

illustrations by Peter Grosshauser

DISCOVER SEA TURTLES

WHAT IS A
SEA TURTLE?

WIDE WORLD
OF SEA
TURTLES

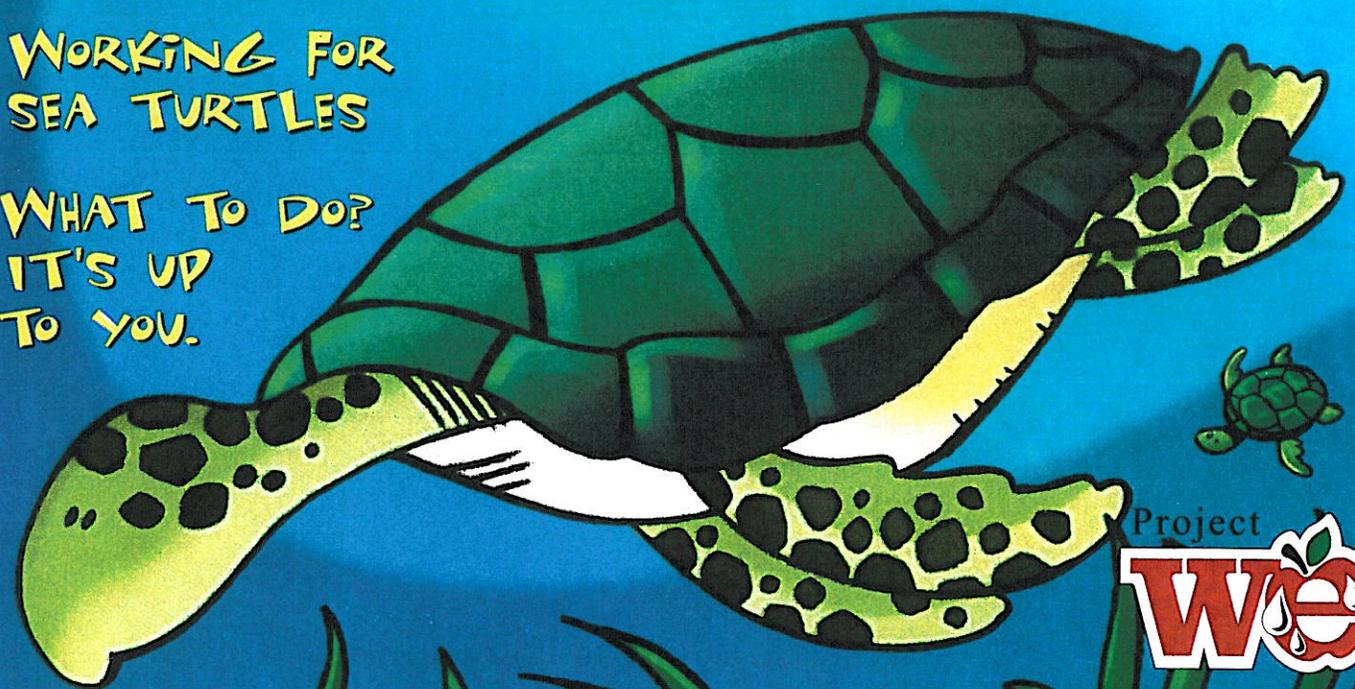
SEA TURTLE
LIFE HISTORY

WHY CLASSIFY?

TURTLE HURDLES

WORKING FOR
SEA TURTLES

WHAT TO DO?
IT'S UP
TO YOU.



Project
wet

WHAT IS A

Sea turtles are an ancient group of reptiles that have been swimming through our seas for more than 100 million years. Like all reptiles, such as snakes, lizards and crocodiles, they are cold-blooded animals. Most sea turtle species prefer the warmer tropical and subtropical waters, but they can be found in all the world's oceans and seas, except in polar regions. These air-breathing reptiles adapted from land animals, left freshwater marshes for the oceans tens of millions of years before our human ancestors walked the planet. They are among the most fascinating and mysterious creatures on Earth.

