

Turtle Tales

Key Concept

Sea Turtles represent ancient marine reptiles that are adversely impacted by man's activities in the Gulf of Mexico.

Summary

Grades: 2 to 5

Disciplines:

- **Life Science**

TEKS Science Strands:

- **Nature of Science**
- **Constancy & Change**
- **Properties, Patterns, and Models**
- **Systems & Interactions**



This lesson was developed by Susie Parkinson and Pam Stryker.

Background information by Dr. Rick Tinnin & John Williams, The University of Texas Marine Science Institute, Marine Education Services.

Synopsis

Students will investigate a mystery nest uncovering clues found on the eggs to determine the type of animal that made the nest. Students will participate in an active predator/prey game simulating events in the life cycle of a sea turtle. Students will match illustration cards with fact cards to learn and share information about specific Texas turtles. Students will make a life-size turtle model. Students will create a product that reflects their understanding of the effects of litter and habitat destruction on Texas sea turtles.

Teacher Background Information

Sea turtles have been roaming the world's oceans for over 68 million years. Five species of sea turtles are found in the Gulf of Mexico. Sea turtles are protected by the Endangered Species Act and are listed as either "endangered," indicating that a species is currently in danger of becoming extinct, or as "threatened," indicating that they are likely to become endangered in the near future. Scientific investigations that led to the inclusion of sea turtles in the Endangered Species Act determined

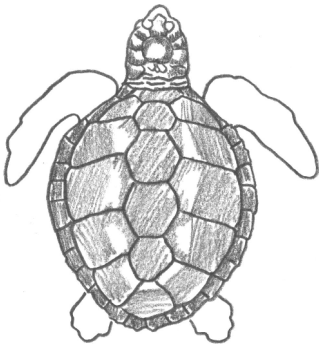


Baby Ridley turtle entering the water after hatching on the beach from a natural nest during the 2004 season. *Photo by Tony Amos.*

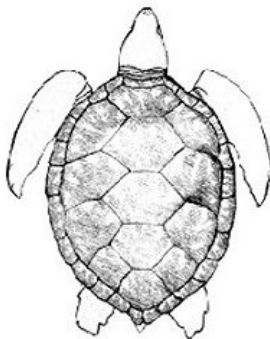
that the greatest cause of turtle mortality was due to drowning in shrimp trawls. This data led to the development of Turtle Excluder Devices (TEDS). TEDS are devices placed in the throat of shrimp trawls that exclude large objects, directing them out of the net through special vents. They are typically hard metal grates sewn into the throat of the shrimp trawl. Their use on all shrimp trawls in inland and offshore U.S. waters was mandated in 1990. There has been a documented decrease in the number of drowned and stranded turtles on Gulf beaches since the law went into effect. This is a good example of marine resource protection.



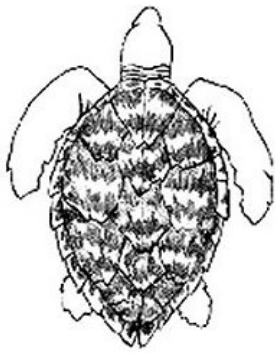
The largest sea turtle is the **leatherback**, *Dermochelys coriacea*. (The scientific name of plants and animals consists of two parts, a genus name, always capitalized, and a species name in lower case letters. It is written either in italics or underlined). Leatherbacks are the only member of the family Dermochelidae. They lack the hardened carapace (top shell), of the other four species. They grow to a carapace length of 190 cm and can weigh up to 600 kg. Adults have a black shell and a white plastron (underside) with black blotches. The body is very streamlined, with long front flippers adapted for a pelagic (open ocean) lifestyle.



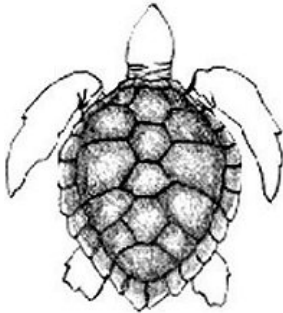
The **loggerhead** sea turtle, *Caretta caretta*, got its name from the relatively large size of the head in comparison to the body. The carapace is reddish-brown and the plastron is yellow. It is the most common species of sea turtle found in U.S. waters, and certainly the most common off the Texas Gulf coast. Adults average 90 cm in carapace length and can weigh 135 kg, although very large adults have been recorded weighing almost twice that.



