Teacher Guide – Freshwater Careers Game

To accompany *Careers in Florida's Freshwater Environments* Presentation: http://plants.ifas.ufl.edu/education
Created by Tom Tidyman / UF SPICE Program (1/2009)

INTRODUCTION: Florida has more than 7800 lakes, nearly 1700 miles of rivers and countless marshes. Along with providing wonderful environments to be enjoyed by residents and visitors, these freshwater resources are managed by people with a variety of skills and training. Working with Florida's invasive aquatic plants is just one type of job related to freshwater environments. There are many to be considered and some of them are surprising. For example, did you know there are fish veterinarians?

ESSENTIAL QUESTIONS: (1) What careers are available in the field of aquatic plant and resource management? (2) What skills and/or education are required to gain employment in these careers?

SUBJECT: Science (Biology, Physical Science, Life Science); Social Studies (Geography); Language Arts (writing); Art (photography, graphic design, video)

GRADE LEVEL: 4-12

CONCEPTS: natural resource management, fish culture, botany, chemistry, ecology, entomology, fisheries, engineering, computer science, information systems, public relations - See the suggested state standards at the end of this document.

OVERALL TIME ESTIMATE: Two 45- minute class periods

LEARNING STYLES: Visual, auditory, and kinesthetic

VOCABULARY: aquaculture **(**aquatic plant nurseries)**,** aquatic plant managers**,** biological illustrators**,** biologists**,** botanists**,** chemists**,** computer specialists, ecologists**,** entomologists (mosquito control)**,** extension agents, fisheries biologists**,** graphic artists**,** information specialists**,** laboratory technicians**,** law enforcement**,** librarians**,** map makers**,** park rangers**,** photographers**,** pilots**,** planners**,** public relations specialists**,** recreation**,** regulators**,** restoration**,** teachers**,** tour guides/fishing guides**,** toxicologists**,** veterinarians**,** video producers**,** wastewater treatment engineers and technicians**,** wildlife ecologists**,** writers

LESSON SUMMARY: This activity accompanies the *Careers in Florida's Freshwater Environments* DVD (UF/IFAS DVD#1236) and is designed to encourage students to consider possible careers that help protect and manage Florida's lakes, rivers, marshes and wetlands. Students are given (or choose) one career to research and then each student will, without speaking to the class, draw their career on the board for the class to guess, followed by discussion. (Optional: they may pantomime it.) This lesson was created to further reinforce *A Fish Tale*, an audio-visual presentation produced by the UF/IFAS Invasive Plant Education Initiative.

STUDENT LEARNING OBJECTIVES: Students should become familiar with the wide variety of jobs associated with protecting Florida's freshwater environments—there are far more careers available than just laboratory researchers or technicians. Students should be able to note the differences in various work environment, job goals, skill set, education level and training required for these potential careers.

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MATERIALS:

- *Careers in Florida's Freshwater Environments* (viewing time = 26 minutes)
  (UF/ IFAS DVD #1236)
  Available for free to teachers by contacting:
  UF/IFAS Center for Aquatic and Invasive Plants
  7922 NW 71st Street, Gainesville FL 32653
  caip-education@ufl.edu

- **Vocabulary – Careers in Florida's Freshwater Environments –** contains terms, definitions, and explanations for 34 careers associated with freshwater environments (available here: plants.ifas.ufl.edu/education)

- Chalkboard, smart board, or dry erase board and writing utensils

- Freshwater career cut-outs (see pages 4-6 of teacher guide)

BACKGROUND INFORMATION: This lesson/activity is designed to be presented as part of the Florida Invasive Plant Education Initiative Curriculum (UF/IFAS Center for Aquatic and Invasive Plants), however it can also be a stand-alone activity. However, students will be much more receptive to some of the vocabulary and aquatic management terms in the video if they are exposed to the previous lessons found in any of the modules found here: http://plants.ifas.ufl.edu/education.

ADVANCE PREPARATION:
  o Preview *Careers* DVD and *A Fish Tale* presentation found here**:** http://plants.ifas.ufl.edu/education
  o Clip out career "cards" (i.e., with careers featured in the DVD). See pages 4-6 of this teacher's guide. Another option: print vocabulary-definition sheet and clip out the careers/explanations.

PROCEDURE AND DISCUSSION QUESTIONS WITH TIME ESTIMATES:

Day 1: After students watch the *Careers in Florida's Freshwater Environments* DVD (26 minutes), discuss how many different types of jobs are beneficial to the management of Florida's freshwater environments. Possible discussion questions may include:

- What jobs did you NOT expect to see?
- What careers did you not fully understand?
- Which careers require the most education? The least?
- Which career did you think would be most exciting, fun, or boring? Why?
- Which careers involved working outdoors most of the time?
- Did you see a career you might be interested in?

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PROCEDURE AND DISCUSSION QUESTIONS WITH TIME ESTIMATES (continued):

Day 2 (or during the last half of the class): Students receive or choose a career printed on a card and are given time to read about their career and/or research it quickly. (See the cut-out sheets available with this lesson). Students are then asked to come to the front of the class and draw/sketch their career on the chalkboard/smartboard, without using words. (Optional: they may choose to pantomime their career.) The rest of the class tries to guess which career they are illustrating. Depending on classroom dynamics, the class could be divided into teams, with a scoring system developed for those who are able to guess with the fewest tries, etc. With more advanced students, set a time limit for drawing and/or guessing. After the class guesses the career or admits to being stumped, the student who illustrated their career explains what their job is and what it might involve.

