

## Water Lettuce - Attack of the Clones

## Teacher's Guide

**Subject:** Integrated Science (Life; Earth-Space; Physical)

**Topic:** Invasive Freshwater Aquatic Plant Reproduction

### Summary:

Students will use 1m<sup>2</sup> quadrats in shallow-water to determine strategies of reproduction in Water Lettuce, an invasive aquatic plant. Students will measure and record numbers of “parent” plants within the quadrats, counting the numbers of attached “daughters,” clones, as well as recording numbers of flowers, if present, in parents. Students will determine which strategy, sexual or asexual, is predominant in two different environments: an open, sunny floodplain marsh; and a relatively closed canopy, shady floodplain swamp.

**Objective(s):** After completing the field lab, students will be able to:

1. Understand the reproductive methods of water lettuce
2. Explain the affects that invasive plants have on the Ichetucknee River

**Ecosystem(s):** Freshwater Wetlands; Rivers/Springs

### Equipment:

- 1m<sup>2</sup> PVC-frame quadrats (4-6, as needed)
- PVC marking posts
- Clipboards and pencils
- Wading boots, hip waders
- GPS Units

### Background:

- **Vocabulary:** biological pollution, sexual and asexual reproduction, clones, emergent plants, invasive plants
- **Reference Material:** FIEPPC: [http://www.fleppc.org/FLEPPC\\_main.htm](http://www.fleppc.org/FLEPPC_main.htm);  
Invasive Plants UF-ifas: <http://plants.ifas.ufl.edu/invasive.html>  
Water lettuce UF-ifas: <http://plants.ifas.ufl.edu/lettuce2.html>
- **Equipment Training:** GPS Units

### Procedure (Engage; Explore; Explain)

1. As the newest recruit of the Florida Alien Resistance Team, your task is to assess why the AWL's (Alien Water Lettuce) from planet XYZ have invaded our beautiful Ichetucknee River. How have they been successful at reproducing in our river?
2. Students assemble at the ISSP Education Center and transport to the South Take-Out and the Powerline.
3. Display poster of invasive exotic aquatic plants. Ask students why such plants are thought of as “biological pollution,” and why many people try to eliminate these plants. Discuss Water Lettuce spread and removal on the Ichetucknee River. Show a sample plant and how to identify the flowering stalks in the center of the rosette. Do you think that water lettuce reproduces more sexually or asexually?
4. Divide students into two groups. One group will examine rafts of Water Lettuce growing in open sunlight in an artificial marsh environment created where utility lines cross the Ichetucknee River. The other group will examine rafts of Water Lettuce growing in a nearby, shaded floodplain swamp. Distribute equipment among the two groups.
5. The groups will select portions of the Water Lettuce rafts closest to the banks in the shallowest sections of the floodplain. Wading a short distance into the water, they will place 1-m<sup>2</sup> quadrats on the rafts so that Water Lettuce plants completely fill the quadrat frames. In order to prevent drifting of the frames in the water flow, PVC posts can be placed along the downstream sides of the frames to secure them in place.

6. Students will carefully lift one “parent” plant at a time from within their assigned quadrat frame (the parents are the largest individual plants). They will then count and record the number of smaller “daughter” plants, or clones, attached to and hanging off of each parent plant. Students will also record the absence or presence of flowers on each parent plant. If more than one flower is present on a parent (sometimes occurs), record the number in the appropriate column.
7. “Free-floaters” (large plants with no clones or small, single, immature plants) are counted and recorded in the appropriate column.
8. Counted parents and daughters are tossed outside the quadrat (up on the bank if it is close enough) until the quadrat is completely empty of Water Lettuce.
9. The groups will then switch and repeat the exercise in the second environment.

### **Sunshine State Standards:**

**Science:** SC.F.1.3.7; SC.F.2.3.1; SC.G.2.3.4

**Language Arts:** LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1

**Mathematics:** MA.A.3.3.3; MA.D.1.3.2; MA.E.1.3.1

**Social Studies:** SS.A.6.3.2,3,5; SS.B.2.3.9



## Water Lettuce: Attack of the Clones

## Assessment

1. Did you observe any animals using the rafts of water lettuce as habitat? What kinds of animals, and what were they doing? What would happen to these organisms if water lettuce was eradicated?

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2. Were there any other plants growing around or with the Water Lettuce? Any submerged plants (those completely underwater, like eelgrass)? What about emergent plants (plants rooted at the bottom but growing out of the water, like Spider Lilies)? If there were no other plants, what do you think happened to them?

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3. By comparing your data with that from the other group (above), which condition (open sun or shade) appears to favor reproduction by cloning? Which condition favors flowering?

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4. Based on what you learned today, what do you think would be the best strategy to get rid of the Water Lettuce? Would you start toward the middle of the river, where it's sunny? Or would you start along the banks, where it's shady? Why?

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