The **green sea turtle**, *Chelonia mydas*, was once called the Texas turtle because there was a historic green turtle fishery in Redfish bay near Corpus Christi, Texas in the late 1800's. The meat of green sea turtles is considered a delicacy. This is an abundant, medium sized turtle with an adult length of 100cm and an average weight of 136 kg, although larger specimens have been recorded.



The **Hawksbill** sea turtle, *Eretmochelys imbricata*, is not that commonly found in the northern gulf of Mexico. Adults average about 100cm in length and weigh up to 90 kg. This beautiful turtle gets its species name, *imbricata*, from the overlapping scutes (plates) on the back of the carapace. The scutes are the source of tortoiseshell, used in jewelry, hair barrettes, combs, and even eye glass frames. The demand for tortoiseshell led to its over fishing at the turn of the century.



The **Kemp's Ridley** sea turtle, *Lepidochelys kempii*, is the smallest species, with a carapace length up to 76 cm and a weight less than 45 kg. The carapace is almost circular, as wide as it is long. The carapace varies in color from light to dark olive green with a yellow plastron. The carapace of hatchlings is gray-black with raised longitudinal ridges on the back. It is the most endangered of the five species, nesting on only one beach in the world, Rancho Nuevo, along the east coast of Mexico. It is the only turtle that nests during the day. It is also one of the best studied turtles of the five species found off the Texas Gulf coast.

This species was the focus of a head-start effort begun in 1978 between the Mexican Government and the U.S. National Marine Fisheries Service in Galveston, Texas. This program was developed to reestablish historic nesting beaches within the protected boundaries of the Padre Island National Seashore, located south and east of Corpus Christi, Texas. Sea turtle reproduction involves males and females of the same species migrating to the nesting beach and mating near shore. By tagging hatchlings, and identifying tagged individuals, scientists are able to determine that female turtles return to the same beach where they hatched to lay their eggs. This is called "imprinting". There are many theories about how turtles return to their particular nesting beach after many years at sea. To navigate to the nesting beach, turtles may use the earth's magnetic field, sightings of certain stars, the position of the sun, or home in on chemical signals in the beach sand or near shore waters that enable the turtle to tell the difference between one beach and another. The exact method is still under investigation by scientists.

When the fertilized eggs are ready to be laid, the female turtle crawls out of the surf, lumbers up the beach, digs a shallow hole in the sand with her hind flippers, and deposits her eggs. She then covers the eggs with sand, and packs it down firmly using her plastron. From 1978 to 1988, the head start program collected turtle eggs as they were laid on the nesting beach at Rancho Nuevo, packed each clutch in Styrofoam boxes filled with sand, and flew them to incubators located at the Padre Island National Seashore. When the eggs hatched, the young turtles were released on the beach, allowed to crawl into the surf, and then collected and shipped to the lab in Galveston. The hatchlings spend their first year in captivity. At one year old, they are tagged with a micro computer chip and returned to the Padre Island National Seashore to be released into the Gulf of Mexico. They swim off into the Gulf, hopefully to return when they are ready to reproduce. Between 1996 and 1998, six turtles, identified by their head start tags, successfully nested on Mustang and Padre Islands. The females were between 11 and 14 years of age. It was one of the first times that scientists could pinpoint the reproductive age of a female turtle species in the wild. The number of turtle nests on the Texas coast has increased each year, with a high percentage of female Kemp's Ridley turtles identified as part of the head start program. It is a curious fact that male turtles, once they scurry across the beach as a hatchling, never come out of the water the rest of their lives.

Turtles eat jellyfishes and sometimes mistake plastic for one of their food sources. In a study by Pamela Plotkin and Tony Amos, 51% of the stranded Loggerhead turtles found on the beach in south Texas had some kind of anthropogenic (man made) debris present in their digestive tracts.

An excellent resource for sea turtle information is *The Beachcomber's Guide to Gulf Coast Marine Life: Texas, Louisiana, Mississippi, Alabama, and Florida* by Sudan B. Rothschild (ISBN 1-58979-061-8). This is the 3rd edition, published in 2004. It contains a wealth of information on coastal marine habitats and the invertebrate life found there, in addition to the section on sea turtles.

