

**Activity: Stream Survey**

**Grade Level:** 5

**Major Emphasis:** Aquatic Habitats (Streams)

**Major Curriculum Area:** Science

**Related Curriculum Areas:**

Refer to Outdoor Education Curriculum Matrix 3-5  
Math                                      Language Arts  
Social Studies



**Program Indicator:**

The students will be able to compare/contrast habitats and adaptations of plants and animals in a fresh water habitat.

**Student Outcomes:** The students will:

1. measure and record stream data (Refer to Supplements A & B).
2. identify signs of run-off, erosion and sedimentation and their effect on a stream.
3. identify potential water quality problems of the stream.
4. evaluate the general health of a stream using data collected (Refer to Supplement C).

**Readiness:**

1. Introduce vocabulary:  
velocity                                      erosion  
stream pool                                      sediment  
stream riffle
2. Practice measuring the pH of water using litmus paper or a water pH test kit.
3. Practice identifying aquatic insects such as mayflies, stoneflies and caddisflies.
4. Complete the Fifth Grade Unified Science Unit, "Aquatic Biomes."
5. Use a map (county/state) to follow streams and discover how they join to form larger streams and rivers.  
Trace the stream on the map nearest your school and follow it to the Chesapeake Bay.

**Materials:**

water thermometer	bottom grab	hip waders	screens
air thermometer	stop watch	tote trays	tweezers
pH Kit	bobber w/string	measuring tape	meter stick
buckets	depth line	magnifiers	data sheets
insect identification sheet			

## Procedures: (DL2&3)

1. Take the following measurements for stream *width* and *depth*:
  - a. the width of the stream at its widest point
  - b. the width of the stream at its narrowest point
  - c. the depth of the stream at its deepest point
  - d. the depth of the stream at its most shallow point
2. Measure *velocity* in a section of the stream that has easy access and where the water is fast-moving.
  - a. Measure off a 10 foot section of the stream with a measuring tape.
  - b. Place markers at the beginning and end of the section.
  - c. Place the floater in the center of the stream at the upstream end of the section. Time it from release until it crosses the other end of the section. Record the time. Retrieve your floater and repeat the process several times and take an average. Always retrieve your floater so that you are not polluting your stream. Compute the velocity in feet per second.
3. Choose an area of the stream for each team to measure and record *temperature*. Make sure some areas are in the shade, others in sun. Measure shallow and deep spots in the stream, where water is slow-moving and fast-moving. Record temperature measurements on a data sheet.
4. Obtain a water samples from 3 different places, using a bucket and sampling jars: in a pool, in a riffle (fast-moving area) and in one other place. Use a pH Test Kit or litmus paper to observe the pH. Record on a data sheet.
5. Make the following observations about the stream banks, stream bottom and the surrounding land area.
  - a. Describe the signs of run-off and erosion on the stream bank (gullies, trails of trash, exposed soil, steep "carved out" slopes).
  - b. Have participants sketch a cross-section of the stream to show what the banks and bottoms look like.
  - c. Ask participants to look carefully at the stream bed and the surrounding land. Note the type of land the stream flows through.
  - d. Ask participants to look for fish barriers. Draw them in on their sketch of the stream.
  - e. Ask participants to note any unusual odors or any signs of foam, oil or other contaminants.
  - f. Ask participants to look at the bottom of the stream. Look for sedimentation, excess algae, gravel and stones. Use a bottom grab to obtain a sediment sample. Record observations.
6. Rate the general health of your stream by doing "The Bug Test."
  - a. Choose riffle areas to test. Fill a bucket with water from the stream and set it in a stable place.
  - b. Select three stones from the riffle area. The stones should be four to eight inches in diameter, bathed in rapidly flowing water and lying loose upon the stream bed. Using your fingers, rub all the insects, casings and debris into the bucket of water. Replace the rocks after scraping them thoroughly. If there are no stones available, use a dip net to obtain several handfuls of twigs and leaves from the stream at the water's edge.
  - c. Pour the water through the strainer. Being careful not to lose any material still in the bottom of the bucket, scoop up more water and pour again through strainer.
  - d. Use tweezers to move around material on the strainer and look for insects. Count and record all stoneflies, mayflies, caddisflies and other insects. Rate the overall condition of the stream according to the directions on "How Clean is the Stream" (excellent, good, fair or poor). Use stream insect identification cards to help identify them (Refer to Supplement B). When observing stream insects,

- keep them wet so students can return them unharmed to the stream.
- e. If you have time, do a second test in another riffle.
  - f. Carefully study a stream animal. Record observations on the data sheet and draw its picture.

**Summary: (DL3&4)**

1. What do the observations and measurements tell us about the stream?
2. Was there evidence of run-off or erosion?
3. What kind of land surrounds the stream?
4. What were the results of the bug test?
5. How many different kind of animals were found?
6. How do you rate the stream? Why?

**Follow-Up:**

1. Participate in a stream survey on a stream in your neighborhood or on school property. **(DL3)**
2. Complete the Integrated Learning Task: Ecofish in the appendix. This compares the stream to the river estuary. **(DL4)**
3. Participate in an environmental action project which would improve the environment of the stream and its surrounding areas. For details on projects such as tree plantings, stream cleanups and storm drain stencilling, refer to Maryland Save Our Streams' Be Part of Something BIG! **(DL4)**

**Extension Activities:**

1. Do a survey of the school property while or after a rainstorm to observe where the water goes and if erosion is a problem. **(DL3)**
2. Design a plan to prevent erosion on your school yard. **(DL4)**
3. Build a watershed model (diorama) to show the effect of water and land.
4. Do "Go with the Flow" Activity in NatureScope: Pollution-Problems and Solutions, p. 64.

**Teacher Resources:**

Books:

- < \*Be Part of Something BIG!, Maryland Save Our Streams.
- < \*NatureScope: Pollution-Problems and Solutions.

Videotape:

- < \*Billy B: "It's Happening Today on the Chesapeake Bay."