

# Module 1 ~ Silent Invaders (UE/MS/HS)

## Teacher Guide – Freshwater Plant Concept Map Activity



**ESSENTIAL QUESTION:** If you were asked to “map” the main concepts and ideas from the *Silent Invaders* presentation, how would you do it? What would it look like? How could this activity be useful to you?

**SUBJECT:** Botany, Biology, Environmental Science, Life Science, Integrated Science

**GRADE LEVEL:** ALL grade levels – See suggested state standards at the end of this document.

**CONCEPTS:** A **concept map** is a diagram showing relationships among concepts and/or main ideas. They are graphic tools for organizing and representing knowledge. These diagrams include brief blocks of text that describe the concepts and/or ideas; the text is usually enclosed in circles or boxes of some type; relationships between concepts are indicated with connecting lines (linking the various boxes/circles, etc.). This technique for visualizing relationships and mapping them out in a diagram is called **concept mapping**.

**TIME ESTIMATE:** 60 minutes total

**LEARNING STYLES:** visual, auditory, kinesthetic

**VOCABULARY:** Refer to the teacher guide for *Silent Invaders* presentation.

**LESSON SUMMARY:** This activity includes watching a presentation that explains the meaning of terrestrial plants and aquatic plants and the difference between native, non-native and invasive plants. After watching the presentation, students are challenged to summarize what they’ve learned by creating/drawing/building concept maps.

**STUDENT LEARNING OBJECTIVES:** Students will be able to:

- Identify key points from a reading passage and/or audiovisual presentation
- Sketch key ideas from a presentation and/or text to illustrate the connections between concepts presented in the material.
- Explain the relationships between the main concepts of a lesson/presentation/text.

**MATERIALS:**

- Paper and pencil (Legal size paper or 11” x 17” paper works best)
- Post-it notes or index cards. (*Note: Using small Post-it notes encourages students to think in terms of key words or phrases. Also, they work well for concept maps because they can be moved easily as students look for patterns.*)
- A white board or overhead projector would be handy to illustrate how to do a concept map.

**ADVANCE PREPARATION:** Prepare classroom computer connection for projection (i.e., online viewing) of *Silent Invaders* presentation: <http://plants.ifas.ufl.edu/education> *Note: Or obtain DVD disk with *Silent Invaders* presentation as PowerPoint™ show, available by contacting the UF/IFAS Center for Aquatic and Invasive Plants: [caip-education@ufl.edu](mailto:caip-education@ufl.edu)*



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### PROCEDURE AND DISCUSSION QUESTIONS WITH TIME ESTIMATES:

1. Watch the *Silent Invaders* presentation. (Estimated time: 25 minutes with 10 minutes of discussion).
2. Discuss the idea of using a map to organize key concepts from the presentation (or other lessons/reading materials, etc). Practice creating a concept map with the class. Estimated time: 10 minutes.
3. Ask students to write the ideas/concepts they remember from the presentation on Post-it notes (or index cards). Each idea/concept should be written individually on each note/card.
4. Ask students to arrange their notes with key concepts down the side of their paper, with the most general ideas at the top of the page and the most specific details at the bottom. (*Note: This process works differently depending on learning style, etc; some students will have a range of general concepts to specific details. Others will find they have mostly general ideas/concepts on their notes.*)
5. Ask students to rearrange their notes, if necessary, grouping the ideas/concepts in a way that makes sense to them. **Refer to sample sheet.** (*At this point, you may ask students to share with the rest of the class. Students will discover that each map is quite different. This helps emphasize the point that there isn't a right or wrong way to build a concept map because each student is constructing his or her own meaning from the process. In addition, individual student understanding of the relationships between concepts will change as the maps change.*)
6. Draw lines between the Post-it notes to show how the ideas/concepts on the Post-it notes are related. Write connecting sentences on the lines that explain the relationships between the ideas/concepts on the Post-it notes. These connections create meaning.
7. Have students share concept maps with each other. Discuss how this process could be used to help writers organize information, map out essays, or plan for a presentation.

**ASSESSMENT SUGGESTIONS:** The activity itself is used as an assessment for comprehension of various learning materials. However, you could follow up the activity with the following questions, to be turned in with the concept map:

- What surprised you the most about the process of completing your concept map?
- How could you use this process to help you in your other classes?
- Why do you think each student's map is different?

