



Title of Lesson: Sea Turtle Adaptations

Length of Lesson: 2 to 3, 50 minute class periods

Grade / Topic: 4th - 7th grade science (biology, environmental science, classification, adaptations)

Source of the Lesson: Gayle N Evans, Science Master Teacher, UFTeach, University of Florida

Concepts: One of the hallmarks of science is close and careful observation of the world around us. In order to make sense of the diverse living organisms we study, scientists needed to develop a way to place them into categories based on their physical and behavioral characteristics. We call this process classification. Carolus Linnaeus developed the system of binomial nomenclature (Genus species) we use today to classify different species. A species is defined in this case as a group of organisms in which all members are closely related, similar in structure and appearance and able to successfully breed with one another to produce fertile offspring. One way to identify the species of an unknown organism is to make close observations of that organisms' physical features and, using a dichotomous key, eliminate other, similar species until only one remains.

How did all of these different species originate? The theory of evolution by natural selection shows us that there is variation among individuals of every species. This variation allows each organism to be more or less adapted to the specific environmental conditions at any given time. As changes occur in the environment, those individuals that are best adapted to the new conditions are more likely to survive and reproduce. As a result, over generations, we see that individuals of any given species tend to show features or adaptations that are well suited to their environmental conditions. For example, sea turtles have a wide variety of adaptations for their aquatic lifestyle. The large and powerful jaw of the loggerhead turtle is well adapted to their diet of clams, crabs and other shellfish. The sharp bill of the Hawksbill turtle is well adapted for scraping sponges and corals from the coral reefs where they feed. Even comparing the flippers of a sea turtle to the legs of other, land-based turtle species, you will see that the Sea turtle limbs are perfectly adapted to allow them to be swift and maneuverable in the water as they swim.

Florida State Standards (NGSSS) with Cognitive Complexity:

| Benchmark Number | Benchmark Description | Cognitive Complexity |
|------------------|---|---|
| SC.4.L.16.2 | Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment. | Level 3: Strategic Thinking & Complex Reasoning |
| SC.5.L.17.1 | Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics. | Level 2: Basic Application of Skills & Concepts |
| SC.6.L.15.1 | Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains. | Level 3: Strategic Thinking & Complex Reasoning |
| SC.7.L.15.3 | Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species. | Level 3: Strategic Thinking & Complex Reasoning |

Performance Objectives *Students will be able to:*

- Make careful observations of pictures of sea turtles to identify specific features and characteristics that would be useful for classification purposes.
- Collaborate with group members to determine which of the identified characteristics is most useful for classification of their given species.
- Share their species identification choices with a new group of peers to determine the classification features of several different sea turtle species.
- Examine specific physical characteristics of each sea turtle species to determine the way(s) in which each feature is adapted to that turtle's habitat and / or lifestyle.

Materials List and Student Handouts

http://conserveturtles.org/educators.php?page=distancelearning_adaptations

- Powerpoint, includes both habitat slides and sea turtle species slides
- Flash Animation
- Pictures and Outline of each species
- Chart handout

Engagement

- Powerpoint slides of the different sea turtle habitats (Sea grass bed, coral reef, hard bottom reef, open ocean with jellyfish)
- Flash Animation showing different parts of a sea turtle.

Exploration

- Powerpoint slides of different species of turtles.
- Pictures of each individual species (or outlines). One picture per student. Students will initially be grouped based on which species is shown in their picture.
- Table handout, one (front & back) per student.

Advance Preparations

- Contact Dan Evans at Sea Turtle Conservancy to arrange a date and time for the video conference. Please make arrangements at least two weeks in advance of the date of your conference request.

Safety

- There are no safety concerns associated with this lesson.

Engagement:

Show a series of pictures: Sea grass bed, coral reef, hard bottom reef, open ocean with jellyfish. Ask students what these habitats have in common, how are they different. Would you expect to see the same species thriving in all these environments or would each habitat have it's own set of species? Why? What sorts of adaptations would you expect to see in an animal that lives in the sea grass bed? Coral reef? Etc...

Bridge: All these pictures represent the habitats where the different species of sea turtles are found. We will be looking at the specific adaptations each different type of sea turtle has in order to thrive in its particular habitat.

Exploration: *(Day 1 & 2)*

Physical characteristics

PPT slides to be shown by teacher: what types of features do you need to look at to identify a species?

Flash Animation showing different parts of a sea turtle.

Expert groups for each species: Give each student a picture of one of the sea turtle species. (Outline with shell pattern for younger students). No species names given.

Have individual students spend about 1 minute closely examining their picture and recording any obvious characteristics of that turtle that may be useful for identification purposes. Then have students mingle and find everyone else who has the same picture and form a group together. Each student gets a picture card (printable) for their species. (Outline with shell pattern for younger students). No species names given.

Students complete a chart identifying the specific characteristics of their species. Make prediction about what types of diet or habitat this turtle may be adapted for.

Note specific visual characteristics that can be used to tell one type of sea turtle from other, similar species (shell shape, scute pattern, relative sizes of head/body/flippers): what is important to know to identify this species of turtle?

Table to complete: species characteristics versus possible adaptations (3 columns: characteristics, predicted adaptations, 3rd column is filled in after / during conference with the actual adaptations). Complete the information related to assigned species in expert groups. (Head, Flippers, Shell shape, scute pattern, etc predict the habitat & diet based on adaptation)

Mixed groups: Students leave the expert group & form groups with each different species represented to compare notes about the identifying characteristics.

Each student reports to others about their species of turtle.

Work on filling in remaining table for all of the other species as peers report. And then finish up by writing a set of questions they would like to ask the expert during the videoconference.

Explanation: *Video conference with Dan Evans, Sea Turtle Scientist with STC*

Students go back to expert groups and each species group presents what they know about their species, then Dan does quick overview of that species: habitat, diet, adaptations etc. Students revise table based on Dan's information as needed.

If time allows, students ask remaining questions & get answers from the expert.

Elaboration:

Basic: Students produce a drawing of a sea turtle species of their choice in it's proper habitat eating a typical food item for that species.

Advanced: Students discuss the scientific classification of sea turtles and create a dichotomous key to be used to identify any of the selected sea turtle species. If you have time & Internet access, students could compare their created keys to the one on the STC Website:

http://www.conserveturtles.org/seaturtleinformation.php?page=species_id

Evaluation:

Online quiz: <http://conserveturtles.org/seaturtleinformation.php?page=seaturtleadaptationsquiz>

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