STREAMWATCH SCHOOLS
BIOLOGICAL TEST PROCEDURE (GRADES K-2)

Supplies:

- Water shoes (old sneakers work too...any close-toed shoes are fine!)
- Small nets (aquarium nets are perfect) for collecting macroinvertebrates (small animals—may be referred to as “macros” for short)
- Small trays or dishes for observing macroinvertebrates. They should be at least one inch deep. White trays are preferable, so the macros are easier to see (plastic take-out containers work very well!)
- Larger containers or buckets for observing animals that may be too large for the small trays. They should also be at least one inch deep and preferably white.
- Macroinvertebrate identification key
- Small spoons, watercolor paintbrushes, and/or forceps
- Data sheet
- Clipboard and pencil

*Note: The Watershed Institute may be able to provide some of these materials for your class. More information is available on our website or you can email dbush@thewatershed.org for more information.
Description:
This document will describe how we can study the animals living in a stream. Some organisms are more tolerant of “poor” water quality than others. The presence or absence of certain species can therefore help us determine water quality. We can then perform chemical tests to confirm that conclusion. **Bold** text indicates something that is important to keep in mind.

Procedure:
1) Using your data sheet, perform a visual assessment of your sample site (includes weather, temperature, time since last rain or snow, “use your senses,” “what’s around the stream,” and stream characteristics).
2) Getting the temperature
   a) Start with air temperature. Wait at least 2 minutes before recording the temperature so the thermometer has time to change.
   b) Hold the thermometer under the stream water for 2 minutes (or have a really good listener do it for you!). Record the temperature.
   c) Hold the thermometer under the stream water for 2 minutes (or have a really good listener do it for you!). Record the temperature.
3) Fill the small trays with stream water so they're ready for the macros.

Collect macroinvertebrates.

4) Finding a good spot:
   a) Try to find a location along the stream where the ground is flat and clear of slippery rocks.
   b) Macros like to be where there are lots of ripples and bubbles in the water—more oxygen for them!
   c) The best practice is to not let students in the water deeper than their knees. If you can't see the bottom, you can stay along the edge of the water but should not go in.

Using the nets

5) Have students use the small nets to try to catch what they see!

   a) The nets can be fragile, so students should not put rocks, sticks, or mud in them.
6) When someone catches something, have them bring it over to the small trays filled with water. It may be helpful to use the spoons, forceps, or paintbrushes to move the macros into the trays.
   a) Remember some animals you find may be too large to comfortably fit in the small trays. This is when you could use a larger container or bucket, if you have them.

7) If you have a hard time transferring macros from the net, you can turn the net inside-out and put the mesh side of the net under the water in the tray and try moving them that way.

8) If you didn’t find many macros, try a new spot.
Flipping rocks:
This is a great option if you don't have enough nets for everyone or if your class is having a hard time catching anything.

9) If there are lots of rocks at your stream site, you can have some students look for macros under the rocks.
   a) Make sure they're looking *closely* for small movements on the rocks.
   b) Use the spoons, paintbrushes, or forceps to gently move macros from the rocks to the small trays.
   c) *When someone is done looking at a rock, make sure it is gently returned to the same place it was found.* Remember that these rocks are the animals' homes!

Note: Make sure you place the macros you've collected in a shady spot so it doesn't get too hot for them. Whenever possible, try to make sure no individual macro stays out of the stream for more than about 10 minutes; they want to go back home!
Analysis:

4.) On the “Biological Assessment” page of your data sheet, record the air and water temperature that you found. Then, have the students circle the animals that look like what they saw at the stream.

Optional: You may choose to bring a macroinvertebrate identification key with you to the stream. These will be available on our website and will help you and your students identify the macroinvertebrates you find. Often, younger students want to know the names of what they’re seeing. An example is shown below.
Stream Insects & Crustaceans

GROUP ONE TAXA

1. Slowly moving. Dorsal Plate: short, 1/2 thick. 5 legs almost touching each other. 2 black eyes. Wings narrow, 1/2 length of body.

2. Crawling. Dorsal Plate: short, 1/2 thick. 5 legs almost touching each other. 2 black eyes. Wings short, 1/4 length of body.

3. Swimming. Dorsal Plate: long, 2/3 thick. 5 legs almost touching each other. 2 black eyes. Wings short, 1/4 length of body.

4. Flying. Dorsal Plate: long, 2/3 thick. 5 legs almost touching each other. 2 black eyes. Wings long, 2/3 length of body.

GROUP TWO TAXA

5. Slowly moving. Dorsal Plate: short, 1/2 thick. 4 legs almost touching each other. 2 black eyes. Wings narrow, 1/2 length of body.

6. Crawling. Dorsal Plate: short, 1/2 thick. 4 legs almost touching each other. 2 black eyes. Wings short, 1/4 length of body.

7. Swimming. Dorsal Plate: long, 2/3 thick. 4 legs almost touching each other. 2 black eyes. Wings short, 1/4 length of body.

8. Flying. Dorsal Plate: long, 2/3 thick. 4 legs almost touching each other. 2 black eyes. Wings long, 2/3 length of body.

Save Our Streams

GROUP THREE TAXA

9. Aquatic Worm. Dorsal Plate: short, 1/2 thick. 7 legs almost touching each other. 2 black eyes. Wings small, 1/8 length of body.

10. Shrimp. Dorsal Plate: short, 1/2 thick. 5 legs almost touching each other. 2 black eyes. Wings small, 1/8 length of body.

11. Clam. Dorsal Plate: long, 2/3 thick. 3 legs almost touching each other. 2 black eyes. Wings small, 1/8 length of body.

12. Crab. Dorsal Plate: long, 2/3 thick. 5 legs almost touching each other. 2 black eyes. Wings small, 1/8 length of body.
VOCABULARY AND FAQS:

Macroinvertebrates:
This is the word we use to describe most of the animals we find in a stream. The word comes from “macro,” which means we can see the animals with the naked eye, and “invertebrate,” which means they do not have a backbone. It should be noted that this term does not apply to fish, since they have a backbone.

Upstream:
The direction where the stream water is coming from. Downstream is the direction the water is flowing.

• What can we do if we can’t find any macroinvertebrates?
  o Often, this problem can be solved by looking at your nets/the rocks of your stream very closely. Look for small movements on the rocks, leaves, and sticks. If you still can’t find anything, try looking in a different spot. Macros love spots where there are lots of ripples and bubbles in the water because that’s where there will be more oxygen. If you still don’t have any luck, there are a few other options that you can focus on instead. You can look for signs that animals passed through the area (feathers, poop, tracks, etc.). You can also put more focus on the chemical tests and see if you can use that data to explain why you’re not finding any macros.