

Module 2 ~ A Fish Tale (LE/UE/MS)

Teacher Guide – Water hyacinth for sale?



INTRODUCTION: Water hyacinth is native to South America. It is a free-floating perennial plant that can grow to a height of 3 feet. Water hyacinth was introduced to Florida in 1884 for ornamental reasons; it has a large purple showy flower. The dark green leaf blades are circular to elliptical in shape attached to a spongy, inflated petiole. Underneath the water is a thick, heavily branched, dark fibrous root system. Water hyacinth is an invasive species. An invasive species is defined as non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Water hyacinth is a very aggressive invader and can form thick mats that float on the water's surface. If these mats cover the entire surface of the water they can cause oxygen depletions and fish kills. Water hyacinth plants can also halt boat traffic. Within 70 years of reaching Florida, the plant covered 126,000 acres of waterways.

Water hyacinth is found globally in the tropics and subtropics, but its spread is limited by severe cold. According to the U.S.G.S., water hyacinth has been reported in New York, Kentucky, Tennessee and Missouri "where plants escape summertime cultivation but do not persist through the winter...it is annually stocked in farm fish ponds in southern Arizona and southern Delaware," but has not become established in the natural systems of these states. Water hyacinth continues to be sold through aquarium supply dealers and over the internet.

ESSENTIAL QUESTION:

- Do you think water hyacinth should be allowed to be sold in any state? Why or why not?

SUBJECTS: Biology, life science, ecology, environmental science

GRADE LEVEL: 3rd-8th grade

TIME ESTIMATES: 25 minutes for video, 50 minutes for lesson

VOCABULARY: aggressive, depletion, elliptical, fibrous, floating-leaved, invasive, naturalized, perennial,

LESSON SUMMARY: The class starts by viewing a presentation introducing the concept of invasive plants. Students then split into groups and take turns rotating through 4 activity stations to further explore the topic, focusing on the invasive plant water hyacinth. After the groups have completed all 4 stations the class re-groups and discusses what they have learned. As an extension, students then can independently complete an essay addressing the essential question.

LEARNING OBJECTIVES:

Students should:

- Become familiar with the problems and impacts associated with water hyacinth.
- Recognize the distribution of water hyacinth and the potential for its spread as an invasive exotic.
- Differentiate water hyacinth from other floating-leaved aquatic plants.
- Discuss whether or not water hyacinth should be allowed to be sold commercially.



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MATERIALS:

Note: All materials are available to download from plants.ifas.ufl.edu/education. Contact us at caip-education@ufl.edu with any questions.

1. Computer and projector (to show video presentation)
2. Access to presentation *Silent Invaders*
3. Station numbers (2 pages): Print and cut along dotted line, then fold on solid line to create markers for each station.
4. Station fact sheets (4 pages): Print and place at each station
5. Station questions (4 pages): Print and place at each station. Students are to write their responses on their own sheet of paper.

The fact sheets provided in this lesson is excerpted from:

- UF/IFAS Extension Publication: *Waterhyacinth: Florida's Worst Floating Weed*
<http://edis.ifas.ufl.edu/ag385>

ADVANCE PREPARATION:

Set up four work stations for students. Each of the four stations should have a station number, a station fact sheet and corresponding questions for students to answer, as follows:

- **Station 1:** What are some of the problems caused by water hyacinth in Florida and the United States? Why does it thrive so well in Florida?
- **Station 2:** Where is water hyacinth found in the US? What are some ways you think water hyacinth travels and spreads?
- **Station 3:** Draw a water hyacinth and label the various parts of the plant.
- **Station 4:** Why is this company allowed to sell this invasive plant? Do you think this should be allowed? Why or why not?

PROCEDURE:

1. As a class, view the presentation *Silent Invaders* (25 minutes)
2. Divide the students into four groups and assign each a station to begin.
3. At each station, students read the fact sheet and discuss the question as a group. Have them each write the answer to the question on their own sheet of paper. After 10 minutes have the students rotate stations. (40 minutes)
4. After the groups have completed all 4 stations, re-group and as a class discuss what they learned. (10 minutes)
5. Students' 'exit ticket' out the door should be to answer the essential question: Do you think water hyacinth should be allowed to be sold in any state? Why or why not?

ASSESSMENT: Student performance in group discussion, written responses to station activities and essential question.



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EXTENSION: Have students respond to the essential question in the form of a newspaper editorial. This can alternatively be assigned as homework.

Pretend you are a newspaper journalist and have to write an editorial for the local paper on whether or not water hyacinth should be allowed to be sold in any state. Include facts and ideas that you had from each station to write up your report. REMEMBER you may include your own thoughts and ideas. Refer back to stations for help if needed.

BACKGROUND INFORMATION:

For additional background information:

- UF/IFAS Center for Aquatic and Invasive Plants (CAIP) Plant Profile Page <http://plants.ifas.ufl.edu/plant-directory/eichhornia-crassipes/>
- Florida Fish and Wildlife Conservation Commission (FWC) Weed Alert <http://myfwc.com/wildlifehabitats/invasive-plants/weed-alerts/water-hyacinth/>

LIST OF STANDARDS

The following is a list of suggested standards that pertain to this activity. This list is provided as a reference to incorporate and expand upon as needed.

Next Generation Sunshine State Standards

7th Grade

SC.7.L.17.3: Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.

9th – 12th Grades

SC.912.L.17.8: Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.

Common Core State Standards

6th Grade

Common Core Code	FL Common Core Code	Common Core Standard
CCSS.ELA-Literacy.RI.6.1	LAFS.6.RI.1.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-Literacy.RI.6.4	LAFS.6.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
CCSS.ELA-Literacy.L.6.4	LAFS.6.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibility from a range of strategies.
CCSS.ELA-Literacy.RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and the topics.



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7th Grade

CCSS.ELA-Literacy.RI.7.1	LAFS.7.RI.1.1	Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text
CCSS.ELA-Literacy.RI.7.4	LAFS.7.RI.2.4	Determine the meaning of words and phrases as they were used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
CCSS.ELA-Literacy.L.7.4	LAFS.7.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-Literacy.RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

8th Grade

CCSS.ELA-Literacy.RI.8.1	LAFS.8.RI.1.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-Literacy.RI.8.4	LAFS.8.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
CCSS.ELA-Literacy.SL.8.1	LAFS.8.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
CCSS.ELA-Literacy.L.8.4	LAFS.8.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-Literacy.L.8.6	LAFS.8.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
CCSS.ELA-Literacy.RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
CCSS.ELA-Literacy.WHST.6-8.9	LAFS.68.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

