



AQUATIC PLANTS AND INVASIVE SPECIES OUTDOOR LABS LESSON PLAN

Subject area: Aquatic Plants and Invasive Species

Grade Level: Middle School

Seasonal timing: Fall

Instructional Time: 45 minutes

A. Learning Goal: Learners will be able to use aquatic plant materials to identify native and invasive species and the value of aquatic plants.

B. Objectives:

- Learners will be able to discern ***Emergent/Free Floating/Submersed/Floating Leaf Aquatic plants.***
- Learners will determine the benefits/value of aquatic plants and life cycles.
- Learners will differentiate between native and invasive aquatic plants.

C. State Standards:

- SCI.SEP3.m – Planning and conducting investigations.
- 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.
- SCI.ESS3.C.m – Human activities have altered the hydrosphere, atmosphere, and lithosphere which in turn has altered the biosphere. Changes to the biosphere can have different impacts for different living things. Activities and technologies can be engineered to reduce people's impacts on Earth.

D. Setting/Area: Outdoor classroom.

- E. Materials/Resources:** Students divided into small groups of 3-5 or work individually
- Student lab manuals, writing utensil, and clipboard.
 - Resource texts: *Through the Looking Glass* and *Lake Plants You Should Know* for identification.
 - Buckets and rakes with ropes attached for sampling.
 - Trays to sort and examine samples.
 - Extra bucket to place identified plants.
 - Plastic bags to collect unidentified/suspicious plants.
 - Variety of backup samples displayed and identified.
 - Invasive species samples/display (optional).
 - Cameras.

F. Delivery:

Introduction of Lesson:

- **Review/discuss from indoor session aquatic green plants and their benefits.**
 1. Habitat, nesting, and spawning areas for animals.
 2. Absorb/hold phosphorous/nitrogen.
 3. Food for mammals, waterfowl, insects and fish.
 4. Roots stabilize sediments at shoreline.
 5. Oxygen for animals in littoral zone.
- Review aquatic plant types: Emergent/Free Floating/Submersed/Floating Leaf
- Review destructive nature of aquatic invasive species.
- Review invasive species targeted in our area: Eurasian Water-milfoil/Curly-leaf pondweed and their destructive nature: over-take native species.
- Review laws about transport of aquatic plants.

Outdoor Preparation: Students should wear warm clothing and rain gear in case of rain. Old tennis shoes or boots should be worn because their feet will probably get wet.

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

Small Group/Individual: Each small group launches their canoes and works with the module leaders to sample aquatic plants in the nearshore habitat. They return to the shore and retrieves an unknown plant and compares it to identification guides and the instructor's samples. Students will identify the aquatic plants, classify their types, and if they are native or invasive Successful identification will result in initials on their lab sheet.

G. Assessment:

- Have an informal class discussion (wrap-up) about the activity.
- Students tally their number of identified plants and score their lab sheets.