One mystery scientists are working to understand is how adult females find their way back to the beaches where they were born to lay their eggs. One theory is that sea turtles use Earth's magnetic field for guidance.



Look out for sea turtles while boating.

People have long been fascinated by sea turtles. See how the stories of people and sea turtles have often been entwined.

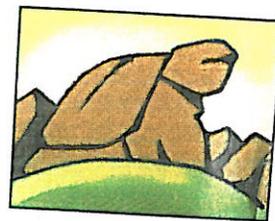
Sea Turtle Stories

North America's Iroquois Indian culture believed that the world was created on the back of a giant sea turtle. On the other side of the globe, sea turtles are revered in Hawaiian chants, tattoos, dance and carvings on rock, called **petroglyphs**.

The legend of the green sea turtle, Kauila, is from Hawaii. She was the daughter of two supernatural sea turtles, and could change herself into a girl to watch children

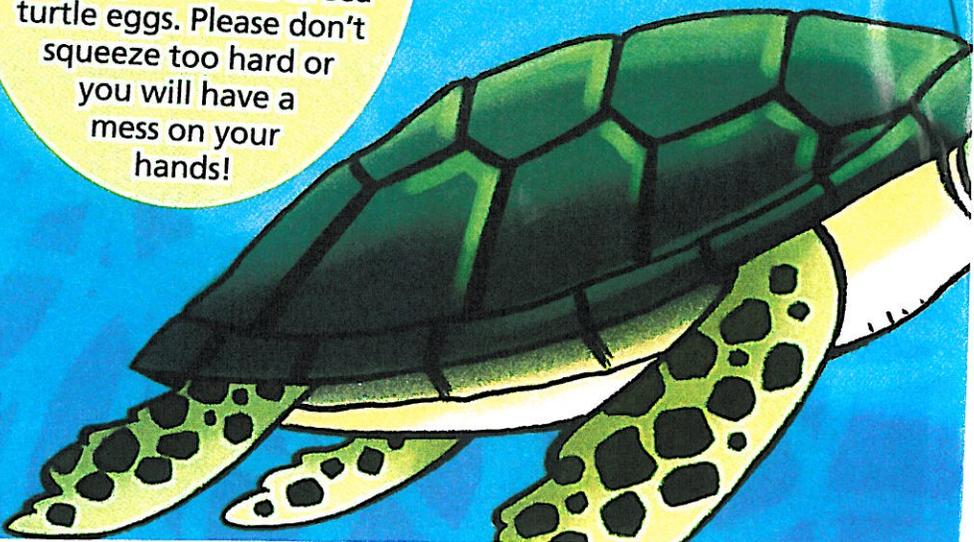
playing along the beach. Kauila is the mythical mother of all turtles, and loved all children.

Along the Miskito Coast of Central America, favorite nesting beaches for green turtles, the "Turtle Mother" legend lives. According to the myth, the turtle-shaped rock faced land at the start of each nesting season, but turned back to the sea when the last hatchlings emerged from their nests. Villagers watched the magic rock, and knew when turtles were



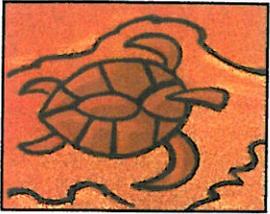
Get a Feel for Turtle Eggs.

Place a fresh chicken egg (not boiled) in vinegar overnight. By morning, the hard shell of the chicken egg will feel leathery like shells of sea turtle eggs. Please don't squeeze too hard or you will have a mess on your hands!



SEA TURTLE?

coming ashore to lay eggs, and when the hatchlings scampered to the sea.



Turtle Petroglyph

In ancient cultures, people created images in stone by chipping away at a rock's surface. Called petroglyphs, this artwork was often used to tell stories. Hawaiians were awed by the sea turtle's ability to return home after long journeys at sea, so they were seen as navigators in their petroglyphs.

Draw your own petroglyphs, and try to decipher each other's stories.

TURTLE ANATOMY

Draw a line between the name and description of the sea turtle's body part to where it is on the illustration.

Rear flippers - In the water they help to steer, but on land females use them for digging nests.