Materials

- Tote tray, dish pan or small child's wading pool filled with sand
 - 12 or more ping-pong balls
 - Black thin-tip permanent marker
 - Chart paper to record clues
 - Markers
 - 4 rulers (optional)
 - 2 meters of yellow or orange crepe paper streamers (optional)
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Preparation

Using the black marker, print the following on the ping-pong balls:

1. Soft, leathery eggs
2. From 80 - 160 eggs per nest
3. Nest found in beach areas
4. Nest left unattended
5. Reptile
6. Five kinds in the Gulf of Mexico
7. Adult eats jellyfish and other things
8. Endangered or threatened
9. Graceful in the water, clumsy on land
10. Air breathing
11. Hatchlings have many predators
12. Lived in the seas over 200 million years

Procedure

Prior to the lesson, set up the mystery nest. This is a representation of a sea turtle's nest that might be found along the Texas coast. Write clues on some of the ping-pong balls. Bury them along with extra balls in the sand to represent eggs in a nest. Use the rulers as stakes and the crepe paper as marking tape to show how a nest might be identified for protection on the beach. Preset the nest in an open area ready for when the students arrive in class.

Materials

Per group of two students:

- **Game Cards: Copy all cards on card stock, two-sided with the turtle pictures on the back.**
Copy each set on a different color:
 - ◆ Beach (B1)
 - ◆ Sargassum (S1)
 - ◆ Open Ocean (O1)
- **Copy of Game Instructions**
- **Copy of Game Board Labels, cut apart**
- **Three lunch sacks labeled Beach, Sargassum, and Open Ocean**
- **2 egg cartons, 12 sections each**
- **20 each of two different colored beans or beads**
- **one die**

Purpose

Students will simulate events in the life cycles of turtles as they move through the game. The game cards represent both hazards created by people, industry and pollution that endanger the lives of turtles, as well as methods used to protect them.

Procedure

Prepare the game:

Both players read the directions before playing.

Students lay the egg cartons end to end to form two rows of 12 sections.

They lay the area labels in order (Beach, Sargassum, Open Ocean) next to each side of the carton running its length.

Then they put the game cards in the corresponding sacks. These sacks are placed in order to one side of the game board.

Each player puts 20 beans (turtle eggs) in the first section of the beach area.

After setting up the game board, students read the Game Instructions, then begin.

The game is concluded when the surviving turtles from both students are in the last section.

The two students playing the game should compare their number of survivors and discuss what affected the lives of all the turtles in their nest.

As a class, have groups report and compare the number of turtles that survived, then discuss what impacted the survival rates in each of the groups. This can easily be integrated into language arts by having each student write and illustrate the adventure of the turtle's life.

Explain

Puzzling Turtle Facts

Materials

- **Turtle Fact Sheets: Copy on card stock. Cut each card into four or five distinct puzzle pieces based on your class size.**
-

Procedure

Students will receive one puzzle piece each. They are to form groups by matching the 4 to 5 puzzle pieces, read the cards and plan a method to present the information to the class. This could be in the form of a short skit, song, poster, news report, puppet show, etc. Students should take notes during the presentation to be prepared for a class discussion comparing the five species of turtles common to our Texas coast.

Evaluate

Life-Size Turtle Models

Materials

- **Bulletin board paper**
 - **Glue**
 - **Scissors**
 - **Markers**
 - **Measuring tapes**
 - **Turtle Fact Sheets: Copy on card stock.**
 - **Turtle pictures from books or the Internet**
-

Procedure

Using magic markers, student groups draw life-size models of the five turtles studied in this lesson on the bulletin board paper. Models can be cut out and used in a hallway displays.

Each group researches their turtle to find five additional interesting facts. These and the ones on the fact cards can be recorded in a creative format (E.g.: written on eggs in a nest or written on the scutes of the turtle). The turtle models and recorded information make an impressive and informative hall display.

Materials

- Poster boards
- Markers
- Research information
- Litter or plastic materials that might be found in the ocean (e.g. balloons, ribbons, plastic bottles, plastic bags, etc.)

Procedure

Students apply what they have discovered by designing environmental posters focused on educating the school community about factors that affect turtles in the Gulf.

Resources

Actual Size, Steve Jenkins, Houghton Mifflin Company, 2004 (ISBN: 0618375945).

Project WILD Aquatic

Project WILD Aquatic is distributed through the Texas Parks and Wildlife's Project WILD office. Educators, youth group leaders, and others can receive the Project WILD Aquatic K-12 Curriculum and Activity Guide by attending a Project WILD workshop. It is a six-hour workshop for which teachers may receive SBEC (State Board of Educator Certification) and TEEAC (Texas Environmental Education Advisory Committee) credit. Workshops are typically free of charge. For more information, visit:

