

Sea Turtle Adaptations



Objectives:

- Students will utilize research skills for the purpose of gathering data on a sea turtle species.
- Students will introduce an assigned species of sea turtle to other class members.

National Education Standards:

- NS.5-8.3
- NS.9-12.3

Suggested Grade Levels: 6-9

Subject Area: Science

Timeframe: Three 50 minute class periods

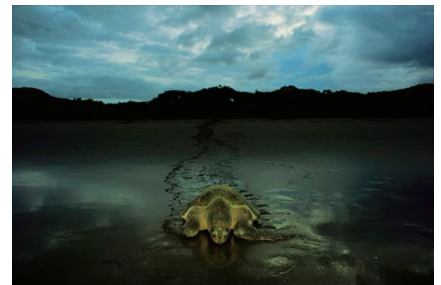
Teacher Information:

Organism adaptations are inherited traits that increase the chance for reproduction and survival in a particular environment. Adaptations can be a change in a species over time for the purpose of survival. Most students will have some background knowledge related to the concept of adaptations. A strong understanding of this concept will be helpful to the students when they study natural selection and evolution.

Because the term adaptation is used commonly, many students will have misconceptions. It will be important for students to recognize these misconceptions and correct them.

Misconceptions:

- Adaptations guarantee survival.
- Any interesting characteristic of an organism is an adaptation.
- Evolution always means that one species has turned into another species.
- A learned behavior can be an adaptation.



Materials:

- Pre-test and post-test photocopies, one per student
- Overhead transparencies of note pages
- Access to the internet for research
- Copies of Web Resources and Sea Turtle Adaptations Questions for students

Lesson:

1. Write the lesson essential question on the board: “What adaptations do sea turtles have that allow them to survive?” Tell the students that they will eventually be able to answer the question.
2. Give students the pre-test to determine their level of knowledge and if they have any misconceptions.
3. Tell the students that they will need to first understand what adaptations are before they can answer the question. Tell them that you will introduce adaptations by giving examples of other organisms that they may be a little more familiar with.
4. Create a transparency from the note sheet. Share this with the students as an introduction to adaptations.
5. Split class into small groups. Either give each group the entire list of research questions or assign each group a few of the questions and allow the groups to share their findings with one another. Ask students to use the website list to aid in their research. Students will need to state what the adaptation is and why this trait aids the turtle in survival.
6. Give students the post-test to determine what they have learned.



Adaptations Notes

What is an adaptation?

- A change a species makes in order to meet environmental conditions that exist.
- Adaptations are made for a PURPOSE which benefits the organisms survival. (NOTE: Adaptations do not guarantee survival.)
- An inherited trait that increases an organism's chance of survival and reproduction in a certain environment.

Adaptations help organisms to survive and/or reproduce by:

- Coping with climate
- Obtaining food and water
- Attracting mates
- Escaping predators
- Dispersing seeds

Examples of adaptations for the purpose of coping with climate:

- Heavy fur
- Thick fat layer
- Deciduous plants cut chlorophyll production and drop their leaves

Examples of adaptations for the purpose of obtaining food and water:

- Giraffes have long necks to reach food in the trees
- Frog's tongue is attached in front for quick movement to catch food
- Plants have root hairs to help absorb water
- Some plants have broad leaves to help collect sunlight

Examples of adaptations for the purpose of attracting mates:

- Coloration of feathers help birds attract mates
- Plants attract pollinators through various methods (ex: bright colors and scents)
- Deer have scent glands to attract females

Examples of adaptations for the purpose of escaping predators:

- A rabbit's leg structure for good running ability
- Quills of the porcupine
- Thorns of rose bush
- A skunk's odor glands producing a smell
- Coloration that helps to camouflage the organism
- Disruptive coloration – an organism's designs that work like an optical illusion to confuse predators (ex: zebras)
- Mimicry – one species is similar in appearance to another species (ex: the Viceroy and Monarch Butterflies)