ALTERNATIVE PROCEDURES: For a unique twist (should more class time be available), ask students to make props from classroom materials, and act out their given career in a game of charades. This activity could be even more interactive and fun for students, and may be completed with students in groups of two or three depending on classroom dynamics. The main goal is to get students thinking and assessing what they learned from the video in a fun way.

ASSESSMENT SUGGESTIONS:
* Students write a short essay about their favorite career and accompany it with a drawing or photographic image.
* Quiz students on the various careers covered in the DVD presentation.

RESOURCES/REFERENCES: Additional information, related to the video can be found at:

* Florida Invasive Plant Education Curriculum: http://plants.ifas.ufl.edu/education/
* Why manage invasive plants? http://plants.ifas.ufl.edu/manage/why-manage-plants/introduction
* Plant Managers at Work: http://plants.ifas.ufl.edu/manage/research-and-outreach/plant-managers
* Florida Aquatic Plant Management Society: http://www.fapms.org/
* Wildlife Management in Florida: http://myfwc.com/about/overview/programs/

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Career Cutouts

aquaculture ~ aquatic plant nurseries	**chemist**
aquatic plant manager	**computer specialist**
biological illustrator	**ecologist**
biologist	**entomologist**
botanist	**extension agent**

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fisheries biologist	**librarian**
fishing guide	**map maker**
graphic artist	**mosquito control**
information specialist	**park ranger**
laboratory technician	**photographer**
law enforcement	**pilot**

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planner	**teacher**
public relations specialist	**tour guide**
recreation	**toxicologist**
regulator	**veterinarian**
restoration	**video producer**

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wastewater treatment engineer (and/or) technician

wildlife ecologist

writer

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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.

Common Core State Standards

4th Grade

Common Core Code	FL Common Core Code	Common Core Standard
RF.4.3	LAFS.4.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding words.
RF.4.3a	LAFS.4.RF.3.3a	Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
RF.4.4	LAFS.4.RF.4.4	Read with sufficient accuracy and fluency to support comprehension.
W.4.9b	LAFS.4.W.3.9b	Apply grade 4 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").
SL.4.1c	LAFS.4.SL.1.1c	Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
SL.4.2	LAFS.4.SL.1.2	Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
SL.4.3	LAFS.4.SL.1.3	Identify the reasons and evidence a speaker provides to support particular points.
L.4.3	LAFS.4.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.4.3a	LAFS.4.L.2.3a	Choose words and phrases to convey ideas precisely.
L.4.4	LAFS.4.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
L.4.4a	LAFS.4.L.3.4a	Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.

5th Grade

RI.5.4	LAFS.5.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
RF.5.3	LAFS.5.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding words.
RF.5.3a	LAFS.5.RF.3.3a	Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
W.5.2d	LAFS.5.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
SL.5.1	LAFS.5.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
SL.5.1c	LAFS.5.SL.1.1c	Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.
SL.5.2	LAFS.5.SL.1.2	Summarize written a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
L.5.3	LAFS.5.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.5.4	LAFS.5.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

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6th Grade

W.6.2d	LAFS.6.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.6.9	LAFS.6.W.3.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.6.1	LAFS.6.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.1c	LAFS.6.SL.1.1c	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
SL.6.2	LAFS.6.SL.1.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
L.6.3	LAFS.6.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
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 flexibly from a range of strategies.
L.6.4a	LAFS.6.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.6.4b	LAFS.6.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).
L.6.6	LAFS.6.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.

7th Grade

SL.7.1c	LAFS.7.SL.1.1c	Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.
SL.7.2	LAFS.7.SL.1.2	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
SL.7.6	LAFS.7.SL.2.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
L.7.3	LAFS.7.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
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.
L.7.4a	LAFS.7.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.7.4b	LAFS.7.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., belligerent, bellicose, rebel).
L.7.6	LAFS.7.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.

8th Grade

W.8.2d	LAFS.8.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
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.
SL.8.1a	LAFS.8.SL.1.1a	Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

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SL.8.1c	LAFS.8.SL.1.1c	Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
SL.8.2	LAFS.8.SL.1.2	Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
SL.8.5	LAFS.8.SL.2.5	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
SL.8.6	LAFS.8.SL.2.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
L.8.3	LAFS.8.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.8.4a	LAFS.8.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.8.4b	LAFS.8.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
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.
WHST.6-8.2d	LAFS.68.WHST.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.

9th – 10th Grade

SL.9-10.1c	LAFS.910.SL.1.1c	Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
SL.9-10.2	LAFS.910.SL.1.2	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
SL.9-10.6	LAFS.910.SL.2.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
L.9-10.4	LAFS.910.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.
L.9-10.4a	LAFS.910.L.3.4a	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.9-10.4c	LAFS.910.L.3.4c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, part of speech, or its etymology.
L.9-10.6	LAFS.910.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 or expression
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.
RST.9-10.7	LAFS.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

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11th – 12th grade

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.
SL.11-12.1c	LAFS.1112.SL.1.1c	Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
SL.11-12.4	LAFS.1112.SL.2.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks.
SL.11-12.6	LAFS.1112.SL.2.6	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate.
L.11-12.4a	LAFS.1112.L.3.4a	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.11-12.4b	LAFS.1112.L.3.4b	Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).
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 or expression.
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.
RST.11-12.7	LAFS.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.