www.tpwd.state.tx.us/learning/project_wild/aquatic_wild.phtml

Websites

www.cccturtle.org/sea-turtle-information.html

www.seaturtles.org

www.nps.gov/pais/myweb2a/sea_turtle_science

www.graysreef.noaa.gov/tw/turtles.html

Game Instructions

Once Upon a Beach

or

It's a Turtle's Life

1. Get ready to play. Place the turtle cards in the matching bags. Set your cartons end to end. Place label strips along side of the egg cartons: Beach by the first four sections, Sargassum by the second four and Open Ocean by the last four.
2. Place your 20 eggs (beans) in the first section of the carton on the Beach end.
3. Roll the die. The highest roll moves first.
4. Take turns rolling the die to move your hatchlings out of the nest. The goal is to get them to the Open Ocean at the other end.
5. If 1,2,3,or 4 is rolled, that many turtles may be moved forward to the next section with no more than five hatchlings in a section at a time. You may choose to move hatchlings from different sections, but the total number of turtles moved must equal the number rolled. Remember each turtle can only move forward one section at a time.
6. If 5 or 6 is rolled, draw a card from a bag in one of the areas in which you have turtles. Follow the directions on the card. Then return the card to the bag. Remember to move turtle that are in the area that matches the bag.
7. Play until your turtles are all in the last section or you can't move. Since the last section holds all of your surviving turtles, it may hold more than five!

Game Cards: Beach

B1

<p>School children clean up beach. Less litter. Lucky you. Move one ahead.</p>	<p>Streetlights confuse you as you travel to the water. One of you must go back to the nest! Wrong direction.</p>
<p>Scooped up by a bird! We'll miss you two. Bye!</p>	<p>Party on the beach, but not for you. Dune Buggy hits edge of nest. Sorry two don't make it.</p>
<p>Environmentalist carries you to the water. Lucky you! Move three hatchlings ahead to the Sargassum.</p>	<p>Poacher gathers eggs for dinner, but he is caught. Lose a turn while eggs are returned to nest.</p>
<p>Crab dinner on the beach. One hatchling becomes dinner.</p>	<p>Condo construction planned this year. Held up in court. You are safe for this year. Move two turtles ahead.</p>
<p>A masked robber found your nest. Raccoons eat turtle eggs. So sorry for three of you!</p>	<p>Caught in fishing line as you cross the beach. So sorry, lose one hatchling.</p>



Game Cards: Open Ocean

01

<p>T.E.D.s are for turtles trapped in shrimp nets. Save this card to free yourself.</p>	<p>That's a balloon, not dinner. Save this card. Get another plastic card and one of you is out!</p>
<p>Storm is tossing the waves. Swim for calmer waters. Miss one turn.</p>	<p>Trapped in a shrimp net. Use a T.E.D. card to save yourself or...one turtle is gone!</p>
<p>Yikes! Bitten by a shark. Miss one turn to heal.</p>	<p>You're wanted for a tortoiseshell hair clip. So long... one of you is gone.</p>
<p>Took a bite of plastic. Feeling full. Save this card. Get another plastic card and one of you is out!</p>	<p>You're wanted for turtle soup. Sorry. So long... one of you is gone.</p>
<p>That plastic bag wasn't a jellyfish! Save this card. Get another plastic card and one of you is out!</p>	<p>T.E.D.s are for turtles trapped in shrimp nets. Save this card to free yourself.</p>



Game Cards: Sargassum

S1

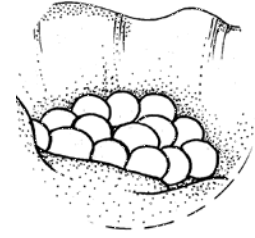
<p>Nice hiding place in the Sargassum. Move three ahead.</p>	<p>Nice hiding place in the Sargassum. Move three ahead.</p>
<p>Ripped from your seaweed raft by a storm. Miss one turn while you look for a place to hide.</p>	<p>Dinner for a fish... that's you! Lose one turtle.</p>
<p>Congratulations! You've really grown. Time for two of you to go to the open ocean.</p>	<p>Scooped up by a bird! We'll miss one of you. Bye!</p>
<p>Yikes! Bitten by a shark. Miss one turn to heal.</p>	<p>Took a bite of plastic. Feeling full. Save this card. Get another card like this and one of you is out!</p>
<p>Took a bite of plastic. Feeling full. Save this card. Get another card like this and one of you is out!</p>	<p>Took a bite of plastic. Feeling full. Save this card. Get another card like this and one of you is out!</p>



