

Macroinvertebrate Water Quality Test

Focus: Water pollution and aquatic ecology

Method: Do a water quality test by studying the aquatic insects in a river or pond water sample.

Materials:

- AV Equipment: computer, projector, projector screen or white wall
- Containers to hold water sample: sealable plastic tupperware works well
- Water sample taken from local pond or stream, about two cups of water per student (See “Places to Get Pond or River Samples” if you need ideas)
- Pipettes, one per student
- Turkey baster, about one for every four students
- Microscopes or magnifying glasses
- Microscope slides (only if using microscopes)
- Small plastic containers (if using magnifying glasses), one per student ([these](#) work well)
- “Monitoring Macroinvertebrates” worksheet
- “What’s in Your Water?” Power Point slideshow
- Optional: watershed model

Procedure:

1. Dip some water out of a local pond or stream into a container.
2. Show your class the “What’s In Your Water?” Power Point presentation.
3. If you can, use a watershed model to demonstrate how pollution enters rivers and lakes. Search the [EnviroScape website](#) if you wish to purchase a model. They are pricey, so you may consider having Pro Youth/HEART purchase one for all of the sites to share.
4. Tell your class where you got your water sample.
5. Demonstrate how to identify macroinvertebrates:
 - a. Dip water out of the large sample tray into a small sample box.
 - b. Wait for the water to calm, and look for little wiggly things in the water. Those are the macroinvertebrates!
 - c. Use your microscope or magnifying glasses to examine the macroinvertebrate. If you have a microscope, use the pipette to suck up the macroinvertebrate and put it on a slide.
 - d. Refer to the “Monitoring Macroinvertebrates” worksheet to identify the macroinvertebrate. Pay close attention to its tail, antennae, and legs to differentiate it from the others on the worksheet.
6. Demonstrate how to use the “Monitoring Macroinvertebrates” worksheet:
 - a. Take a good look at your macroinvertebrate. How many legs does it have? Does it have antennae?
 - b. Examine the worksheet closely, and find the picture that most closely matches your macroinvertebrate. Circle the picture.
7. Pass out the materials to your students, and let them begin. Materials include:
 - a. “Monitoring Macroinvertebrates” worksheet
 - b. Pencil
 - c. Microscope or magnifying glass
 - d. Pipette and slides (if using a microscope)
 - e. Small plastic containers (if using magnifying glasses)
8. Assess your water sample’s overall quality:

- a. Add up the number of different kinds of macroinvertebrates you found in each section. For example, if you circled three different kinds of macroinvertebrates in the “Excellent” category, write 3 in the right-hand column.
 - b. Next, multiply the number of macroinvertebrates you found by the “x 3,” “x 2,” or “x 1” in the right hand column.
 - c. Add up the products of those equations, and write the sum down in the lower right hand square next to “Add up results for Pollution Tolerance Index (PTI).” This is your PTI.
 - d. Refer to the chart at the bottom of the worksheet to see how clean your water sample is. Circle the answer.
9. Give your water sample an overall PTI by averaging everyone’s PTI numbers. How clean is the water overall? If it has a low PTI, how do they think it got polluted? If it has a high PTI, why do they think it is so clean?