Macroinvertebrate Sampling

Activity Purpose

For this activity we will spend some time exploring macroinvertebrates that live in fresh water, and reflect on the relationships between water, human, and more-than-human relatives by collecting samples and determining water quality. Macroinvertebrates are animal relatives that do not have a backbone and are visible without magnification. Some macroinvertebrates can live in polluted water while others are very sensitive and will not survive in low quality water conditions. Understanding macroinvertebrates and other relatives who live with water has always helped Indigenous peoples determine the condition of the water.

Activity Overview

Visit a stream, pond, or other place with fresh water and explore the macroinvertebrates that live there. You can lift rocks and sift through sediments to collect the relatives and place them into shallow containers filled with water (a two liter soda bottle cut in half horizontally works well).

Use the activity sheet to identify the relatives and record what you collect. Stream-bottom macroinvertebrates include such relatives as crayfish, mussels, aquatic snails, aquatic worms, and the larvae of aquatic insects.

Identify relatives you've collected and use the activity sheet to determine the water quality by understanding the macroinvertebrates' sensitivity to pollution. If the water is healthy there will be many different kinds present (high biodiversity) including some pollution sensitive ones. If the water is unhealthy the diversity will be low and only pollution tolerant species will be present.

Make other observations of the place to consider the level of pollutants in the water. Are you in a forest without industry or traffic? Are you near a highway or train track where the water is exposed to toxins? What do you and your family know about this place to help you understand the relatives living with the water?

Roles, Relations, Responsibilities & Gifts

- **Observe water relatives and surrounding places, what is your relationship with this place? Consider how visiting these waters and relatives contributes positively to the health and wellness of this place.**
- **Who visited the water relatives in the past? Who might visit in the future?**

Image taken at ISTEAM camp

Learning Across Generations & with Other Families

- Take time to hear the ideas from everyone in your family. What do you learn from each other? What are the different perspectives the youngest and oldest children bring?
- Talk with relatives, friends, and elders about the fresh water relatives you collected and what story they told you about the water. What do they know, remember, or imagine about that place? What do they know about fresh water relatives in other places?
- Share your activity sheet with family in other places and compare what you found.

Supporting Learning & Wellbeing

- Imagine what this place was like in the past, were the water and macroinvertebrates here before? Will they be here 100 years from now?
- What stories did the macroinvertebrates offer you during the visit?

Making Connections with Stories

- Share stories of other places with freshwater relatives you have visited as a family.
- Imagine stories about fresh water relatives in different places or in different times.
- Tell or listen to stories and songs from your community about water and relatives that live in water.
- Gossiping Clams Story told by Roger Fernandes

Making Relations with Lands & Waters

- Discuss the unique gifts your family has that can be offered to the water relatives. What gifts do water and other relatives offer in return?
- What other fresh waters have you visited? What connections do you notice across the different places?

Decolonization, Resurgence & Good Relations

Consider social movements around water sovereignty (#NoDAPL, #WaterIsLife, #ShutDownLine5). Discuss ways that relationships with water work to secure positive Indigenous futures.

Discuss what you learned about the wellbeing of water from the macroinvertebrates, what action can you take to ensure healthy water for the future?

Salmon illustrations by Roger Fernandes

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Identify the relatives you've collected and record them on this activity sheet. Use your recordings to determine the water quality by understanding the macroinvertebrates' sensitivity to pollution. If the water is healthy there will be many different species present (high biodiversity) including some pollution sensitive ones. If the water is unhealthy the species diversity will be low and only pollution tolerant species will be present.

Date: _____ Time: _____ Weather: _____

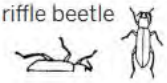
Stream/Site Name: _____ Time spent sorting/identifying: _____

# of people sorting/identifying: _____ ☐ Riffle ☐ Pool

Directions:
1. Record the number of each type of organism found in the # found column of each section.
2. Then circle the number in the score column (3, 2, or 1) if any of that organism was found.
3. Complete the equation at the bottom by adding up the circled numbers from each score column.

SENSITIVITY TO POLLUTION

Sensitive / Intolerant

	# found	score
caddisfly 		3
mayfly 		3
riffle beetle 		3
stonefly 		3
water penny 		3
dobsonfly 		3
Sensitive TOTAL =		

Somewhat Sensitive

	# found	score
clam/mussel 		2
crane fly 		2
crayfish 		2
damselfly 		2
dragonfly 		2
scud 		2
fishfly 		2
alderfly 		2
mite 		2
Somewhat Sensitive TOTAL =		

Tolerant

	# found	score
aquatic worm 		1
blackfly 		1
leech 		1
midge		1
snail 		1
mosquito larva 		1
Tolerant TOTAL =		

\+ ☐ Sensitive total
\+ ☐ Somewhat sensitive total
☐ Tolerant total
= ☐ **Water Quality Rating**

☐ Excellent (>22) ☐ Good (17-22)
☐ Fair (11-16) ☐ Poor (<11)

Adapted from: Environmental Services City of Portland

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