

2: Ecological Roles of Chelonians – Habitat, niche and ecosystem (Guided Inquiry)

Grade Level: 6

Science Concept:

Guided by the “big question” students will conduct research and create their own understanding of one type of chelonian (turtle or tortoise) within its habitat and ecosystem. Students will explain the ecological role of their chelonian to demonstrate their understanding of the concept. Students will be introduced to the concept of niche. It is essential to know the difference between an ecosystem and a habitat. The concept of niche is more complex and is not an expectation for all students, merely an introduction to the concept for further investigation.

Ecosystem: a complex set of relationships among the living resources, habitats, and residents of an area. It includes biotic: plants, trees, animals, fish, and abiotic: water, soil, air. Everything that lives in an ecosystem is dependent on the other species and elements, if one part is damaged or disappears, it impacts everything else.

More on ecosystems:

<http://forest.mtu.edu/kidscorner/ecosystems/definition.html>

Habitat: All living (biotic) organisms have an ecological role. Remind students about what these are: producer, consumer –primary, secondary and tertiary, and decomposer.

Niche: the way in which organisms fits into an ecological community. an evolutionary result of an organism's physical structure, physiology and adaptations to surroundings.
Ex: an organism's "place in the biotic environment, its relations to food and enemies." (Elton, 1927).

Ex: The factors that govern a species' potential geographical distribution usually considered these to be physical or climatic factors, as opposed to relationships with other species such as competition or predation. (Grinnell, 1917)

Excellent resource for understanding Niche and Habitat

<http://marinebio.org/Oceans/Conservation/Moyle/ch7.asp>

Relationship to CA Science Content Standards:

Investigation and Experimentation:

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

d. Communicate the steps and results from an investigation in written reports and oral presentations.

Ecology (Life Sciences)

5.b. Students know populations of organisms can be categorized by the function they serve in an ecosystem.

Learning Objectives:

Student will discover important information from credible sources about the testudine of their choosing: what do they eat, where do they live, how do they reproduce, who are their predators, how to they move around? What role do they serve in the ecological system.

Student will develop methods and investigate the “big question” and present their findings in an organized report or through an oral presentation.

Conceptual Background:

Students will use their prior knowledge about turtles and tortoises along with relevant research to construct their understanding of ecosystem, habitat and niche. Focusing on one species will be the gateway to constructing knowledge relevant to biology and how all organisms are categorized in their respective ecosystems. Through teacher guided self-explorations students will be demonstrating their own autonomy and learning how to think critically through personally meaningful questions. Students will develop a method for collecting and organizing data with given resources but allowed the freedom to choose how they will collect, represent, and communicate their findings to other classmates and the teacher.

Because this is a guided inquiry lesson, teacher planning will be essential to allow students to explore relevant research. Please see teacher resources and arrange to have them available in class the day you plan to teach this lesson.

LESSON

Implementation Plan:

Engage- Show video about turtles in their natural habitat similar to this one about baby loggerhead turtles. This video highlights these babies as they make their way from their clutch to the ocean where they face many dangers, including human intervention.

<http://video.nationalgeographic.com/video/kids/animals-pets-kids/reptiles-kids/turtle-loggerhead-kids/>

After the video, ask Ss what they noticed about the turtles and generate a chart of their observations. Refresh Ss memories about what factors contribute to an organism’s ecosystem and the difference between an ecosystem and a habitat. After a discussion on the differences, ask “is a habitat the focus of an individual organism or a the species?” This may require a definition of a species (a class of individuals having some common characteristics or qualities; distinct sort or kind) (dictionary.com).

After a discussion where the teacher facilitates inquiry and guides the discussion toward the main concepts of the lesson ask “Based on the following question which Chelonian (turtle/tortoise) would you choose to research?”

Post this on a document camera or overhead:

Big Question:

How does the Chelonian you chose survive in its ecosystem? What is its role and how do changes to its ecosystem affect its adaptations and survival rate.

Explore:

Allow students time to first choose an animal from the chelonian family and create a draft of how they will answer the big question. In small groups Ss should reflect on their own writing and critique other Ss writing. The teacher should allow enough time to visit all of the groups and facilitate the Ss ideas of how to answer the big question with guiding questions. Try to help student make a real-life connection to the animal of their choosing ie. maybe they have seen one in person, have one as a pet, been curious about an aspect about turtles or tortoises, or want to know how they can help save the endangered species. Help them to understand the best way to understand the tortoise or turtle it to look at it in its natural habitat and define its ecological role.