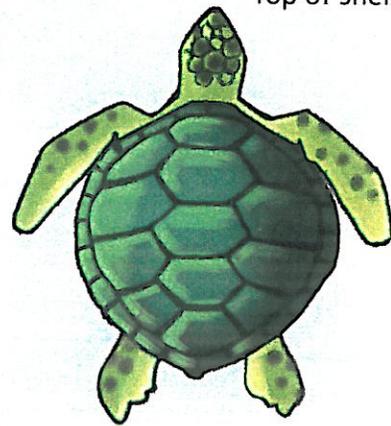
Plastron - This is the bottom part of the shell that varies in color among the different species of sea turtles.

Carapace - This is the top part of the shell. It is flattened and streamlined to help the turtle glide through the water.

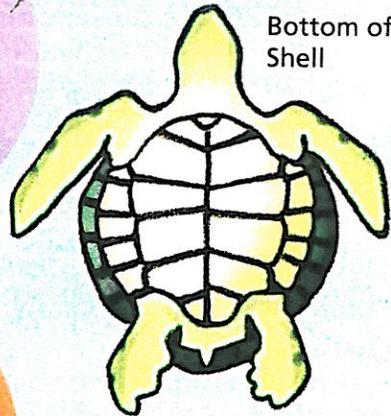
Skull - One job of the skull is to protect the brain.

Scute - These are the individual scales on top of the carapace that help distinguish one species from another.

Top of Shell



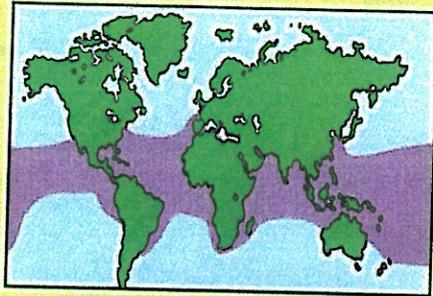
Bottom of Shell



Support local conservation efforts to protect sea turtles.

WIDE WORLD

Sea turtles travel great distances in their lifetime. They travel to mate, nest on beaches and find food. Different sea turtles have different **ranges** (areas where an organism naturally occurs). Many sea turtles share overlapping ranges.



Caroline S. Rogers, PhD

Hawksbill Turtle

(*Eretmochelys imbricata*)

Shell: 25-35 inches
(63-88 centimeters)

Weight: Up to 200 pounds
(91 kilograms)

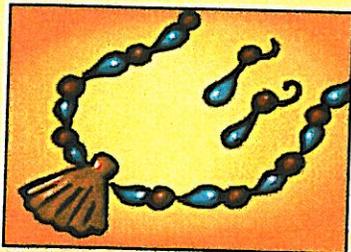
Color: Dark amber carapace with streaks of orange, brown or black and clear yellowish plastron

Favorite foods: Sponges

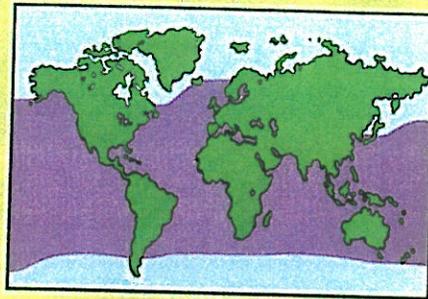
Habitat: Coral reefs and surrounding habitats in tropical and subtropical oceans

International status: Critically endangered

Fact: Their narrow heads with pronounced beaks resemble those of hawks.



4



istockphoto/sestevens

Loggerhead Turtle

(*Caretta caretta*)

Shell: 34-49 inches
(85-123 centimeters)

Weight: Up to 400 pounds
(181 kilograms)

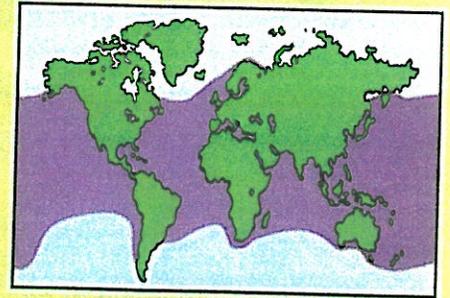
Color: Reddish brown carapace and yellowish plastron

Favorite foods: Whelks, crabs and other shelled **invertebrates** (animals without a backbone)

Habitat: **Continental shelf** (shallow water sea bottom close to continents) and open ocean subtropical waters

International status: Endangered

Fact: The large head contains strong muscles for crushing their shelled prey.