Game Board Labels



Beach

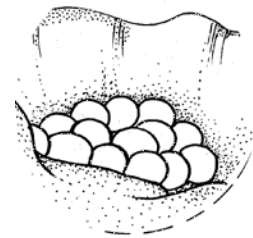


Sargassum

Open Ocean



Beach



Sargassum

Open Ocean

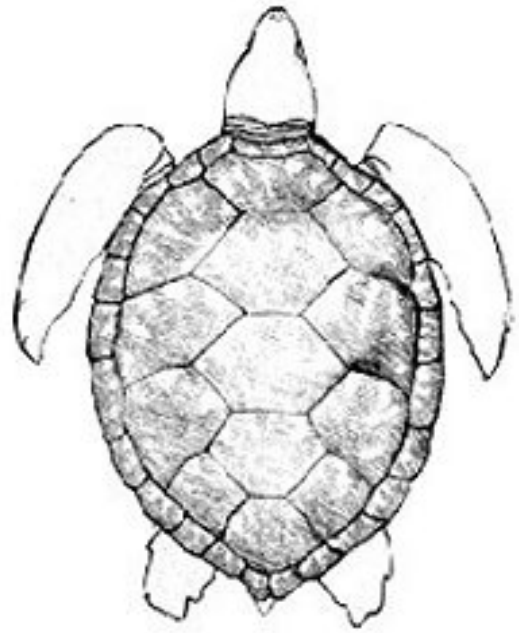


Green Sea Turtle

Endangered

Description

- Carapace: flattened, oval shape
- Carapace: grey, green, brown, and black
- Carapace: 105 – 122 cm long (3.5 – 4 feet)
- Flippers have 1 claw
- 136 – 182 kg (300 – 400 pounds)



Diet

Diet changes as it grows:

- Less than 20 – 26 cm (8 – 10 inches): worms, insects, sea grasses, algae, young crabs and shrimp
- 20 – 26 cm (8 – 10 inches): sea grass and algae
- Adults: herbivorous – eat plants - serrated jaws help them tear Turtle grass and algae.

Habitat

- Near the shore, in bays, sea grass beds, and along the jetties

Threats to Survival

- Drowning in shrimp nets
- Ocean pollution (plastics mistaken for food)
- People collect eggs, eat the meat, and use skins for leather to make boots, belts and other items

Nesting

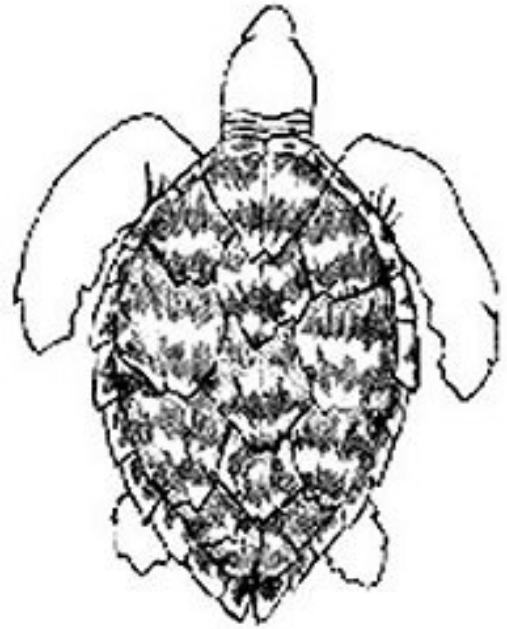
- Returns to the same beach
- Nests three to five times every 2 or more years
- Lays about 115 eggs in each nest
- Incubation – about 60 days

Hawksbill

Endangered

Description

- Carapace: oval shape
- Carapace: orange, brown or yellow
- Carapace: 76 – 92 cm long (2.5 – 3 feet)
- Flippers have 2 claws
- 45 – 68 kg (100 – 150 pounds)



Diet

- Pointed, beaklike jaw used to get into cracks to reach food
- Eats shrimp, squid, anemones and sponges

Habitat

- Rocky areas, around coastal reefs and lagoons, jetties

Threats to Survival

- People use their shells for jewelry and hair clips – called tortoiseshell
- Ocean pollution (plastics mistaken for food)

