MACROINVERTEBRATES INDOOR LAB
LESSON PLAN

Subject Area: Water quality & macroinvertebrates
Grade Level: Middle School
Seasonal timing: Spring before outdoor field trip
Instructional time: 45 minutes

A. Learning Goal: Understand how water quality can impact which macroinvertebrates are found in lakes and how they are indicators of lake health.

B. Objectives:
- Identify and record macroinvertebrates in a sample.
- Determine how to use macroinvertebrates as indicators of water quality.
- Differentiate between complete and incomplete metamorphosis.
- Observe traits of macroinvertebrates and use an identification key.

C. State Standards:
- SCI.SEP4.m – Analyzing and interpreting data.
- SCI.SEP5.m – Using mathematics and computational data.
- SCI.LS1.B.m – Animals engage in behaviors that increase the odds of reproduction. An organism's growth is affected by both genetic and environmental factors.
- SCI.LS2.A.m – Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors, any of which can limit their growth. Competitive, predatory, and mutually beneficial interactions vary across ecosystems but the patterns are shared.
- SCI.LS2.D.m – Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on — for example, water purification and recycling.
- SCI.LS4.D.m – Changes in biodiversity can influence humans' resources and ecosystem services they rely on.

D. Setting: Indoor classroom.

E. Materials and Resources:
- LEEP macroinvertebrates lab packets.
- Identification key to macroinvertebrates.
- Pencils.
- Macroinvertebrate sheet for each group (found in lab packet.
- Preserved native and invasive macroinvertebrate samples.
- Stamper and ink pads to validate extra credit.
- Calculators.
- Relevant PowerPoint slideshow led by local expert, if available.

F. General delivery, see teacher guide for detailed implementation suggestions:

Introduction of Lesson:

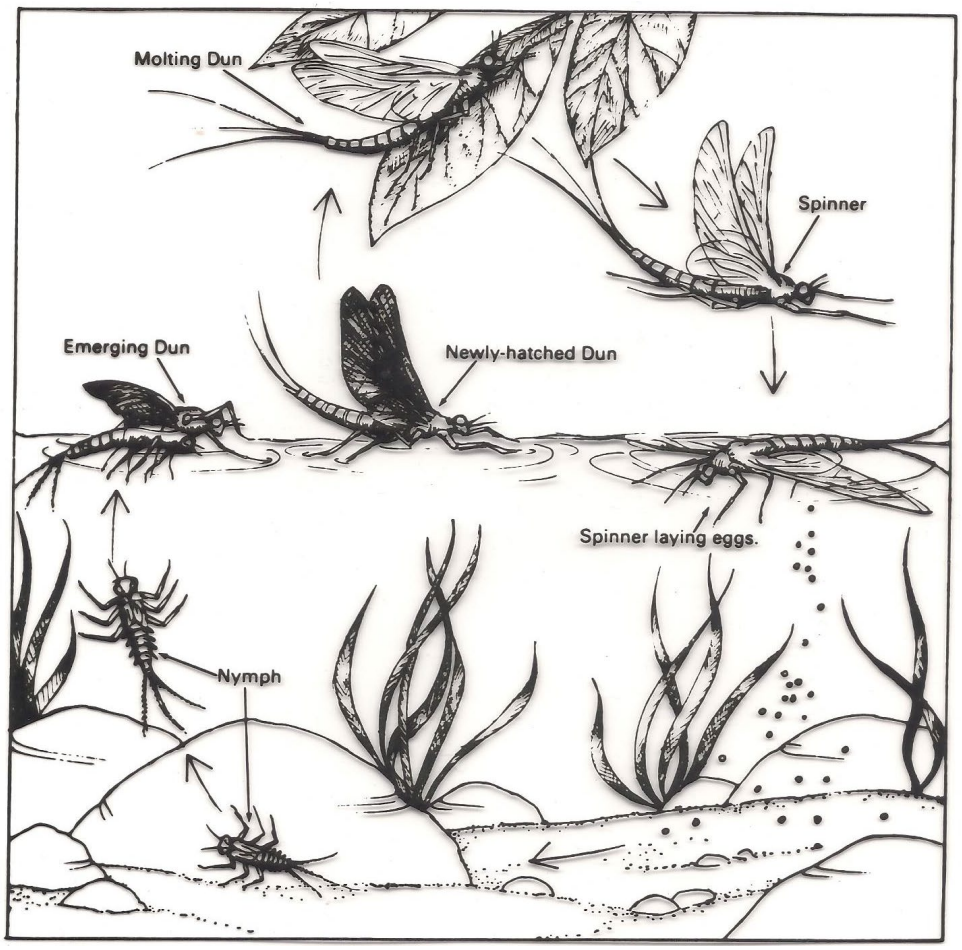
- Review macroinvertebrates (animals without backbones that can be seen).
- Review life cycles of aquatic insects (complete/incomplete metamorphosis).
- Review water quality/health and how some animals are tolerant and sensitive to environmental conditions.

Large Group: Go over introductory materials and hand out equipment.

Small Group: Each small group goes to a station. Learners will identify the macros on the sample sheet according to their "groups," count, and record them. The learners will complete the "***Tally Sheet Recording Form***" and determine the water's ***index score***.

G. Assessment:

- Have *each group* write a short paragraph about their findings on the ***Tally Sheet***.
- Have an informal class discussion (wrap-up) about the activity and how macroinvertebrates can be indicators of water quality.



Suggested handout/ overhead transparency.