AQUATIC STUDIES OUTDOOR LAB
LESSON PLAN

Subject Area: Aquatic studies and LEEP culminating activity
Grade level: Middle school
Seasonal timing: At the end of the spring field trip
Instructional time: 45 minutes

A. **Learner Goals:** Learners will review previous key points from fall modules, including water quality, critical habitat, and aquatic plant identification.

B. **Objective:** Learners will experience an adventuresome competitive outdoor activity while learning more about the aquatic/shoreline environment.

C. **State Standards:**
- SCI.CC7.m – Students explain stability and change in natural or designed systems by examining changes over time and considering forces at different scales, including the atomic scale. They understand changes in one part of a system might cause large changes in another part, systems in dynamic equilibrium are stable due to a balance of feedback mechanisms, and stability might be disturbed by either sudden events or gradual changes that accumulate over time.
- SCI.SEP3.m – Planning and conducting investigations.
- SCI.SEP4.m – Analyzing and interpreting 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.LS1.C.m – Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy.
- 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.C.m – Ecosystem characteristics vary over time. Disruptions to any part of an ecosystem can lead to shifts in all of its populations. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health.
- 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: Safe outdoor lake area with adequate canoe embarking/disembarking area.

E. Materials and Resources – Students are paired and in canoes for this session:

- Canoes, paddles, life preservers.
- Outdoor lab manuals, clipboards, writing utensil.
- Aquascopes and WI DNR Critical Habitat designation sheets with instructor in their boat.
- Plant books and identification materials on table on shore.
- Small plastic garden rakes with instructor in their boat.
- Pontoon boat and instructor with water testing equipment**:** pH paper, oxygen-temperature meter or thermometer/Chemette kit.
- Cameras.

F. Safety Considerations:

- Students should have already had some canoeing experience with previous activities.
- Students are directed to keep properly fitting life preservers on whenever in the canoes.
- Safety boats should be in the area to monitor students and prevent major mishaps.
- Students work in "sister" canoe pairs.
- All canoes and students visible to shoreline, safety boat, and instructors at all times.
- Canoe partners determined by classroom teacher.

G. General Delivery, see teacher guide for detailed implementation suggestions:

- Review above safety considerations and establish canoe partners.
- Inform students about search parameters and time limitations. Some students will be working on shore while others are in canoes and switch in orderly fashion.
- Students disembark.
- After allotted time students return to share and verify their "findings" with the instructors.

H. Assessment: Each canoe team "show-and-tell" about what they learned and how the modules fit into the big picture for the quality of the lake.