AQUATIC PLANTS AND INVASIVE SPECIES INDOOR LAB
TEACHER'S GUIDE

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

Objectives:

- Discern emergent, free floating, submerged, floating leaf aquatic plants.
- Determine the benefits and value of aquatic plants and life cycles.
- Differentiate between native and invasive aquatic plants.

Note: Before beginning this lesson, make sure you have collected plant samples from all four different aquatic plant types for students to identify during the lab. Be sure to have enough samples for each of the classes that you are presenting to. Lay out the samples in trays with wet paper towels underneath the samples to keep them moist. When the samples are not being used, place wet towels on top to keep the samples hydrated.

A. Introduce the guests in the room and today's topic. Ask leading questions that connect to students' experiences – have you been swimming in a lake and noticed the plants along the shoreline? As an overview, talk about why aquatic plants are important for the overall health of the lake ecosystem (ask questions to engage students). If you have done other LEEP modules, it's important to make connections to those topics for a more comprehensive understanding.

B. Nearshore zone is where plants grow because the sun (for photosynthesis) can penetrate to the bottom of the lake floor. There are four main types of aquatic plants that are used to categorize plants and will be useful for using the identification books.

C. There is a PowerPoint presentation that is split as follows:

    1. Types of native plants and their benefits.
        a. Habitat for animals
        b. Spawning areas
        c. Absorb/hold phosphorus/nitrogen
        d. Food for mammals, waterfowl, insects, and fish
        e. Roots stabilize sediments at shoreline
        f. Cover of near shore animals (ducklings)
        g. Oxygen for animals in littoral zone
        h. Nesting areas for marsh birds, songbirds and waterfowl

2. Invasive aquatic plants and how they disrupt ecosystems.
    a. characteristics that lead to invasive species taking over – outcompete native species, no natural predators, adaptive, able to reproduce effectively at high rates (more offspring, start growth cycle earlier)
    b. consequences of invasive species
        i. reduced biodiversity
        ii. limits native species at all levels in the lake ecosystem by reducing food sources and habitat availability, disrupting the food web.
    c. examples of specific local invasive species and how they are harming lakes and rivers – e.g., curly-leaf pondweed can start growing in the fall when the native plants die back. They will continue to grow under the ice, giving them a head-start to outcompete native species in the spring.

D. A review with relevant questions to check for concept understanding and introducing strategies for how students and their families can prevent the spread of invasive species. First, discuss any state laws relevant to the transfer of invasive species. Then, share ideas to limit spread, such as cleaning boats, tackle, waders and other gear, dumping water from live wells, and not releasing or transferring bait to other lakes.

E. Hand out lab packets and identification books*. Introduce students to the pictures for identification of the common types of aquatic plants. Describe and show examples of aquatic plant types: Emergent/Free Floating/Submersed/Floating Leaf. Point to the samples on the table and how they can use the identification books.

F. Be sure to monitor the time and save about 1/3 of the lab time for invasive species plant identifications.

G. As students identify samples, they should write the name and type of AP in the lab packet and have an instructor verify and initial the correct answer. Ink stamps are a fun alternative to initials.

H. The directions for the invasive species lab should be succinctly introduced. Point out that students now need to record the destructive nature of the species and the consequences for other species. Provide examples that link destructive natures with specific consequences before they start.

I. Have students answer the critical thinking questions in the lab packet and have an informal class discussion (wrap-up) about the activity.
    - 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 regarding transport of aquatic plants

*Suggested identification books:

"Through the Looking Glass"

"Lake Plants You Should Know"