Scott A. Eckert

Leatherback Turtle

(*Dermochelys coriacea*)

Shell: Up to 78 inches
(195 centimeters)

Weight: Adults can weigh up to 2,000 pounds (907 kilograms)

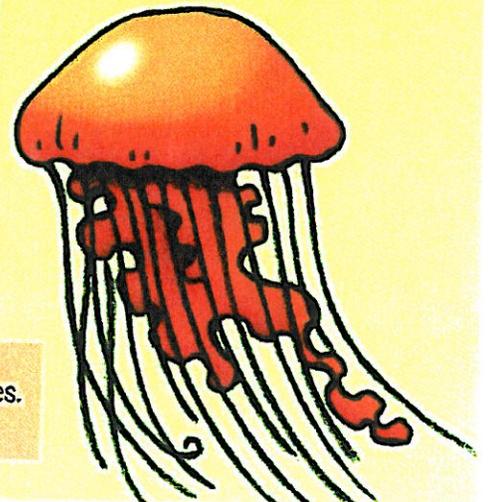
Color: Black with pinkish-white spotted carapace and white with black spotted plastron.

Favorite food: Jellyfish

Habitat: Tropical and subtropical open ocean waters

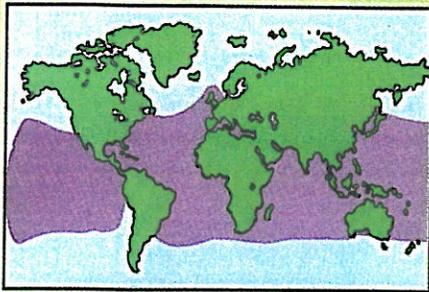
International status: Endangered

Fact: The largest of all sea turtles, the leatherback is the only species with a carapace made up of tiny bones covered with a rubbery skin.



Never buy anything made from sea turtles. It is against the law and harms sea turtles.

F SEA TURTLES



istockphoto/Filipken

Green Turtle

(*Chelonia mydas*)

Shell: More than 36 inches (90 centimeters)

Weight: Up to 350 pounds (159 kilograms)

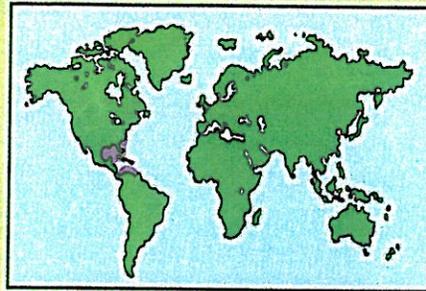
Color: Brownish carapace that can be shaded with olive and pale yellow to white plastron

Favorite foods: Sea grasses, algae

Habitat: Tropical and subtropical ocean and continental shelf waters

International status: Endangered

Fact: Green turtles are the largest of the hard-shelled sea turtles and are named for the color of the fat under their shell.



istockphoto/Gina Hanf

Kemp's Ridley Turtle

(*Lepidochelys kempii*)

Shell: 24-28 inches (60-70 centimeters)

Weight: Up to 100 pounds (45 kilograms)

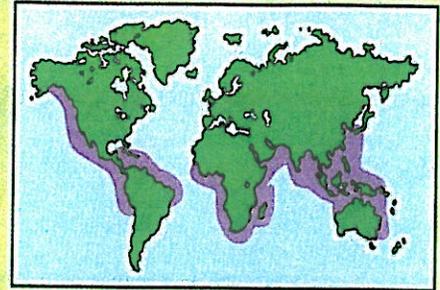
Color: Gray-green carapace and pale yellowish to cream colored plastron

Favorite food: Crabs

Habitat: Tropical and subtropical ocean and continental shelf waters

International status: Critically endangered

Fact: Kemp's ridley turtles have the most restricted nesting range of all sea turtles.



