Lesson 4

Physical Properties of a River

Introduction

The physical properties of a river: the landforms we see in the stream and on the bank, the size of bed material, the speed, colour and temperature of the water, all tell us about the health of the river.

Natural river systems are usually self balancing. Today we are faced with increased development near rivers as population and desire for resources rapidly increases. Not only are stabilizing trees being removed for timber, dams built for power and mining sites being built close to the stream for resources, our climate is changing and this affects every living thing in the river ecosystem.

You have seen in the video investigating the physical properties of a river can mostly be done without any specialized equipment - just using your senses, which are pretty specialized after all, but you can carry them with you always.

Let's take these skills outside and check in with a local river or creek.

Time: 30 minutes

Materials: Your senses, a notebook or a printed copy of the data sheet below, pencil, a thermometer if you have one.

Activity 1: Data Collection and Investigation

- Find a river or creek near to your home. It can be big or small, wide or narrow.
- Find out the name of this river/stream/creek. Can you research where its source is?
- Print or copy down the table below into your book. Enter the appropriate data about your river. If you can access more than one river you can repeat the table to compare your data or go to two separate spots along the same river.
- Why would the tests give different results at different locations on the same river?
- What is the land use directly adjacent to your river?

- From your results, do you think your river is physically healthy? Can you see signs of life in the river channel?
- If you were an environmental planner, what might you do to improve the quality of your river stretch?

Please note: May and June are when the freshet (flood from melting snow) enters the river channel in our region. The river volume and speed can change very quickly. It can be extremely dangerous to approach any waterway at these times.

Avoid all waterways at these times. Make your observations from a bridge or way back from the bank.

Physical Properties of a River continued

	4. Excellent	3. Good	2. Fair	1. Poor
1. Bare soil (% of soil on banks)	0-10%	11-40%	41-80%	81-100%
2. Streamside vegetation (% of bank covered by plants)	>90%	70-90%	50-70%	<50%
3. Bank erosion	Stable, no signs of any bank erosion	Stable, very little sign of bank erosion	Overall erosion present	Extensive erosion
4. Water odour intensity (faint, distinct, strong)	No unusual smell			Sulfur, musky, pollution, chlorine
5. Water appearance	No unusual colour			Green, brown or red, purple or black, foam, oily
6. Temperature	0-2 °C	3-5 °C	6-10 °C	<10 °C
7. Turbidity (how clear is the water?)	Crystal clear	Some milkiness visible	Very murky	Cannot see the river bottom due to mud and silt in the river

Detailed Instructions for Data Collection

- Stand on a bridge or way back from the bank in a safe spot
- **NOTE:** May June is when the freshet (flood from melting snow) enters the river channel in our region. The river volume and speed can change very quickly. Avoid entering the river at these times and be very careful on banks (they may be unsupported overhangs and prone to collapse). People regularly have serious accidents or even die on BC rivers at this time of year. **BE EXTREMELY CAREFUL.**

Physical Properties of a River continued

1. Choose a 1m squared area on the bank. This is your plot. Estimate a percentage that is bare soil. You can repeat this with multiple metres and average the score (add the total coverage and divide by number of plots). Look for clear signs of erosion: big cracks, undercuts, slumping or overhangs. You can note if the bank slopes gently, is vertical, or is overhung.
2. Can you smell any industrial or chemical smells?
3. What colour is the water? Is it clear? Can you see the stream bed? Is there any film on the water?
4. If you have a kitchen thermometer at home ask to borrow this. If not, if you can do so safely, place your fingertips in the water. Is it cool, very cold, warm to the touch? Only complete this after May/June and if there is a beach or safe spot to measure the water temperature.
5. Turbidity: From a safe spot on the bank or from a bridge, look into the creek to see how clear the water is. Is it crystal clear with no signs of muddiness? Is it slightly murky? Or is it so muddy and silty that you cannot see the bottom of the river at all?

Summary

- Now you can identify key physical properties of a river and what influences them.
- You can identify these physical characteristics and link them to the water quality and health of the river. Now you are ready to move onto learning about the **chemical properties of a river (lesson 5).**

Extensions

Field Sketch

- Try sketching your river sampling site.
- There are some examples on the next page to help. You can just use pencil or colour too.
- You can just draw the river channel as is or label the different parts that link to the physical properties.
- You don't have to be the best artist, it's just about paying attention to the different parts of the river.

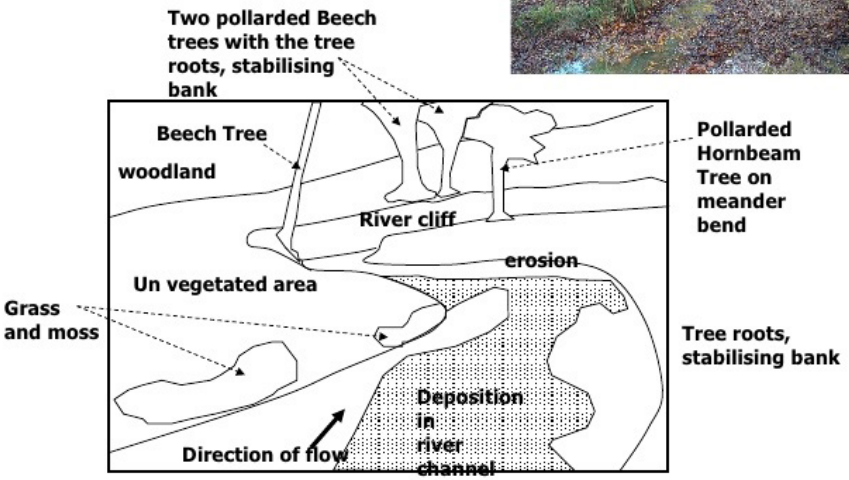
Resources

Physical Properties of River - Book Chapter

Video of Whitewater Kayakers Paddling the Jordan River. Can you see the physical properties of the Jordan River in this fast paced video? What can you tell about the landforms in the river bed from the activity in the video?

Physical Properties of a River continued

How to Draw a Field Sketch



Credit: Msrichards, Slideshare

Example of a river sketch. Credit: Painting Valley