



## Adaptations—What a Concept

Students learn about adaptations of the pink river dolphin through concept mapping, and then they compare pink river dolphins with marine dolphins.

### SUBJECT

Science

### TIME

Two to three class periods

### OBJECTIVES

Students will be able to

- describe the specific adaptations that allow pink river dolphins to survive in their freshwater environment.
- construct a concept map to graphically represent relationships between content.
- compare and contrast pink river dolphins and marine dolphins.

### MATERIALS

- “Pink Dolphins of the Amazon” video (5 minutes 12 seconds); available to stream or download at [www.pbs.org/kqed/oceanadventures/video/pinkdolphins](http://www.pbs.org/kqed/oceanadventures/video/pinkdolphins)
- Notebook paper
- 1–2 packages of 3”x5” index cards (12 cards for every pair of students)
- Scissors
- Glue or tape
- Colored pencils or markers
- 10–15 pieces of large white butcher paper (one for every pair of students)
- Internet or library access

### BACKGROUND

Pink river dolphins (*Inia geoffrensis*), also known as Amazon river dolphins and botos, are born gray and become pink as they age. They are the largest of the freshwater dolphin species and are mainly found in the tributaries and rivers of the Amazon and Orinoco river systems of South America.

Unlike other dolphins, the neck vertebrae of pink river dolphins are not fused, giving them the ability to turn their heads 180 degrees. This, along with the excellent maneuverability provided by their large flippers, allows them to feed in flooded forests and shallow waters. They use a scanning technique, turning their heads from side to side, as they echolocate, searching for prey in murky water. Their beaks are long and contain stiff hairs thought to provide a sense of touch while they forage in the sediment for food. They eat a variety of prey, including fish and crustaceans. Pink river dolphins have two types of teeth: Conical teeth in the front of the mouth grasp and hold prey, and molars in the rear of the mouth crush the prey. They also have good eyesight despite their small eyes.

Pink river dolphins are listed as Vulnerable by the International Union for Conservation of Nature. Their survival is threatened by habitat destruction, dam projects, mercury poisoning, entanglement in fishing nets, pollution and boat traffic.

For more information on the Amazon rainforest, visit “The Amazon: The World’s Largest Rainforest” at <http://rainforests.mongabay.com/amazon/>.

### PROCEDURE

#### Day 1

1. Have each student fold a sheet of notebook paper to make six squares. Students will use one side of the paper to write one of the following concepts at the top of each square: habitat, ecosystem, adaptation, communication techniques, feeding techniques, and body type and color. After they are done, have them do the same on the other side.

**STANDARDS****National Science  
Education Standards  
Grades 5-8**

[www.nap.edu/readingroom/books/nses/6d.html#ls](http://www.nap.edu/readingroom/books/nses/6d.html#ls)

**Life Science -****Content Standard C:**

Regulation and behavior  
Populations and ecosystems  
Diversity and adaptations of organisms

**Ocean Literacy: Essential  
Principles and Fundamental  
Concepts**

<http://coexploration.org/oceanliteracy/>

**Essential Principle #5:**

The ocean supports a great diversity of life and ecosystems.

2. Place students in pairs. Have each pair of students brainstorm everything they know about each concept and write down their ideas on one side of the paper in the corresponding squares. Students should also provide an example of each concept.
3. Students share out and discuss each concept square while you make a class list of the examples and descriptions that your students have generated on an overhead or on a large sheet of paper.
4. Ask students to turn their pages to the other side. Tell them to fill in as much as they can for each concept while they view the short video "Pink Dolphins of the Amazon" on the Ocean Adventures Web site at [www.pbs.org/kqed/oceanadventures/video/pinkdolphins](http://www.pbs.org/kqed/oceanadventures/video/pinkdolphins).
5. Students share out again while you generate a class list of examples of each concept on the overhead or a large sheet of paper.
6. Introduce the idea of concept mapping to your students and show them an example. (You can find an example at [http://www.inspiration.com/vlearning/index.cfm?fuseaction=concept\\_maps](http://www.inspiration.com/vlearning/index.cfm?fuseaction=concept_maps).) Tell them that they are going to construct a concept map about the pink river dolphin.
7. Pass out 12 index cards to each pair of students. Have each pair cut six of the cards in half. On the large cards, have students write with a marker or colored pencil each main concept from their paper: habitat, ecosystem, adaptation, communication techniques, feeding techniques, and body type and color. These are the main concepts associated with the pink river dolphin. Have students work together to generate two specific concepts associated with the main concept and write one on each of the small cards. For example: For the main concept of adaptation, students might have the two specific concepts of echolocation and sharp teeth.

