

# *Knowing your Stream*

**Title:** Knowing your Stream

**Subject:** Science (Ecology, Data collection)

**Grade Level:** Grades 5-6

**Overview:**

The purpose of the following activity is to:

1. Allow students the opportunity to learn about stream characteristics.
2. Allow students to explore the outdoor environment and to observe natural patterns.
3. Allow students to collect data and recognize differences in interpretation of data.
4. Develop ecoliteracy.
5. Correspond with the “Curriculum Focus” as outlined in the Atlantic Canada Science Curriculum Foundation:

*“By the end of grade 6, students will be expected to observe and investigate their local environment and record the results,... interpret findings from investigations using appropriate methods,... (and) work collaboratively to carry out science-related activities and communicate ideas, procedures, and results (p 21)*

**Outcome:**

Through this activity, students will:

1. Learn about stream characteristics.
2. Learn how to map using observational skills.
3. Learn how to map using GPS.
4. Learn how to use GIS software.
5. Enhance their observation and analysis skills.
6. Enhance their interpretation skills.

**Description: (Teacher to student)**

Today we will be going outside to map Washbrook from the Baille Ard Trail to Brookland Elementary. You will be in groups of 4 (or 5 if necessary), mapping the trail by how it looks and mapping the trail using a GPS.

We will have a brief description of what to look for in the stream and we will also have a brief explanation of what a GPS is and how to use it. (Lecture notes attached)

You will have to be very careful near the water! Walking close to the stream bank can be dangerous (you could fall in!) and walking on the bank can hurt the stream itself, loosening up important soils.

Learning how to map a region is important because you will notice certain patterns that show up again and again. Mapping using GPS is more precise than using your judgment, but doesn't develop observation skills that are important when you work with nature. A GPS will not tell you which neighborhood the stream is near, or what animals live in the ecosystem, it will only give you the coordinates. That is why it is important to know how to "read" an ecosystem, not simply rely on technology.

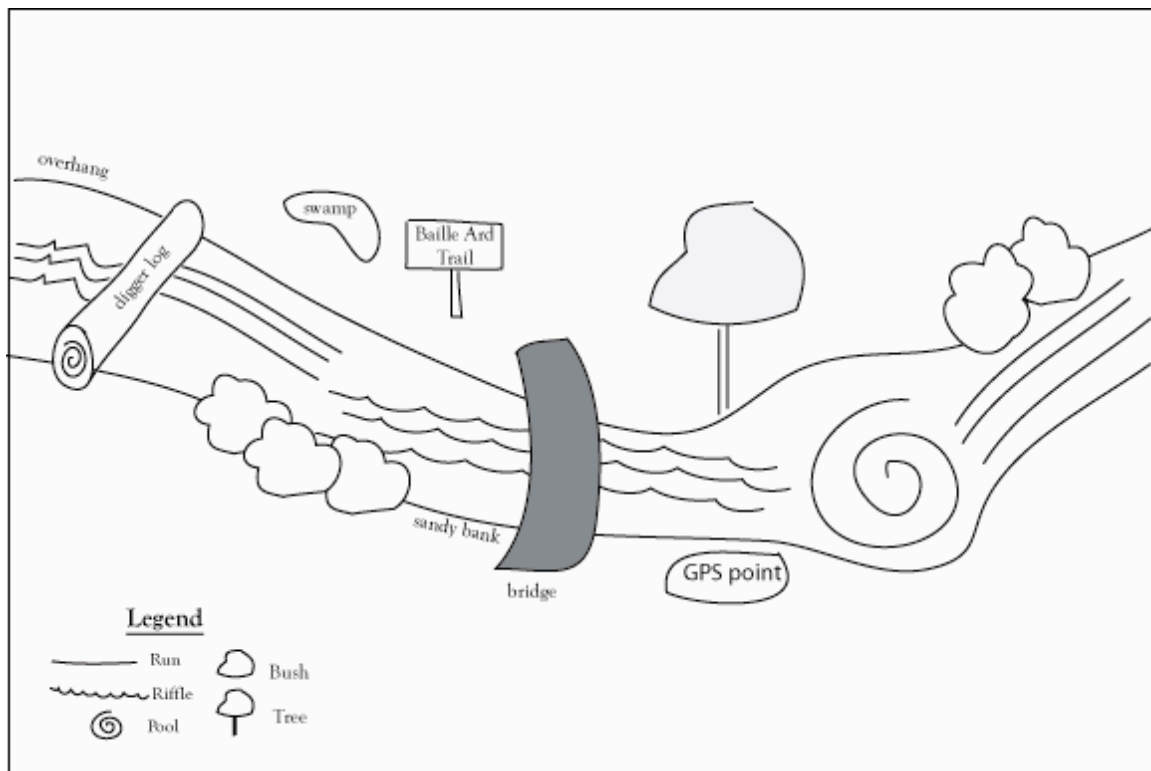
**Materials:**

Pencil  
Paper for map drawing (at least 10 sheets)  
Table for GPS points

**Procedure:****Inside:**

1. Explain that you will be walking along the bank of Washbrook from Baille Ard Trail to Brookland Elementary. Give mini lecture about stream characteristics and how to use the GPS. (Notes attached)
2. Students should discuss with their group who will do what. One or two students will need to draw the map (which will fill many pages). Another student will need to take GPS points. Another student will need to record the GPS points. If they wish, they can switch roles throughout the activity (someone else can have a turn with the GPS, drawing the map, etc.)
3. Groups are reminded to take with them pencils, paper and a hard surface to write on.