Nesting

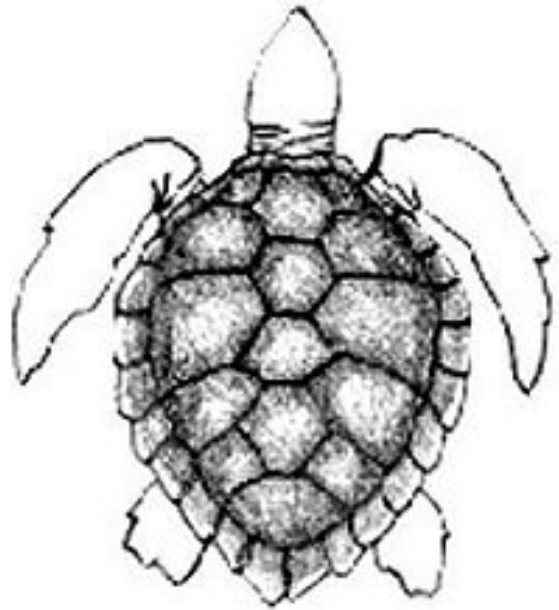
- Returns to the same beach
- Nests two to four times every 2 or more years
- Lays about 160 eggs in each nest
- Incubation – about 60 days

Kemp's Ridley

Most Endangered

Description

- Carapace: round, without ridges
- Carapace: dark grey green
- Carapace: 61 cm long (2 feet)
- Flippers: one claw on front, one or two claws on rear
- 35 – 45 kg (77 – 100 pounds)



Diet

- Powerful jaws to crush and grind food
- Eats shrimp, crabs, clams, mussels, fish, sea urchins, jellyfish, squid

Habitat

- Shallow areas with sandy and muddy bottoms

Threats to Survival

- Drowning in shrimp nets
- People collecting the eggs, eating the meat or using their parts to make other products
- Ocean pollution (plastics mistaken for food)

Nesting

- Returns to the same beach
- Nests in large groups
- Nests twice a year
- Nests during the day
- Lays about 110 eggs in each nest
- Incubation – about 55 days

Leatherback

Endangered

Description

- Only sea turtle without hard shell
- Carapace: long, large flexible
- Carapace: dark grey or black with white or pale spots
- Seven ridges run the head to tail
- Thin tough rubbery skin
- 122 – 183 cm long (4 – 6 feet)
- 250 – 700 kg (550 – 1,545 pounds)
- Flippers have no claws



Diet

- Delicate, scissor-like jaws
- Feeds mostly on jellyfish
- Jellyfish are soft-bodied animals mostly made of water

Habitat

- Open ocean

Threats to survival

- Caught and drowned in commercial fish nets
- Pollution in the ocean
- Balloons and plastic bags mistaken for jellyfish

Nesting

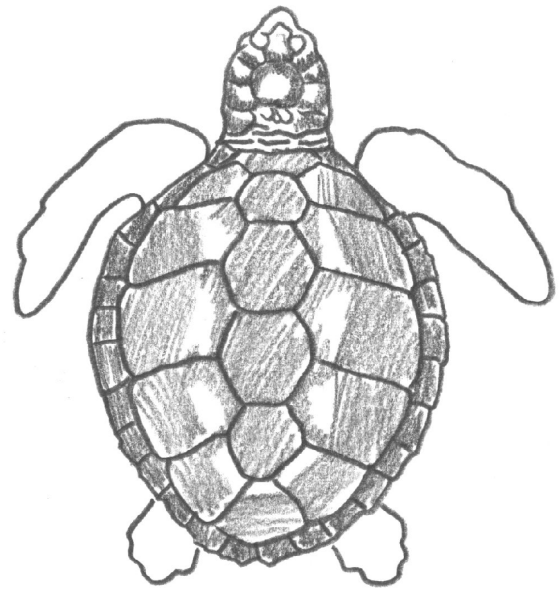
- May nest on different beaches in same area
- Lays about 80 billiard ball sized eggs that can produce hatchlings and 30 smaller eggs that will not hatch
- Incubation – about 65 days
- Nests 6 to 9 times every two or three years

Loggerhead

Threatened

Description

- Carapace: heart-shaped
- Carapace: reddish-brown
- Carapace: 76 – 105 cm long (2.5 – 3.5 feet)
- Flippers: front flippers are short, thick with two claws, rear flippers have 2 to 3 claws
- Up to 160 kg (350 pounds)



Diet

- Powerful crushing jaws
- Eats shellfish, horseshoe crabs, mussels, clams, other invertebrates

Habitat

- Bays and shallow water along coast

Threats to Survival

- Loss of nesting areas because of building along the coast
- Lighting causes hatchlings to become confused as they seek the water
- Drowning in shrimp nets
- Ocean pollution (plastics mistaken for food)
- Shoreline predators such as crabs, birds, and mammals

Nesting

- Returns to the same beach
- Nests in large groups
- Nests twice a year
- Nests during the day
- Lays about 110 eggs in each nest
- Incubation – about 55 days