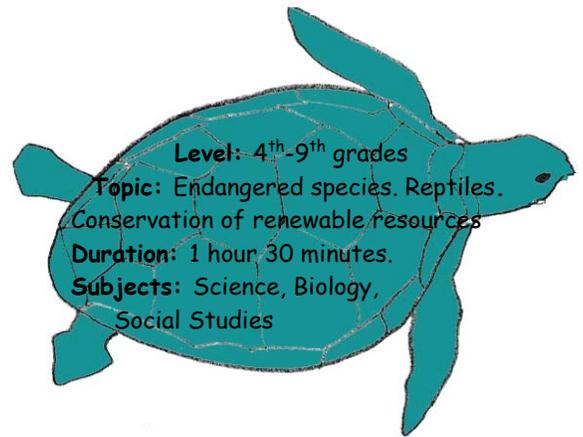


Let's Save the Hawksbill Turtle

Objective:

1. To distinguish the causes which endanger a species.
2. To learn about the natural history of the Hawksbill turtle

Learning Skills: Observation, Analyzing and Deduction.



Information Base:

Usually when we think of an extinct species we think of the dinosaurs, which constitute a large extinction, yet the extinctions caused by humans have been great during recent history. Since the 18th century, a time when most superior species were named, 180 species of birds and mammals have become extinct. Actually, 1 out of every 40 is endangered today.

There are two fundamental reasons why a species may be in danger of extinction:

- 1) **Direct attack** by man, the hunter.
- 2) The **alteration of habitat**, which includes deforestation, canalization, urbanization, contamination, farming, and/or tourism. Another way of impacting a habitat is through the introduction of a new exotic species, which may result in new predation or competition for resources rapidly affecting the ecological balance.

These are some examples of recent extinctions that are sadly famous:

Dodo (*Raphus cucullatus*): Was a giant pigeon weighing 22 kg from the Mauricio islands. Like the penguins, the dodo lost its ability to fly and nested on the ground in this isolated habitat. During the 16th century, these islands became a natural stopping ground in ship navigational routes and many dodos were killed. The Dutch converted this island into a colony and introduced dogs, rats, and pigs which destroyed the remaining eggs and hatchlings. The last dodo died in 1681. In January of 1775, an inspector from the Oxford Museum discovered the only remaining dodo, stuffed and disintegrating, and decided to throw it away. The man in charge of this task

saved the head and a foot that were in good condition. This is all we have of the dodo bird today.

Passenger Pigeon: As late as 1810, this bird flew over the North American continent in flocks of millions. No one ever expected they could become extinct. Large massacres of this bird resulted in their total extinction. The last nest of the passenger pigeon, the most common bird in North America, was seen in the late 19th century and the last representative of this species died in the Cincinnati Zoo in 1914.

Sea Turtle Information:

Sea turtles are large reptiles that have inhabited the oceans for 200 million years. They are well adapted to their life in the sea thanks to a hydrodynamic carapace and modified feet or flippers, which enable the turtles to swim easily. They have lungs and must surface to breathe. Sea turtles reach sexual maturity after 20-30 years. They undergo migrations between their feeding grounds and nesting grounds, every 2-3 years, depending on the species. Males and females mate in waters near their nesting beaches. The females emerge onto the beaches at night to lay the eggs in sandy nests. Scientific experiments and genetic studies confirm the hypothesis that nesting females return to the same beaches where they were hatched. A female may nest several times during one nesting season with a 15 day interval between egg deposits. A nest contains an average of 100 eggs.

The incubation time of the egg is approximately 60 days (2 months) after which the baby turtles (hatchlings) emerge and crawl into the surf, guided by the moon light reflecting off the surface of the ocean. It's interesting to note that sea turtles do not possess sex chromosomes. Sex determination is established by outside influences and environmental factors, the most important being incubation temperatures. If the temperature on the sand is between 28 and 30 degrees centigrade, the hatchlings will all be the same sex. Temperatures above this range produce predominately females while temperatures below this range produce predominately males.

The newly hatched turtles are carried by currents to zones with high concentrations of floating algae, which serve as nourishment and refuge for the tiny turtles. Only one out of every thousand turtles reaches adulthood.

These chelonians are distributed among two families, the **Cheloniidae** and **Dermochelyidae**.

