

## Module 2 ~ A Fish Tale

### Concept Map Activity (MS/HS) -- Teacher Guide



#### QUESTION:

- 1) If asked to “map” the main concepts and ideas from the **A Fish Tale** presentation, how would you do it?
- 2) What would it look like?
- 3) How could this activity be useful to you?

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

**GRADE LEVEL:** ALL grade levels

**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 Module Guide for **A Fish Tale** presentation.

**LESSON SUMMARY:** This activity includes watching a presentation about how Florida’s aquatic plants help to maintain water quality by providing oxygen and habitat for fish and wildlife populations. However, Florida has also been experiencing growing problems from a number of non-native invasive plants that are having an adverse effect on native plant communities and wildlife. Becca the bass narrates this refreshing lesson about Florida’s freshwater environments, a place where the oxygen content is constantly changing, 24 hours a day, seven days a week. Students will learn how non-native plants are making things more difficult for all of the life in our freshwater habitats, especially the fish and other organisms that rely on dissolved oxygen for survival. After watching the presentation, students will be challenged to summarize what they’ve learned by creating/drawing/building concept maps. Students may work together in small groups or individually.

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

- Take a reading passage and/or presentation and pick out key points that are important.
- “Map” key ideas from a presentation, text (or other material) as a way of “connecting” the concepts presented in the material.
- Make use of this visual technique to explore 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 “key 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 computer connection for projection (i.e., online viewing) of **A Fish Tale** presentation: <http://plants.ifas.ufl.edu/education> . *Note: Or obtain DVD disk with **A Fish Tale** 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 **A Fish Tale** presentation. (Estimated time: 20 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. Share your concept map with your classmates. Discuss how this process could be used to help writers organize information, map out essays, plan for a presentation they might give themselves.

**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 each of these Modules or 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:

- Oxygen in freshwater habitats: <http://plants.ifas.ufl.edu/guide/oxygen.html>
- Aquatic plants and photosynthesis: <http://plants.ifas.ufl.edu/guide/photosynthesis.html>
- Native aquatic and wetland plants in Florida: <http://plants.ifas.ufl.edu/guide/natplant.html#nataquatic>
- Non-native and invasive aquatic plants: <http://plants.ifas.ufl.edu/guide/invplant.html#invaquat>
- Florida LAKEWATCH Information Circular 109: [http://plants.ifas.ufl.edu/guide/circ\\_109.pdf](http://plants.ifas.ufl.edu/guide/circ_109.pdf)
- Dissolved Oxygen for Fish Production: <http://edis.ifas.ufl.edu/FA002>

### 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://cmap.ihmc.us/Publications/ResearchPapers/TheoryCmaps/TheoryUnderlyingConceptMaps.htm>



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### Sunshine State Standards

Note: Standards *italics* are touched on briefly and can be fully developed by the teacher.

#### 4<sup>th</sup> Grade

LA.4.1.5.1: TSW demonstrate the ability to read grade level text.

LA.4.1.6.1: TSW use vocabulary that is introduced and taught directly.

LA.4.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.

LA.4.1.7.3: TSW determine explicit ideas and information in grade-level text, including but not limited to main idea, relevant supporting details, implied message, inferences, chronological order of events, summarizing, and paraphrasing.

LA.4.2.2.2: TSW use information from the text to answer questions related to explicitly stated main ideas or relevant details.

LA.4.2.2.3: TSW organize information to show an understanding of main ideas within a text through charting, mapping, or summarizing

*LA.4.3.1.1: TSW prewrite by generating ideas from multiple sources (e.g., text, brainstorming, graphic organizer, drawing, writers notebook, group discussion) based upon teacher-directed topics and personal interests.*

*LA.4.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, recipes, instructions, graphs/tables, experiments, rubrics, how-to manuals).*

LA.4.5.2.2: TSW plan, organize, and give an oral presentation and use appropriate voice, eye, and body movements for the topic, audience, and occasion.

#### 5<sup>th</sup> Grade

LA.5.1.5.1: TSW demonstrate the ability to read grade level text.

LA.5.1.6.1: TSW use vocabulary that is introduced and taught directly.

LA.5.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.

LA.5.1.7.3: TSW determine the main idea or essential message in grade-level text through inferring, paraphrasing, summarizing, and identifying relevant details.

LA.5.2.2.2: TSW use information from the text to answer questions related to explicitly stated main ideas or relevant details.

LA.5.2.2.3: TSW organize information to show understanding (e.g., representing main ideas within text through charting, mapping, paraphrasing, or summarizing).

*LA.5.3.1.1: TSW generating ideas from multiple sources (e.g., text, brainstorming, graphic organizer, drawing, writer's notebook, group discussion, printed material) based upon teacher-directed topics and personal interests.*

*LA.5.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to manuals, assembly instructions).*

LA.5.5.2.2: TSW make formal oral presentations for a variety of purposes and occasions, demonstrating appropriate language choices, body language, eye contact and the use of gestures, the use of supporting graphics (charts, illustrations, images, props), and available technologies.

#### 6<sup>th</sup> Grade

LA.6.1.6.1: TSW use vocabulary that is introduced and taught directly.

LA.6.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.

LA.6.1.7.3: TSW determine the main idea or essential message in grade-level text through inferring, paraphrasing, summarizing, and identifying relevant details.