Explain:

Regroup with Ss and ask them to tell a partner which turtle or tortoise they chose and why. Randomly select several students and have the partner share with the class what their partner chose and explain why. Take time to clear up definitions or terms Ss may be struggling with and post them on a word wall or a chart around the room.

Elaborate:

Formative assessment

Students will participate in class discussions before group activity to highlight their knowledge and concepts they have yet to grasp. Throughout the lesson students will join in discussions of ecological concepts, specifically how turtles and tortoises can be categorized by their ecological role, ie: producer, consumer, decomposer. Teacher should listen to students discussions during group work and guide their understanding through questioning.

Summative Assessment:

After students have had ample time to develop their method of data collection and organize it in a logical way to answer the “big question”, Ss will write a report, create a diorama or a brochure based on the ecological role and habitat of their testudine. Next, they will present their project to the class in an oral report.

Differentiated Plans:

Behavioral for Ss A- This lesson requires students to focus on their own work without a lot of guidance from the teacher. Monitor Ss A’s progress at individual work time during the explore and elaborate phases of the lesson. Ensure they are on task by engaging them in questions about their turtle or tortoise.

Cognitive for Ss B: As this lesson is very student centered Ss B, who at times lacks the ability to complete tasks, may need extra encouragement as well as one-on-one time with the teacher. Fortunately during this guided lesson, the teacher should have more time allotted for Ss B.

Cognitive for Ss C: This student will be challenged to think of a unique project (not necessarily on the list), first approved by the teacher. The student will also be encouraged to think try the extension activities prior to beginning the lesson for the rest of the class.

Affective for Ss D: The teacher will closely monitor the student's interaction with the group. The teacher will provide extra encouragement and guidance as needed, to make tasks easier to manage and delegate. The teacher should check in with the Ss periodically to see how the Ss is doing in the group, and make modifications to grouping if needed. The teacher can also give one-on-one advice and guidance if the student needs extra support for their project.

El Adaptations:

Ss E: Beginning ELL: Use a slower rate of speech and post new vocabulary for Ss E. Take time after the video to describe tier 2 and 3 words more in depth. Provide sentence frames to assist student in creating a method for inquiry.

Ss F: Intermediate ELL: Encourage Ss F to participate more by monitoring their reactions to questions posed. Elicit a response and use guiding questions to make the material more comprehensible.

Ss G: Advanced ELL: While Ss G may have the conversational English needed to communicate, their writing skills may need more attention. Take time to help this Ss communicate their thoughts more clearly by reviewing their draft of their work and giving suggestions for improvement.

Student resources:

If no computers or computer lab are available, you may want to print out specific pages from the following webpages:

<http://www.nmfs.noaa.gov/pr/species/turtles/green.htm>

http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AR_AAD04010

http://www.azgfd.gov/w_c/deserttortoisemanagement.shtml

If you have access to Grzimek's Animal life via Gale Database, this online encyclopedia has a wealth of information for over 4000 animals.

Books:

Becker, J.E., (2004) .Green sea turtles. San Diego: Kidhaven Press

Rebman, R.c., (2007). Turtles and Tortoises, NY : Marshall Cavendish Benchmark.

Blomquist, C., (2004). Box Turtles NY Powerkids Press 2004

Spotila, J.R., (2004). Sea turtles: a complete guide to their biology, behavior and conservation. Baltimore: John Hopkins University Press.

Lutz, P. L., & Musick, J. A. (1997). *The biology of sea turtles*. CRC.

Kalman, B. (2004). *Endangered sea turtles*. New York: Crabtree Publishing Company.

Ernst, C.H., (1994) Turtles of the United States and Canada. Washington: Smithsonian Intuition Press.

Extension Activity:

Students who need more of a challenge could be asked to investigate not only the ecosystem and habitat but also the niche of the chelonian they chose. Further, they could create a concept map to diagram how all three work together.

For an Open-inquiry lesson extension, students could develop a question they have about their turtle/tortoise and find a method to investigate their question.

Teacher Resources:

<http://www.arkive.org/afghan-tortoise/testudo-horsfieldii/>

For a detailed discussion and lesson plans on evolution and natural selection:

<http://evolution.berkeley.edu/evolibrary/teach/68goals.php>

Links to Literature:

Helget, N.L. (2009) *The turtle catcher*. Boston: Houghton Mifflin Harcourt.

References:

Elton, C. 1927. *Animal Ecology*. Sidgwick and Jackson, London. □

Grinnell, J. 1917. *The niche-relationships of the California Thrasher*. *Auk* 34:427-433.

Kalman, B. (2002). *The life cycle of a sea turtle*. New York: Crabtree Publishing Company.