- Students will be walk along the stream and draw in the stream bank, trees, bushes, large rocks, digger logs, gabion walls, bridges, roads (crossing the stream), fallen trees, and all runs, riffles and pools, and any other landmarks they think are important. This will not be easy. Drawings do not have to have an artistic flair. Students should create a legend, so drawing details will be less important.
- Students will also be taking GPS points every 25 steps. The GPS will assign a name to that point. Write that point in on the map. It will look something like this:



- After you've completed the hike (and the students have completed as much of the map and GPS points), return to the classroom. Students may need some time to complete their drawn map.
- This part may have to take place another day, depending on time. Each group will have to upload their GPS points onto the computer. With proper GIS software, students will be shown a map of their points. Students should compare the computer's interpretation of the GPS points to their drawn map. They are then to answer the questions on the question sheet.

# Knowing your Stream

## Lecture Notes

### STREAMS

All streams are different. They are all different shapes, they carry different amounts of water, and there are different plants and animals living in their ecosystems. There are a few characteristics that all streams have in common. Streams like to meander. This means that they like to make “s”-shaped curves as they pass through the land. When water flows through a curvy stream, it carves out features that fish love. Water digs up some parts, making deep **pools**, where fish can hide and keep cool on summer days. Fish also like to lay their eggs in deep pools. Other parts are rocky and the water is choppy over them. This is called a “**riffle**”, and even though it looks rocky, fish can swim easily over them. Another feature is in areas that are straight. This is called a “**run**”, because the water moves so quickly through it.

You will have to know what a pool, a riffle and a run are. You will be drawing them on your map.

Different things help shape the curves in the stream. **Fallen logs, large rocks**, the shape of the **stream bed** all push the water in different directions, making it twisty and turny.

Another important feature of a stream is its bank. Have you ever wondered why the water doesn't just wash away the soil? Well, it's held very tightly in place by plant roots, especially big trees. Trees are very important for a stream. Their roots hold soil together and keep the banks stable, and trees also provide shade for fish. You will see how the bank sometimes hangs over the stream, and there is very little soil underneath. This is called an “**overhang**”.

Stream banks can be **rocky, sandy, or loamy** (loam is that dark soil that plants tend to grow in)

All streams naturally curve, and their shapes naturally change over time, however, humans can dramatically change the shape of a stream. If people build houses or roads close to a stream, a lot of dirt gets washed into the stream and gets piled up in different places in the stream, and it usually straightens out the stream over time. When a stream flows straight, it becomes one long “run”, with no riffles and no pools, and fish start to look for a healthier stream because there is no place for them to hide or for them to lay their eggs.

When this happens, humans can help a stream to get its meandering shape back. People can plant trees, to help hold the soil in place. Or, they can mimick fallen logs by placing logs across the stream, forcing the water to flow in a certain direction, and creating pools. These are called “**digger logs**”, and there are many throughout Washbrook. You should draw in digger logs on your map.

You have a list of things to include in your Stream Map. You will notice many other things along the stream. Animals, bird nests, swampy areas, culverts, bridges, etc. Feel free to include them in your map.

## GPS

“GPS” stands for “Global Positioning System”. It is a device that uses satellites (in the sky) to tell you where you are. The ones we will be using are held in your hands, and when you click the buttons on the GPS, satellites pinpoint where you are and send your GPS a message with your coordinates (latitude and longitude). Basically, it’s a very detailed compass, except it doesn’t tell you which way is which, it just tells you your latitude and longitude. You can use a GPS to create a map by taking points all along the area you want to map. So, today, we will be walking along the stream, taking GPS points. This way, we will have many points along the stream, and once we drop those points into a computer, a line image of our stream will appear.

Each group has a GPS, and as we walk along the stream, one person will be taking GPS points every 25 steps. This means there will be a lot of GPS points, because we will have a long walk! When you take a point, the GPS will give it a name. Write the name down in the GPS table, and write a few words about the site (Is it near the school or the soccer field or Cottagedale Crescent? Is there a culvert? Is there a digger log there?). Also, note on your group’s drawn map where you took the GPS points.

We will be creating two maps – one will be hand-drawn, with details of the stream’s structure, and the other will be with GPS points.

### Things to include in your Stream Map:

pool

tree

overhang

rocky bank

riffle

fallen tree

culvert

sandy bank

run

digger log

rocks

loamy bank

### Question Sheet

1. What are some benefits to mapping with GPS?
2. What are some benefits to mapping with your hand?
3. Do you see any patterns in your hand-drawn map?  
(Does the stream meander? Is there always a run after a pool? Were there overhangs at each pool? Was the stream straight under bridges?)
4. Do you see any patterns in your GPS map? (Is the stream mostly straight? Or mostly meandering? Which direction is the stream flowing?)