8. Explain how to link the concepts to create the concept map. Talk about linking words that describe the relationships and that create a link between the main concept and the specific concept. Here is a list of some common linking words and phrases: such as, like, for, provides, has, used in, which includes, which is, as, can be, part of, adapts for, makes up, lives in, by and is.
9. Pass a piece of butcher paper out to each pair of students. The students will create a concept map similar to the one shown in the attached template. Tell them to write “Pink River Dolphins” at the top of the paper in big letters and draw a circle around it. Coming out from the bottom of the circle they should draw six branching lines. At the end of each line, they then tape or glue one of the six main concepts (large cards). Then from the bottom of each main concept (large cards), have the students draw two branching lines. At the end of each of these lines, and under the correct main concept, they will glue or tape their specific concepts (small cards).
10. Ask the students to work together to choose the linking words or phrases that best describe the relationships between the main concepts and the specific concepts. To complete the concept map, the students then write these linking words or phrases across each of the “linking” lines.
11. Each group shares their concept map with the entire class.

### Days 2–3

1. Students research marine dolphins on the Internet or in the library. Have students fold a sheet of paper and fill in the squares with the six main concepts from the day before. The students’ job is to collect information on marine dolphins in order to generate another concept map. (NOTE: Students can use the attached concept map template or draw their own concept map in their science journal.)
2. After another concept map has been generated for marine dolphins, lead the class in a discussion that compares the pink river dolphin with the marine dolphin.

### Optional

- In addition to the concept map, you may choose to have students create a multimedia-based presentation showing what they have learned about the differences between pink river dolphins and marine dolphins. Be sure to let students utilize the **Ocean Adventures** image download library: <http://www.pbs.org/kqed/oceanadventures/educators/library/>

### Assessment

- Have students look at photos of both a pink river dolphin and a marine dolphin and identify and explain the physiological differences and similarities between them.
- Have students create a Venn diagram for adaptations of river and marine dolphins.
- Give students a list of main concepts and specific concepts from which to generate a concept map or let students create a concept map of their own on another topic.

### Extensions

- Have students research the issues affecting the Amazon rainforest and the possible extinction of the pink river dolphin. Students can create educational presentations about these issues and present them to the class or post them around school as a way of educating the school community.
- Take a field trip to a local zoo, aquarium or other nature center that has dolphins or an exhibit about them.

### Additional Resources

Additional educator resources for **Jean-Michel Cousteau: Ocean Adventures** can be found at [pbs.org/oceanadventures](http://pbs.org/oceanadventures).

Also try:

- The University of Michigan's Animal Diversity Web site for more information on the pink river dolphin. [http://animaldiversity.ummz.umich.edu/site/accounts/information/Inia\\_geoffrensis.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Inia_geoffrensis.html)
- The Virtual Explorers Web site for data and information on river dolphins of the Amazon, collected and compiled by a group of educators. [www.virtualexplorers.org/ARD/index.htm](http://www.virtualexplorers.org/ARD/index.htm)
- The American Cetacean Society's Web site for information about pink river dolphins and species of marine dolphins. (Use the menu on the left side of the Web page to view species fact sheets.) <http://www.acsonline.org/factpack/>
- SeaWorld's Bottlenose Dolphin Animal InfoBook. <http://www.seaworld.org/animal-info/info-books/bottlenose/index.htm>
- Pennsylvania Building a Presence for Science's article for more information on concept mapping. [www2.etown.edu/bap/Resources/conceptmap.pdf](http://www2.etown.edu/bap/Resources/conceptmap.pdf)

**About the Author**

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**CREDITS**

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