The **Cheloniidae** family contains 6 representatives, of which four are found in Panama. The first, *Chelonia mydas*, commonly called the green or white turtle, nests predominately in the Pacific waters of Panama and is rarely seen in the Caribbean. The carapace measures 90-110 centimeters in length and is frequently dark purple with tiny black lines. They weigh up to 230 kilograms. This species is predominately herbivorous, feeding on marine grasses and algae, like turtle grass (*Thalassia testudinum*).

The *Caretta caretta* species is commonly called the loggerhead turtle due to its large head in comparison to its body size. Its carapace can reach a length of 120 centimeters and is uniformly orange-red in color. These turtles weigh approximately 200 kilograms and feed predominately on crabs and oysters but also eat sponges, sea urchins and jellyfish. The chelonian can be found in both the Caribbean and Pacific waters of Panama throughout the year. There are no known nesting beaches in Panama.

The common name for *Eretmochelys imbricata* is Carey or Hawksbill turtle. The hawksbill turtle has a beak-like mouth, hence its name. An adult carapace can measure up to 90 centimeters in length and can vary in color from purple to black, with stains of amber, yellow and orange. The thick plates are arranged in an imbricate pattern (overlapping). Hawksbills on the average weigh 80 kilos and feed predominately on sponges and invertebrates found on coral reefs. They are found in both the Pacific and Caribbean oceans. Females usually nest alone. In Bocas Del Toro and Kuna Yala where this turtle is more common, hawksbill turtles are seen to have isolated nesting and feeding territories, migratory routes and maturation habitats. High nesting frequencies occur during the months of May through September. There is little information about these turtles from the Pacific of Panama. It is known that they nest in the islands of the Gulf of Montijo, Coiba and in the Gulf of Chiriqui. For many years, on the island of Coiba, the carapaces of hawksbill turtles were used to create many turtle products by the prisoners of this penal colony. The meat, viscera and eggs are consumed and the fat is used for the treatment of asthma and burns. In the decade of the 1970's, inhabitants of the Caribbean commercialized the use of the carapace and calipee, a cartilaginous green substance when fresh, is highly sought after for making turtle soup and as an ingredient in the production of cosmetics in European countries. The carapace is used to make accessories

like the combs used with the Panama national dress (pollera), and the spurs used for cock-fights.

The Olive Ridley turtle, *Lepidochelys olivacea*, has an olive green carapace measuring approximately 70 centimeters in length. They weigh 45 kilograms making them the smallest species found in Panama. Their diet consists of crabs, shrimp, lobsters, sea urchins, jellyfish and some fish. They are distinguished by their nesting behavior (arribadas) whereby thousands of females emerge onto the nesting beaches for 2-3 nights. Since 1975 there has been an effort on Isla Cañas to establish a program for protection and sustainable consumption of these turtles.

The Family **Dermochelyidae** contains only one representative world-wide. The leatherback turtle (*Dermochelys coriacea*) is the largest sea turtle measuring 130-165 centimeters in length. Its carapace is quite distinct from other turtles in that it does not contain hard plates, and is soft or leathery black with small white spots and has six longitudinal crests. Leatherbacks can weigh between 300 and 500 kilograms, feeding almost exclusively on squid and jellyfish. They are found in both oceans of Panama. Bocas Del Toro and Chiriqui beach are the most important nesting habitats in the entire western Atlantic. In the Pacific they nest in Las Perlas Archipelago and the Peninsula of Azuero.

Conservation and Threats:

Sea turtles have many natural enemies. The eggs and hatchlings suffer depredation from crabs, birds, fish, terrestrial and marine mammals.

Juvenile, sub-adult and adult turtles are attacked frequently by sharks and large marine mammals (i.e. Orcas).

Human threats include the use of nesting beaches for development, tourism and industry causing destruction of nesting habitats. Untreated sewage and garbage pollute not only the nesting sites but the feeding grounds as well. Intense lights near nesting beaches may dissuade females from emerging and disorient the hatchlings which use light to find the surf. On the beach, domestic animals destroy the eggs and consume the hatchlings.

Commercial fishing nets cause the accidental death of thousands of turtles yearly. In the Caribbean, turtles are caught using nets and harpoons while in the Pacific they are only captured accidentally in fishing nets. Also the eggs are harvested during arribadas. Due to their long life-span and migratory habits, sea turtles face many conservational problems which require the joint effort of many countries. The long period of time for turtles to reach

sexual maturity makes reproductive individuals vital for the survivorship of the species.

