

Module 2 ~ A Fish Tale (MS/HS)

Teacher Guide – What’s the deal with these applesnails?



INTRODUCTION: There are five species of applesnail (genus *Pomacea*) present in Florida. One species of applesnail is native to Florida: *P. Paludosa*. Four species of non-native applesnails have been observed in Florida. Of these, in order of the number of recorded observations (from most-observed to least), they are:

- P. Insularum* (Island applesnail)
- P. Canaliculata* (Channeled applesnail)
- P. Diffusa* (Spike-topped applesnail)
- P. Haustrum* (Titan applesnail)

P. Insularum 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. The other three non-native applesnail species are not currently causing injury, however, they are potential threats to Florida’s aquatic ecosystems. For example, the channeled applesnail (*P. Canaliculata*) has caused significant damage to rice and taro crops in southeastern Asia.

ESSENTIAL QUESTION:

- Do we need to control the spread of non-native applesnails? Why or why not?

SUBJECTS: Biology, life science, ecology, environmental science

GRADE LEVEL: 6th-12th grade

TIME ESTIMATES: 45-60 minutes

VOCABULARY: endangered, exclusive, extinction, fauna, fecund (fecundity), flora, habitat, hybridization, invasive, littoral zone, native, non-native, omnivorous, parasites

LESSON SUMMARY: The class will read an article on invasive applesnails from *Aquatics* magazine. Four stations will be set up with additional information on non-native and invasive applesnails. Students will break into groups to visit each station, read the information provided and answer discussion questions. The class will then re-group and discuss the essential question: Do we need to control the spread of non-native applesnails? Why or why not?

LEARNING OBJECTIVES:

Students will be able to:

- Explain how to identify the five types of applesnails discussed in this lesson by the unique characteristics of their corresponding shells and eggs.
- Discuss ways invasive applesnails can be disruptive to native species.
- Describe how invasive applesnails affect the ecological balance of aquatic environments.

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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. One copy per student of The Lake Okeechobee Apple Snail Monitoring Program, *Aquatics Magazine*, Summer 2014
2. Station Numbers (2 pages): Print and cut along dotted line, then fold on solid line to create markers for each station.
3. Station Fact Sheets (5 pages): Print in color and laminate if possible. Place the numbered fact sheets at the corresponding station.
4. Station Discussion Questions (4 pages): Print and place at each station. Students are to write their answers on their own notebook paper.

The fact sheets provided in this lesson were excerpted from:

- The Florida Fish and Wildlife Conservation Commission (FWC):
http://myfwc.com/media/673720/FWC_applesnails_FLMS_handout.pdf
- United States Geological Survey (USGS), Nonindigenous Aquatic Species
<http://nas.er.usgs.gov/default.aspx>

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:** How could the invasive applesnail affect aquatic ecosystems in the United States?
- **Station 2:** If there is no chemical (pesticide) to control the invasive snail what else could be used? Why?
- **Station 3:** Which species of applesnail may have a competitive biological advantage? What is their advantage?
- **Station 4:** Look at the applesnail distribution maps. Draw a map that you think shows the snails' distribution in 5 years' time. Do you think the snails will have left Florida?

PROCEDURE:

1. Together as a class or individually have students read the applesnail article. Present the essential question for them to think about as they read and complete the activity. (10-15 minutes)
2. Divide students into four groups and assign them a station to begin at.
3. Instruct groups to visit each work station for 5-7 minutes, where they will review the fact sheets as a group and answer the discussion questions. Each student should write their answers on their own paper. (20-30 minutes)
4. After the groups have had the opportunity to participate at each station, reconvene as a class and discuss the essential question. Continue discussion by soliciting answers to the questions from each station. (15 min)



Florida Invasive Plant Education Initiative • <http://plants.ifas.ufl.edu/education>
A Collaboration of the UF/IFAS Center for Aquatic and Invasive Plants
and the Florida Fish and Wildlife Conservation Commission / Invasive Plant Management Section

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

EXTENSION:

- If there is time left in class, have students write an answer to the essential question based on their new understanding. “Do we need to control the spread of non-native applesnails? Why or why not?” Make sure they cite information they learned during the activity. This could also be assigned as homework or as a review activity.

BACKGROUND INFORMATION:

For additional background information:

- UF/IFAS Entomology and Nematology Department, Featured Creature: *Pomacea* Spp.
http://entnemdept.ufl.edu/creatures/misc/gastro/apple_snails.htm
- US Federal Aquatic Nuisance Species (ANS) Task Force
<http://www.anstaskforce.gov/spoc/applesnail.php>

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.

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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.

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.

9th – 10th Grade

CCSS.ELA-Literacy.RI.9-10.1	LAFS.910.RI.1.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
CCSS.ELA-Literacy.RI.9-10.4	LAFS.910.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 cumulative impact of specific word choices on meaning and tone (e.g. how the language of a court opinion differs from that of a newspaper).
CCSS.ELA-Literacy.SL.9-10.1	LAFS.910.SL.1.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 9-10 topics, texts and issues, building on others’ ideas and expressing their own clearly and persuasively.

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CCSS.ELA-Literacy.L.9-10.4	LAFS.910.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grades 9-10 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-Literacy.RST.9-10.4	LAFS.910.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 9-10 texts and topics.
CCSS.ELA-Literacy.WHST.9-10.9	LAFS.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

11th – 12th Grade

CCSS.ELA-Literacy.RI.11-12.1	LAFS.1112.RI.1.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
CCSS.ELA-Literacy.RI.11-12.4	LAFS.1112.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g. how Madison defines faction in Federalist No. 10)
CCSS.ELA-Literacy.SL.11-12.1	LAFS.1112.SL.1.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-Literacy.L.11-12.4	LAFS.1112.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11-12 reading and content, choosing flexibly from a range of strategies.
CCSS.ELA-Literacy.L.11-12.6	LAFS.1112.L.3.6.	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension of expression.
CCSS.ELA-Literacy.RST.11-12.4	LAFS.1112.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 11-12 texts and topics.
CCSS.ELA-Literacy.W.11-12.9	LAFS.1112.WHST.3.9	Draw evidence from informational text to support analysis, reflection, and research.