Examples of adaptations for the purpose of dispersing seeds:

- Burs have hooks that allow them stick to fur and feathers for animals to transport the seeds
- Wings of maple seeds and parachute shape of milkweed seeds allow wind to carry them to new locations
- Seeds encased in fruits are eaten by animals and dispersed as the animal travels

Resource Websites

SEE Turtles: www.seeturtles.org/43/sea-turtle-facts.html

Oceanic Resource Foundation: www.orf.org/turtles.htm

Office of Naval Research: <http://www.onr.navy.mil/focus/ocean/life/turtle1.htm>

Earthtrust: www.earthtrust.org/wlcurric/turtles.html

DeepSeaNews Blog:

www.deepseanews.com/2009/04/deep-diving-adaptations-of-leatherback-turtles

Works Cited

"Deep-diving adaptations of Leatherback turtles | Deep Sea News." *Deep-Sea News*. Web. 16 Sept. 2009.

<http://deepseanews.com/2009/04/deep-diving-adaptations-of-leatherback-turtles>

"GREEN SEA TURTLES." *Earthtrust - Wildlife Conservation Worldwide*. Web. 16 Sept. 2009.

<http://www.earthtrust.org/wlcurric/turtles.html>

"Oceanography." *Office of Naval Research - ONR*. Web. 16 Sept. 2009.

<http://www.onr.navy.mil/focus/ocean/life/turtle1.htm>

"Underwater Photography / Marine Conservation." *The Oceanic Resource Foundation*. Web. 16 Sept. 2009.

<http://www.orf.org/turtles.htm>



These materials are provided by SEE Turtles, a non-profit project that protects sea turtles through conservation travel. Please see our website, www.seeturtles.org for other lesson plans, fundraising ideas, in-class presentations, and field trips. For more information, please contact Brad Nahill, SEE Turtles Director, at brad@seeturtles.org or 503.608.9679.

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Adaptations Pre-test

Name _____

Directions: On the line next to each statement, write "True" or "False."

- _____ 1. An adaptation is a species change in order to meet environmental conditions.
- _____ 2. Adaptations are made for a purpose that benefits the organism.
- _____ 3. Adaptations are inherited.
- _____ 4. Adaptations guarantee survival.
- _____ 5. When a species develops an adaptation over time, it is called evolution.
- _____ 6. A man puts on a coat to survive through freezing temperature. This act is an adaptation.
- _____ 7. A rabbit can run away from predators. This is an adaptation.
- _____ 8. A male peacock has brightly colored feathers to attract female species. This is an adaptation.
- _____ 9. The seeds of a maple tree are contained in a helicopter-shaped structure. This is an adaptation.
- _____ 10. A flower is brightly colored for the purpose of attracting pollinators. This is an adaptation.

Adaptations Pre-test Answer Key

Directions: On the line next to each statement, write "True" or "False."

___ **TRUE** ___ 1. An adaptation is a species change in order to meet environmental conditions.

___ **TRUE** ___ 2. Adaptations are made for a purpose that benefits the organism.

___ **TRUE** ___ 3. Adaptations are inherited.

___ **FALSE** ___ 4. Adaptations guarantee survival.

___ **TRUE** ___ 5. When a species develops an adaptation over time, it is called evolution.

___ **FALSE** ___ 6. A man puts on a coat to survive through freezing temperature. This act is an adaptation. (A coat is not inherited.)

___ **FALSE** ___ 7. A rabbit can run away from predators. This is an adaptation. (The adaptation is the inherited characteristic that allows the rabbit to run away from its predators.)

