

Part 1: Stream Habitat Assessment

1.2 Lesson Sequence



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Engage

If your students have experience with watersheds, begin by having them think/pair/share around their knowledge of watersheds. Ask:

1. What is a watershed?
2. Where does the water in streams come from?
3. How might the land around a stream affect the river?

Write down answers on the board. For question 3, you might want to separate human and non-human impacts.

Optional Reading. If your students are not familiar with the importance and functions of rivers, this might be a good time to assign them reading about why stream characteristics and habitat are important. Two articles you may want to assign:

- **1.2e Cold Water Streams Reading** (easier reading level)
- **1.2g River Habitat Reading** (more difficult reading level)

If you do choose not to assign these readings, they are also included in the **1.2a Stream Physical Characterization** and **1.2b Habitat Assessment Handbook**, on pages 7 and 14 respectively.

Explore

The site(s) you select will depend on many factors; however, it is best to have a stream reach of 100m, or 40x the width of the stream.

The **1.2a Stream Physical Characterization** and **1.2b Habitat Assessment and Handbook** were written to be used together. To complete the assessment, students will need to have copies of the handbook to reference, as there are many images and descriptions for each factor being assessed. In addition, whenever possible, the reason or importance of each factor is given in the handbook, so that as students analyze their site, they can return to their assessment and use it to understand how the different parameters impact the river.

Depending on your site(s), how many areas you are sampling, time available, and the number of student groups, you may want to execute the habitat assessment in a variety of ways.

- If you only have one site and limited time, you may want to break the habitat assessment into parts and have each group become an expert on their section. They can then report back out to the class on their findings.
- If you have multiple sites, you may have each group do the entire assessment.

- If time is a concern, you may want to do some of the assessment items as a demonstration prior to going out, so that students can spend time on the areas you find the most relevant for your classroom.
- If you are working with groups of 4, a nice way to break up the work is the following:
 - Sections 1, 2 – prior to going to the site
 - Sections 3,4 - two students, on-site
 - Section 5 - two students, on-site

Stream Physical Characterization and Habitat Assessment Sections Hints & Tips

Sections 1 & 2

- These sections can be completed prior to going onsite with the exception of the location description, latitude and longitude if you are using GPS Coordinates, and air temperature.

Section 3

- If you have access to the Internet, your students can determine the land use for the watershed prior to going onsite. Try using Google Maps (process is described in the handbook), Google Earth (If you are familiar with this and can download it), or ArcGIS (**1.2d How to use ArcGIS**) to determine predominant land use.
- ***For some in-stream features, some students will need to enter the river.***
- If you do not have a stream flow meter, you can use an orange to estimate stream velocity. The description of how to do this is in the handbook.
- In the past, students have struggled with identifying riffles, runs, glides, and pools. You may want to have a large group discussion of these features in your stream.
- You may want to make copies & laminate the ruler on page 7 of the Handbook if you want students to measure the substrate and not just visually assess. Doing this will help them in the design layout of their Hester Dendy samplers (Part 3, Design Challenge.) Hester Dendy samplers work best when small pebbles/gravel from the stream can imbed between the plates. Spacing plates to maximize might increase the number of macroinvertebrates on the plates.

Section 4

- Taking pictures is a great way to document your site. However, having students hand draw and label features of their stream will allow them to analyze what they are seeing and transfer that to a permanent form.

Section 5

- There are 10 parameters to measure. Some of them are assessed differently for riffle-run dominated streams than for pool-glide dominated streams. It is helpful to have students look over these descriptions and examine the pictures prior to going on site.

- You may want to do the river characterization together so that all groups come to the same determination and complete the assessment correctly. When in doubt, most streams in the Grand River Watershed are pool/glide.

Explain

When students return to the classroom, they can upload their information into a shared Google Sheet with the classroom: the **1.1f Stream Physical Characterization and Habitat Assessment Spreadsheet**. This interactive document has a summary sheet first, followed by sheets made for up to 9 groups. Once you make a copy, you will be able to make any changes you want; however, the students you share it with will not. The document has all cells locked except for where students will enter their data. The sheet is set-up to automatically calculate a habitat score. Students should upload any images and a picture of their site map to the worksheet.

If all groups collected data on the same site, then this would be an opportunity to compare results and discuss reasons why there might be similarities and differences.

This is also a good time for students to complete the second half of the **1.2c Stream Habitat Analysis Worksheet**. Depending on how many different sites you assessed, students might want to present their finds to each other to compare and share data. This could be done with short presentations to the group or via a gallery walk.

The final two questions on the worksheet should be discussed as a class to see what students want to know more about, and to develop ideas about how you might build something to collect macroinvertebrates.

Extend

From this habitat assessment, students can identify human impacts on the stream, research ways to mitigate them, and work to implement their plans when possible.

Students can research which habitat is needed to support fishing in their local stream.