

# ***From the Mountains to the Estuary: From the Schoolyard to the Bay***

**Meaningful Watershed Experiences  
for Grade 6 Students**

**Created by:**



**With grant support from  
The NOAA Bay Watershed Education Training (B-WET) Program**



**In partnership with:**



**Occoquan Bay National Wildlife Refuge  
Manassas Battlefield National Park**



## ***Macroinvertebrate Study*** “Who Lives Here?”

### **Overview:**

Students will collect macro invertebrates at a local water source. Using field guides, the students will identify the organisms and determine the water quality based on their findings.

### **Teacher Background: Using Macroinvertebrates to Determine Water Quality**

- Since 1978 the VA Department of Environmental Quality has had a biological monitoring program.
- The presence or absence of organisms is used as an indicator of the health of the body of water. Changes in water quality result in changes to the ecosystem.
- The types and numbers of macroinvertebrates (organisms without a backbone that are large enough to be seen by the naked eye) indicate the quality of that water.
- Most of the benthic (bottom dwelling) macroinvertebrates in Virginia come from 4 main groups:
  - insects- adult and larval
  - mollusks
  - crustaceans
  - annelid (segmented) worms
- Macroinvertebrates are good indicators because they are relatively immobile and different groups have different resistance to a number of contaminants.
- Generally, water with numerous diverse aquatic species usually indicates a healthy environment.

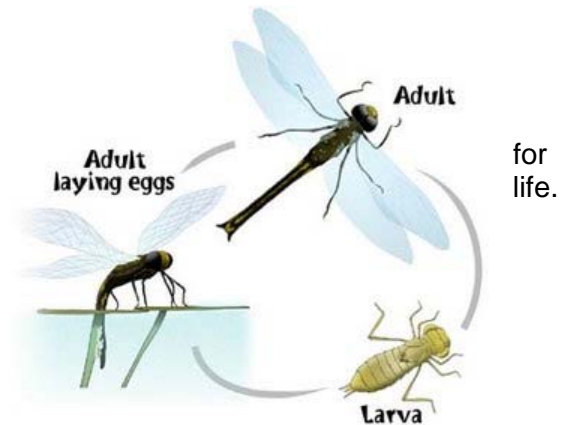
### **Materials**

- Identification books- *The Golden Guide to Pond Life*
- Macroinvertebrate ID cards
- Dip nets
- Plastic trays to hold specimens
- Magnifying lenses
- Plastic ice cube trays for separating organisms
- Viewers
- Brock scopes
- Clip boards with datasheet and pencil (See Appendix)
- Folding tables—4 (optional)
- Five gallon buckets—5

## Setting the Stage

What are two ways scientists can investigate water quality? (*the presence and types of macro invertebrates and water chemistry*) During this station you will be collecting information on the different species of macro invertebrates that live in the water. Ask for some examples of macro invertebrates. (*allow for answers-invertebrate means without a backbone*) Explain that scientists sample macroinvertebrates because they usually can't move if there is pollution, some macros can survive a lot of pollution like leeches, and some organisms like mayflies need very clean water so scientists can discover what the water quality is based on the macroinvertebrates they find.

Students will work in groups of three or four. Each group will have one net and a bucket. Advise students to be very careful around the water. Ask students to observe any flying insects around the pond (dragonflies, mosquitoes, crane flies etc..). Many of these adults lay their eggs near the waters edge. The larvae feed, grow, and molt repeatedly underwater. They eventually emerge from the water as winged adults. They search mates and lay eggs. Thus water quality has a great effect on their



## Acquisition of Learning:

1. Demonstrate putting a small amount of water in bucket and model the procedure for collecting. The goal is to keep the water as clear as possible so you can still see the organisms.
2. Show students how to look through net. They should lay the net on the ground and bend down to sort through. Remind them that the organisms they are looking for are very small and camouflaged
3. When the student finds an organism they should carefully pick it up and transfer it to the bucket. CAUTION: The only organism they shouldn't pick up are spiders. Remind the students that they are in a protected area so they must take care of everything.
4. Have the students collect for about 15 minutes.
5. Bring samples to table for observation with microscopes and magnifiers. Have students carefully empty contents of bucket into container on table.
6. Have students identify organisms using pond book and ID cards. Allow about 10 minutes for observation and data collection.
7. Have student record findings on worksheet. Walk around to be sure students are completing data sheets.
8. If time permits, have student go to other tables to see what they caught.
9. Ask students to release collected organisms back into water (Manassas) or empty them into one bucket (Occoquan).

## Closure:

10. Bring class together as group and ask what the organisms were found. Start with one group and have students circle organism if it's not already circled on their data sheet.
11. Base on their data, what is their conclusion about the water quality?
12. What factors might influence what they found? *Pollution, temperature, season, turbidity, weather, microhabitat*