Sea turtles have been designated as an endangered species world-wide. Panama was once a major exporter of turtle shells to Japan until 1993 when it joined CITES, an international committee for the protection of endangered species. Panamanian law prohibits the consumption, trapping, and exporting of sea turtles and their products nation-wide. There is also a moratorium from the 1st of May until the 30th of September for the collection and selling of eggs, although this period should be modified to reflect the nesting periods of the different turtle species. In 1993, Panama began the use of TEDs for fishing (nets for turtle exclusion).

http://www.nacion.com/In_ee/ESPECIALES/informes/carey/home.html

Commerce and Control in Costa Rica:

Although CITES has prohibited the commercialization of sea turtles and their products, there is still a small black market where these products may be found. Conservation of Wildlife laws prohibits this trade nation-wide. It is evident that there are people willing to buy turtle products although they are illegal. Evidence has been found that certain vendors are willing to trade, and through these contacts, they have been decommissioned. These articles are targeted mainly to tourists and are displayed, initially, alongside of imitation turtle products. There is no real study of the impact of turtle trade in Costa Rica although there is a partial study by ANAI and the Costa Rican Turtle Conservationists. This study was done in 18 towns in the central areas on the Pacific coast. The study began in October 2000 and the results are pending. Preliminary data found 39 establishments, the majority of them small, which deal in illegal turtle trade. Interviews with the vendors of Puntarenas revealed that they traded in turtle products despite the risks due to the high monetary rewards. For example, a ring is bought for C.100 (100 colons; \$0.30) and sold for C.500 (\$1.55). In the beginning, the number of products confiscated was established as follows:

Product	Number of Pieces
Bracelets	179
Hair Clips	16
Rings	1,578
Ear Rings	29
Charms	1

Product	Number of Pieces
Necklaces	1
Guitar Picks	14
Stuffed	2
Carapace	7
Total	1.827

Turtles used to make these products come from Nicaragua (68%) and the Caribbean coast of Costa Rica (23%) according to the vendors. This trade is maintained by people who move readily between Costa Rica and Nicaragua and are therefore most likely, immigrants.

In the mid 1990's there were investigations into the complaints of trade of turtle products and alligator skins but no products were found by wildlife inspectors at this time. In 1999, answering renewed complaints presented to the offices of MINAE, inspectors were able to decommission 255 pieces of turtle and black coral products, and denunciations were filed with the local judge.

Vocabulary: Endangered species, habitat, contamination, arribadas, conservation, renewable resources, and life-cycle.

Materials: Jigsaw puzzle of the Hawksbill sea turtle for the game "Let's Save the Sea Turtle" (see diagram attached). Chalk board or poster board with the phrase to complete: "The principle causes that contribute to a species becoming endangered are from _____ of man, and the destruction of _____."

Procedure:

1. The children are met at the entrance to the forest (when the turtles are at the Center, if not in NAOS), in front of the sign. After welcoming the students and introducing the docents, ask them if they know what it means when we say that an animal is "in danger of becoming extinct". "Do you know any animals that are endangered? Do you know why they are in danger?" Let them discuss their opinions and demonstrate their knowledge on the subject (10 minutes).
2. Now we can invite them to meet an animal that is in danger of becoming extinct. We will see how much they know about this animal, why they think



it is endangered, and later will play a special game that will help them survive.

3. While at the turtle tanks let the children ask questions if they are alert or guide them through a conversation about vertebrates, what are some special adaptations (carapace shape, flippers), how long they remain under water, and camouflage coloration. We also talk a little of their life history and reproduction and ask the children if they are familiar with the reasons for this animal being on the endangered species list. "What do men use turtles for?" (20 minutes).

4. We now go to the classroom and play "Let's Save the Sea Turtle". The object of this game is to build the puzzle. Each piece that is placed represents an action in favor of the turtle. If we can build the puzzle we are doing things to help save them.

5. To build the puzzle, we form **only one group**, with the same objective. One-by-one, each student is given a question to respond to that is found on the back of each puzzle piece. If the student answers correctly, he/she can place the piece on the puzzle board (the docent will decide if the question was answered correctly). **After each correct response we can ponder its significance, why this option instead of that one (especially questions 24 and 25 which require more in depth discussion, see list).**

6. The questions that were not individually answered can be answered by **the group on the second round** until the turtle is saved by placing all of the parts it needs to survive.

7. There will be approximately 20-30 pieces and every question has three options for answers. These will include review topics from the turtle tanks and new material about their biology and threats to turtles (see attached list of questions and options).