**EXTENSIONS:** Practice this activity with other materials you are covering.

### LITERATURE:

- Novak, Joseph D and D. Bob Gowen. *Learning How to Learn*. Cambridge University Press. 1984
- Ditson, Leslie A., Kessler, Anderson-Inma and Mafit. *Concept-Mapping Companion, 2nd Edition*. ISTE. 2001
- Margulies, Nancy and Maal Nusa. *Mapping Inner Space: Learning and Teaching Visual Mapping*. Zephyr Press. 2002



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### RESOURCES/REFERENCES:

- Native aquatic and wetland plants in Florida: <http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida>
- Non-native and invasive aquatic plants: <http://plants.ifas.ufl.edu/manage/why-manage-plants/non-native-invasive-plants-an-introduction>
- Emerged plants: [http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Emersed Plants](http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Emerged%20Plants)
- Free-floating and floating-leaved plants: [http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Free Floating and Floating Leaved Plants](http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Free%20Floating%20and%20Floating%20Leaved%20Plants)
- Submersed plants: [http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Submersed Plants](http://plants.ifas.ufl.edu/manage/why-manage-plants/aquatic-and-wetland-plants-in-florida#Submersed%20Plants)

### BACKGROUND INFORMATION:

From [http://en.wikipedia.org/wiki/Concept\\_map](http://en.wikipedia.org/wiki/Concept_map):

A concept map is a way of representing relations between ideas, images or words, in the same way that a sentence diagram represents the grammar of a sentence, a road map represents the locations of highways and towns, and a circuit diagram represents the workings of an electrical appliance. In a concept map, each word or phrase is connected to another and linked back to the original idea, word or phrase. Concept maps are a way to develop logical thinking and study skills, by revealing connections and helping students see how individual ideas form a larger whole.

Concept mapping can be contrasted with the similar idea of mind mapping, which is often restricted to radial hierarchies and tree-like mapping structures. Another contrast between Concept mapping and Mind mapping is the speed and spontaneity when a Mind map is created. A Mind map reflects what you think about a single topic, which can focus group brainstorming. A Concept map can be a map, a system view, of a real (abstract) system or set of concepts. Concept maps are more free form, as multiple hubs and clusters can be created, unlike mindmaps which fix on a single conceptual center.

**History:** The technique of concept mapping was developed by Joseph D. Novak and his research team at Cornell University in the 1970s as a means of representing the emerging science knowledge of students. It has subsequently been used as a tool to increase meaningful learning in the sciences and other subjects as well as to represent the expert knowledge of individuals and teams in education, government and business. Concept maps have their origin in the learning movement called constructivism. In particular, constructivists hold that learners actively construct knowledge.

Novak's work is based on the cognitive theories of David Ausubel (assimilation theory), who stressed the importance of prior knowledge in being able to learn new concepts: "The most important single factor influencing learning is what the learner already knows. Ascertain this and teach accordingly." Novak taught students as young as six years old to make concept maps to represent their response to focus questions such as "What is water?" "What causes the seasons?" In his book *Learning How to Learn*, Novak states that "meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures."

**For more information, see:** The Theory Underlying Concept Maps and How to Construct and Use Them (Joseph D. Novak & Alberto J. Cañas). Florida Institute for Human and Machine Cognition; Pensacola FL, 32502 [www.ihmc.us](http://www.ihmc.us). <http://cmap.ihmc.us/Publications/ResearchPapers/TheoryCmaps/TheoryUnderlyingConceptMaps.htm>



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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**

**4<sup>th</sup> Grade**

Common Core Code	FL Common Core Code	Common Core Standard
RI.4.1	LAFS.4.RI.1.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.5	LAFS.4.RI.2.5	Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.
RI.4.7	LAFS.4.RI.3.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
SL.4.1	LAFS.4.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
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.4.1d	LAFS.4.SL.1.1d	Review key ideas expressed and explain their own ideas and understanding in light of discussion.
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.
L.4.3	LAFS.4.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.4.6	LAFS.4.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

**5<sup>th</sup> Grade**

RI.5.1	LAFS.5.RI.1.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
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.5.1d	LAFS.5.SL.1.1d	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
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.5.6	LAFS.5.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**6<sup>th</sup> Grade**

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.
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.6.1d	LAFS.6.SL.1.1d	Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
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.



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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.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
WHST.6-8.2a	LAFS.68.WHST.1.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
WHST.6-8.2b	LAFS.68.WHST.1.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

7<sup>th</sup> Grade

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.
SL.7.1	LAFS.7.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
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.
L.7.3	LAFS.7.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
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.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
WHST.6-8.2a	LAFS.68.WHST.1.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
WHST.6-8.2b	LAFS.68.WHST.1.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

8<sup>th</sup> Grade

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.
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.8.1c	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.8.1d	LAFS.8.SL.1.1d	Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
L.8.3	LAFS.8.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
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.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
WHST.6-8.2a	LAFS.68.WHST.1.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
WHST.6-8.2b	LAFS.68.WHST.1.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

9<sup>th</sup> – 10<sup>th</sup> Grade

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.
RI.9-10.3	LAFS.910.RI.1.3	Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.



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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 grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
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.9-10.1	LAFS.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
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.
WHST.9-10.2a	LAFS.910.WHST.1.2a	Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
WHST.9-10.2b	LAFS.910.WHST.1.2b	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.

**11<sup>th</sup> – 12<sup>th</sup> Grade**

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.
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.
RST.11-12.2	LAFS.1112.RST.1.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
WHST.11-12.2a	LAFS.1112.WHST.1.2a	Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
WHST.11-12.2b	LAFS.1112.WHST.1.2b	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.



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