___ **TRUE** ___ 8. A male peacock has brightly colored feathers to attract female species. This is an adaptation.

___ **TRUE** ___ 9. The seeds of a maple tree are contained in a helicopter-shaped structure. This is an adaptation.

___ **TRUE** ___ 10. A flower is brightly colored for the purpose of attracting pollinators. This is an adaptation.

Sea Turtle Adaptations Questions

1. What is a carapace, and how does it help sea turtles?
2. How does having bulky intestines help green sea turtles?
3. How are sea turtle jaws, or beaks, adapted to their different diets?
4. What are some adaptations that allow sea turtles to remain underwater for lengthy time periods?
5. How do sea turtles differ from land turtles?
6. What two aspects of a sea turtle's shell helps it move through the water?
7. What is countershading, and how does it help a sea turtle?
8. How are the limbs of a sea turtle an adaptation?
9. How are sea turtles able to maintain a healthy water balance in their bodies?



Sea Turtle Adaptations Answers

1. What is a carapace, and how does it help sea turtles?

The carapace is the dorsal or upper part of the shell which protects a turtle's vital organs. It is made of bone and covered with scutes, or scale-like plates.

2. How does having bulky intestines help sea turtles?

Long intestines are necessary to allow the turtle to digest plant material. They also have microorganisms in their gut which aid in breaking down the otherwise indigestible plant material.

3. How are sea turtle jaws, or beaks, adapted to their different diets?

Leatherbacks have sharply pointed jaws to grasp and pierce jellies and other soft-bodied animals. Greens have finely serrated jaws for scraping algae and tearing sea grasses and seaweeds. Hawksbills have a sharp, narrow bird-like beak for biting sponges and getting into crevices and cracks on the reef. Loggerheads have large, strong jaws for crushing molluscs, crustaceans and other hard-bodied animals.

4. What are some adaptations that allow sea turtles to remain underwater for lengthy time periods?

- Sea turtles are able to store large amounts of oxygen in their blood and muscles.
- Sea turtles can adjust their metabolism which helps to limit their oxygen needs.

5. How do sea turtle differ from land turtles?

6. What two aspects of a sea turtle's shell helps it move through the water?

- The shell of the turtle is streamlined to allow for less friction as it moves in the water.
- The shells are reduced in weight compared to land turtles.

7. What is counter-shading, and how does it help a sea turtle?

Countershading is a type of protective coloration in which an animal is darker on the upper surface of its body and lighter on the lower surface of its body. The darker carapace (upper surface) of a sea turtle helps it to blend in with the darker sea floor from predators hunting from above. The lighter plastron (lower surface) helps the turtle to blend in with the light coming from the ocean surface to protect from predators below.

8. How are the limbs of a sea turtle an adaptation?

Rather than the bulky legs of the land turtles, sea turtles have muscular, paddle-like flippers. The front flippers function to lift and thrust the sea turtle through the water, like having wings and a propeller. The rear flippers are used like rudders for steering, and for females, to dig nests.

9. How are sea turtles able to maintain a healthy water balance in their bodies?

Sea turtles have salt glands near their eyes, similar to tear ducts. This enables them to constantly shed thick "tears" which contain excess salt. The salt gland is the primary method for salt removal.

Adaptations Post-test

Name _____

Basing your answers on class discussion and notes, check all statements that are true about adaptations.

- An example of an adaptation is you putting your coat on to go outside.
- Species change in order to meet environmental conditions.
- Adaptations are made for a purpose that benefits the organism.
- Adaptations are inherited.
- Adaptations guarantee survival.

Choose two of the adaptations you have learned about sea turtles. Explain what the adaptation is and how it enables the sea turtles to survive and/or reproduce.

Adaptations Post-test Key

Name _____

Basing your answers on class discussion and notes, check all statements that are true about adaptations.

- An example of an adaptation is you putting your coat on to go outside. (false)
- Species change in order to meet environmental conditions. (true)
- Adaptations are made for a purpose that benefits the organism. (true)
- Adaptations are inherited. (true)
- Adaptations guarantee survival. (false)

Choose two of the adaptations you have learned about sea turtles. Explain what the adaptation is and how it enables the sea turtles to survive and/or reproduce.

Please refer to the sea turtle adaptations research answers.