LA.6.2.2.2: TSW use information from the text to answer questions related to the main idea or relevant details, maintaining chronological or logical order.

LA.6.2.2.3: TSW organize information to show understanding (e.g., representing main ideas within text through charting, mapping, paraphrasing, summarizing, or comparing/contrasting).

*LA.6.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to manuals, assembly instructions).*

LA.6.5.2.1: TSW listen and gain information for a variety of purposes, (e.g., clarifying, elaborating, summarizing main ideas and supporting details).

LA.6.5.2.2: TSW deliver narrative and informative presentations, including oral responses to literature, and adjust oral language, body language, eye contact, gestures, technology and supporting graphics appropriate to the situation.

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### Sunshine State Standards

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#### 7<sup>th</sup> Grade

- LA.7.1.6.1: TSW use new vocabulary that is introduced and taught directly.
- LA.7.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
- LA.7.1.7.3: TSW determine the main idea or essential message in grade-level or higher texts through inferring, paraphrasing, summarizing, and identifying relevant details.
- LA.7.2.2.2: TSW use information from the text to state the main idea and/or provide relevant details.
- LA.7.2.2.3: TSW organize information to show understanding (e.g., representing main ideas within text through charting, mapping, paraphrasing, summarizing, or comparing/contrasting).
- LA.7.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to manuals, assembly instructions).*
- LA.7.5.2.1: TSW use effective listening strategies for informal and formal discussions, connecting to and building on the ideas of a previous speaker and respecting the viewpoints of others when identifying bias or faulty logic.
- LA.7.5.2.3: TSW organize and effectively deliver speeches to entertain, inform and persuade, demonstrating appropriate language choices, body language, eye contact, gestures, and the use of supporting graphics and technology.

#### 8<sup>th</sup> Grade

- LA.8.1.6.1: TSW use new vocabulary that is introduced and taught directly.
- LA.8.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
- LA.8.1.7.3: TSW determine the main idea or essential message in grade-level or higher texts through inferring, paraphrasing, summarizing, and identifying relevant details.
- LA.8.2.2.2: TSW synthesize and use information from the text to state the main idea or provide relevant details.
- LA.8.2.2.3: TSW organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing, or comparing/contrasting).
- LA.8.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to manuals, assembly instructions).*
- LA.8.5.2.1: TSW demonstrate effective listening skills and behaviors for a variety of purposes, and demonstrate understanding by paraphrasing and/or summarizing.
- LA.8.5.2.2: TSW use effective listening and speaking strategies for informal and formal discussions, connecting to and building on ideas of a previous speaker and respecting viewpoints of others when identifying bias or faulty logic.
- LA.8.5.2.4: TSW research, organize, and effectively deliver speeches to entertain, inform, and persuade.

#### 9<sup>th</sup> - 12<sup>th</sup> Grades

- LA.910.1.6.1: TSW use new vocabulary that is introduced and taught directly.
- LA.1112.1.6.1: TSW use new vocabulary that is introduced and taught directly.
- LA.910.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
- LA.1112.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
- LA.910.1.7.3: TSW determine the main idea or essential message in grade-level or higher texts through inferring, paraphrasing, summarizing, and identifying relevant details.
- LA.1112.1.7.3: TSW determine the main idea or essential message in grade-level or higher texts through inferring, paraphrasing, summarizing, and identifying relevant details and facts.
- LA.910.2.2.2: TSW use information from the text to answer questions or to state the main idea or provide relevant details.
- LA.1112.2.2.2: TSW use information from the text to answer questions or to state the main idea or provide relevant details.
- LA.910.2.2.3: TSW organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing, comparing, contrasting, or outlining).
- LA.1112.2.3: TSW organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing, comparing, contrasting, outlining).



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### Sunshine State Standards

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*LA.910.3.1.1: TSW prewrite by generating ideas from multiple sources (e.g., brainstorming, notes, journals, discussion, research materials or other reliable sources) based upon teacher-directed topics and personal interests.*

*LA.1112.3.1.1: TSW prewrite by generating ideas from multiple sources (e.g., brainstorming, notes, journals, discussion, research materials or other reliable sources) based upon teacher-directed topics and personal interests.*

*LA.910.4.2.1: TSW write in a variety of informational/expository forms, including a variety of technical documents (e.g., how-to-manuals, procedures, assembly directions).*

*LA.1112.4.2.1: TSW write in a variety of informational/expository forms, including documents using precise technical and scientific vocabulary (e.g., manuals, procedures, directions).*

*LA.910.5.2.1: TSW select and use appropriate listening strategies according to the intended purpose (e.g., solving problems, interpreting and evaluating the techniques and intent of a presentation).*

*LA.1112.5.2.1: TSW demonstrate effective listening skills and behaviors for a variety of purposes, and demonstrate understanding by critically evaluating and analyzing oral presentations.*

*LA.910.5.2.2: TSW research and organize information for oral communication appropriate for the occasion, audience, and purpose (e.g., class discussions, entertaining, informative, persuasive, or technical presentations).*

*LA.1112.5.2.3: TSW use research and visual aids to deliver oral presentations that inform, persuade, or entertain, and evaluates ones own and others oral presentations according to designed rubric criteria.*