8. In conclusion we will complete the phrase on the chalk board by filling in the blank spots. Many words may be used to express the same thing (i.e. direct action, direct attack, habitat, house, environment, etc.)

"The principle causes that contribute to a species becoming endangered are from _____ of man, and the destruction of _____."

Suggestions for the Docent:

If the group is active, you may go deeper into the topic of possible individual action that may contribute towards maintaining our Earth healthy, and saving our species from extinction (use containers of recycled material for recycling or alternate use, conserve water and energy, etc.).



Suggested Classroom Activities:

- ◆ Look for information on other species that are endangered in Panama, their biology and reasons for their being in danger.
- ◆ For the older children, you can suggest that they invent other related games (puzzles, trivia, crossword puzzles, word finds, etc.) about other endangered species.
- ◆ Create a school newspaper with an endangered species theme. Pick a catchy title like "Danger, Humans Ahoy!"

Evaluation:

The game is the evaluation although the final phrase will be a summary evaluation.

References:

Miracle, María Rosa. 1985. Ecología. Colección Salvat tema Clave. Salvat editor. Madrid. 64 pages.

Revista Kena Entretenimientos Infantiles.

http://www.nacion.com/In_ee/ESPECIALES/informes/carey/home.html.

Informe nacional: estados de distribución de la tortuga carey en el gran Caribe.

<http://escenarios.com/natura/> Natura is a section of the magazine Escenarios which publishes periodically ecological themes related to Venezuela. By Jazmina Mendez

Naturaleza Tropical No 12.21 de Junio de 1995. Las Tortugas marinas y las areas protegidas de Panama. Supplement in La Prensa newspaper with the support of Smithsonian Tropical Research Institute.

Questions	Answers
1. What shape are the legs of sea turtles?	Fingers, nails, flippers
2. How do sea turtles breathe?	Lungs, gills, snorkel
3. How long can they stay under water?	10 minutes, 2 hours, 1 day
4. What is the favorite food of the hawksbill turtle?	Lettuce, sponges, marine algae



Questions	Answers
5. How do sea turtles reproduce?	Eggs, live birth, cloned
6. Where do sea turtles lay eggs?	On rocks, on the bottom of the sea, on the beach
7. How often can a hawksbill turtle lay eggs?	Only once, every year, every 2 years
8. How does a hatchling find its way to the sea?	By smell, by sound, by reflection of the moon on the water
9. How old does a hawksbill turtle have to be before she can lay eggs?	1 year, 5 years, 20 years
10. How do you tell a male from a female turtle?	By size, by color, there are no external differences
11. Why is the carapace of a sea turtle flatter than that of a land turtle?	To hide his head, to swim faster, to fly
12. Where can we see a hawksbill turtle in Panama?	Caribbean Sea, Pacific Ocean, both
13. What is the preferred habitat of the hawksbill turtle?	Open ocean, coral reefs, beach
14. What is a natural enemy of sea turtles?	Shark, whale, worms
15. What is the carapace of the sea turtle used for?	Accessories, pots, musical instruments
16. What is the fat of the turtle used for?	Medicine, to cook, fuel
17. What part of the turtle is eaten?	Meat, eggs, both
18. How does a hawksbill turtle defend itself?	Biting, swimming fast, camouflage
19. What is the most dangerous for a sea turtle?	An airplane, a Ninja turtle, a shrimp boat
20. What can contribute to a hawksbill's becoming endangered?	Construction of airports, a hotel built near a nesting beach, creating a natural reserve
21. What endangers a hawksbill turtle?	A cruise liner in open sea, a sailboat anchored on a coral reef, diving on a coral reef
22. What endangers a hawksbill	A six-pack ring, a buoy, an angel fish

Questions	Answers
turtle?	
23. What endangers a hawksbill turtle?	You snorkeling, a mangrove seed, an oil spill
24. How do we place the most danger on the survival of this species?	Hunting adults, hunting juveniles, collecting all of the eggs in a nest
25. How can we help save the sea turtles?	Not buying, not contaminating, learning about the turtles

For question # 24 it is important you try to explain that when we disturb the base of the life-cycle the animals are impacted the most, especially when the length of time it takes to reach adulthood is considered. This implies that the effects of these actions will not be apparent for many years after depredation of eggs.

For question # 25, any answer is correct. With any one or all options we contribute to the conservation of sea turtles. This questions employs a different strategy, there is not only one option for a correct answer.

Photograph of the Wood Puzzle constructed by the Program.

