>	<ul style="list-style-type: none"> <li>• Human actions affect the quality of water and its ability to sustain life</li> <li>• Human activities cause changes in the global climate system</li> <li>• Living sustainably supports the well-being of self, community, and Earth</li> </ul>	<ul style="list-style-type: none"> <li>• Questioning and predicting</li> <li>• Planning and conducting</li> <li>• Processing and analyzing data and information</li> <li>• Evaluating</li> <li>• Applying and innovating</li> <li>• Communicating</li> </ul>
<b>Grade 12 Specialized Science</b>	<ul style="list-style-type: none"> <li>• Biodiversity is dependent on the complex interactions and processes between biotic and abiotic factors</li> <li>• Climate change impacts biodiversity and ecosystem health</li> </ul>	<ul style="list-style-type: none"> <li>• Questioning and predicting</li> <li>• Planning and conducting</li> <li>• Processing and analyzing data and information</li> <li>• Evaluating</li> <li>• Applying and innovating</li> <li>• Communicating</li> </ul>



# Activity Plan

## Session 2: Wading In



### Big Idea/Inquiry

What is a watershed?



### Time

Approximately 2.5 hours

### Indigenous Knowledge Element: Local Indigenous word for water

Ideally, an Elder or Culture-keeper visits for this initial session to share a bit about local Indigenous watershed knowledge and language (See regional resources). If this is not possible, there are some key points to share in the “Introducing the Topic” section below.



### Purpose

The purpose of the session is to:

- introduce the concept of watersheds so that students become familiar with the theme that underpins the learning projects
- understand and identify the important role of watersheds in our community
- consider the Indigenous knowledge of the local watershed



### Handouts/Materials

- *Learner’s Guide—Session 2: Wading In*
- Chart paper for “Watershed Words” and quiz activities
- Encyclopedias and dictionaries
- Grade-level appropriate Geography and/or Earth Science reference books
- “Watershed Words” cards for this session (see Learner’s Guide page LG2-4)



### Equipment Needed

- AV equipment or computer with audio
- Internet access (at least one per group)
- *Water is Weird* BBC video (3 min): <https://www.bbc.com/ideas/videos/why-water-is-one-of-the-weirdest-things-in-the-uni/p06y2c9k>



### Learning Goals

To gain a basic understanding of watershed systems in our environment, both globally and locally.

## Learning Outcomes

Students will be able to

- › Define the term watershed
- › Identify three features of a riparian ecosystem
- › Discuss the relationship between salmonids and a healthy watershed
- › Learn and practice the local Indigenous word for water

## Key Learning Points

- › All biological life (humans and other mammals, fish, birds, insects, plants, and microbes) rely on clean, uncontaminated water
- › Water is an unusual substance because all the water in our biosphere arrived here from asteroids after Earth formed, and it is the only substance that can exist in all three states of matter at normal Earth temperatures
- › Watersheds are a key part of the global water cycle
- › Indigenous cultures living in a region for thousands of years have a wealth of local knowledge, language, and understanding of the watershed
- › Most fresh-water travels through watershed systems
- › Everyone lives within an interconnected network of watershed systems
- › The features such as tributaries (streams and creeks), ground surface and sub-surfaces, riparian ecosystems, marshes, bogs, fens, and estuaries of the Watershed work together to catch, collect, and transport precipitation (snow/rain/mist/dew). These also act as carbon sinks
- › A riparian ecosystem is an area where land meets/adjoins a waterway or water body. A functioning riparian zone provides food, energy, and habitat for waterfowl, amphibians, fish, migratory birds, insects, and more
- › Plants, creatures, soil, and physiographical aspects of a riparian zone affect the water
- › Salmonids are keystone species within our local watersheds. They need the watershed, and the watershed needs them (nutrients when they return to spawn and decompose).

## Introducing the Topic

To introduce the topic, watch the [Water is Weird video](#) (link on page EG2-2 and above) together.

If an Indigenous Culture-Keeper is not available, explain that Indigenous cultures living in a region for thousands of years have a wealth of local knowledge, language, and understanding of the watershed. If you are able, share the local Indigenous language word for water. Then break into small groups and have learners read through the introduction section of the *Session 2: Wading In* Learner's Guide.





### Activity 1: Wading In

Assign each group with two of the vocabulary words to research and share about, using the method in the *Session 2: Wading In Learner's Guide* (page LG2-4) (20 min)

## Closing the Session

**Summarizing and Reflecting Activities:** Have learners complete the following activities.



### Activity 2: Watershed Wiz Quiz (optional)

Play "Watershed Wiz Quiz" using the "Wading In" session cards.

Each group:

- Carefully takes their chart papers from Activity 1 and folds over the top part where the word/term is written.
- Tapes or pins each paper at the front of the room so everyone can see the image and bullet notes, but not the word/term itself.

Put notebooks away and let the quiz begin! Learners will draw a word/term from a container and match it to the correct chart paper. When they get it right (maybe with a little help from their friends), they will read out the bulleted notes about the word/term. And then they get to pick who goes next!



### Activity 3: Watershed Reflection

Recommendations for transitioning to this activity:

- Share a bit about what you are reflecting on at this stage of the session.
- Direct learners to page LG2-8 of their Learner's Guide to work independently through this activity.

Review each student's entry to help in evaluative.



### Activity 4: Sharing Circle

Take a few moments to sit in a circle and invite participants to share something from their "Watershed Reflection".

**Watershed Wiz Quiz**  
**"Wading In" Words and Term**

<b>Watershed</b>	<b>Indigenous</b>
<b>Indigenous Knowledge</b>	<b>Indigenous Territory</b>
<b>Traditional Indigenous Language</b>	<b>Aquifer</b>
<b>Water Table</b>	<b>Surface Water</b>
<b>Ground Water</b>	<b>Tributary</b>
<b>Salmonid</b>	<b>Aquatic Invertebrate</b>