Scott Handy

Olive Ridley Turtle

(*Lepidochelys olivacea*)

Shell: 22-30 inches (55-75 centimeters)

Weight: Up to 100 pounds (45 kilograms)

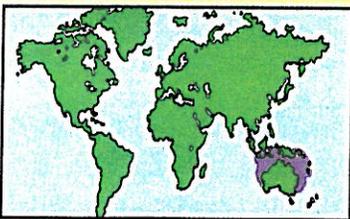
Color: Gray-green carapace and pale greenish-yellow plastron

Favorite foods: Crabs, jellyfish, clams, snails and algae

Habitat: Tropical and subtropical ocean waters

International status: Endangered

Fact: Olive ridley turtles lay their eggs in large groups at the same time. This event is called an 'arribada', which means 'arrival by sea' in Spanish.



Jarrod Sherborne

Flatback Turtle (*Natator depressus*)

Shell: 30-39 inches (75-98 centimeters)

Weight: Up to 200 pounds (91 kilograms)

Color: Olive-gray carapace and cream-colored plastron

Favorite foods: Jellyfish and sea pens

Habitat: Tropical waters of Australia

International status: Not yet determined

Fact: The flatback turtle has the smallest range of all the world's sea turtles.



No matter where you live, protect turtles by not littering and by recycling. Turtles may mistake a floating plastic bag for a jellyfish. This can be deadly.

SEA TURTLE

For a sea turtle, the journey of a hatchling emerging from an egg to an adult female returning to nest has the turtle traveling full circle.

The "Lost Years"

After hatchlings swim to open ocean, it is rare for

people to see them again until they migrate back to shallow water, which can take many years. What in the world do they do for all this time? Though still sometimes called the "lost years," scientists are now

closer to solving this mystery. It is believed that hatchlings live among rafts of floating seaweed that drift for thousands of miles in ocean currents. There, they can find food and are camouflaged from predators. During this time, they grow and develop.



Keep pets away from nesting beaches to help protect eggs and hatchlings.

LIFE HISTORY

Turtle Time

The seven living sea turtle species have changed remarkably little in millions of years. Though evolution is slow, the changes humans are making to the environment are happening quickly. With turtles evolving slowly and our environment changing so rapidly, what does this mean for sea turtles?

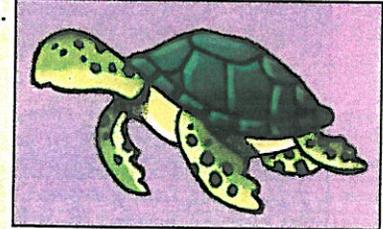
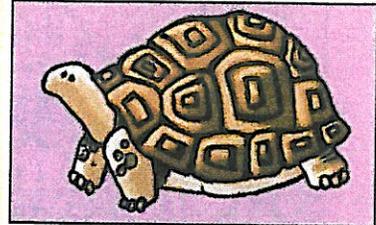
AMAZING
TURTLE SCIENCE

SEA TURTLE OR LAND TORTOISE?

Below are differences between sea turtles and land tortoises. Can you identify the characteristics of each turtle?

Check the answer key.

1. Withdraws head and limbs into their shells for protection.
2. Flippers help them swiftly escape predators.
3. Shell is streamlined to move more efficiently in water.
4. Legs and feet designed for walking.
5. Hides in rocky places and uses its shell as a shield.
6. Moves slowly.
7. Achieves short bursts of speed.



Salty Tears

Sea turtles do not drink fresh water; they drink salt water. Glands located behind their eyes enable them to secrete excess salt in the form of tears.

Thermo-Regulation

When winter temperatures arrive, most sea turtles retreat to warmer waters. Because of their large size and exceptional ability to regulate their body heat, leatherbacks can live in subarctic zones where they feast on jellyfish.

Long-Distance Swimming

Sea turtles swim hundreds and even thousands of miles in search of good feeding grounds. How far would you travel for a good meal?

Deep Sea Diving

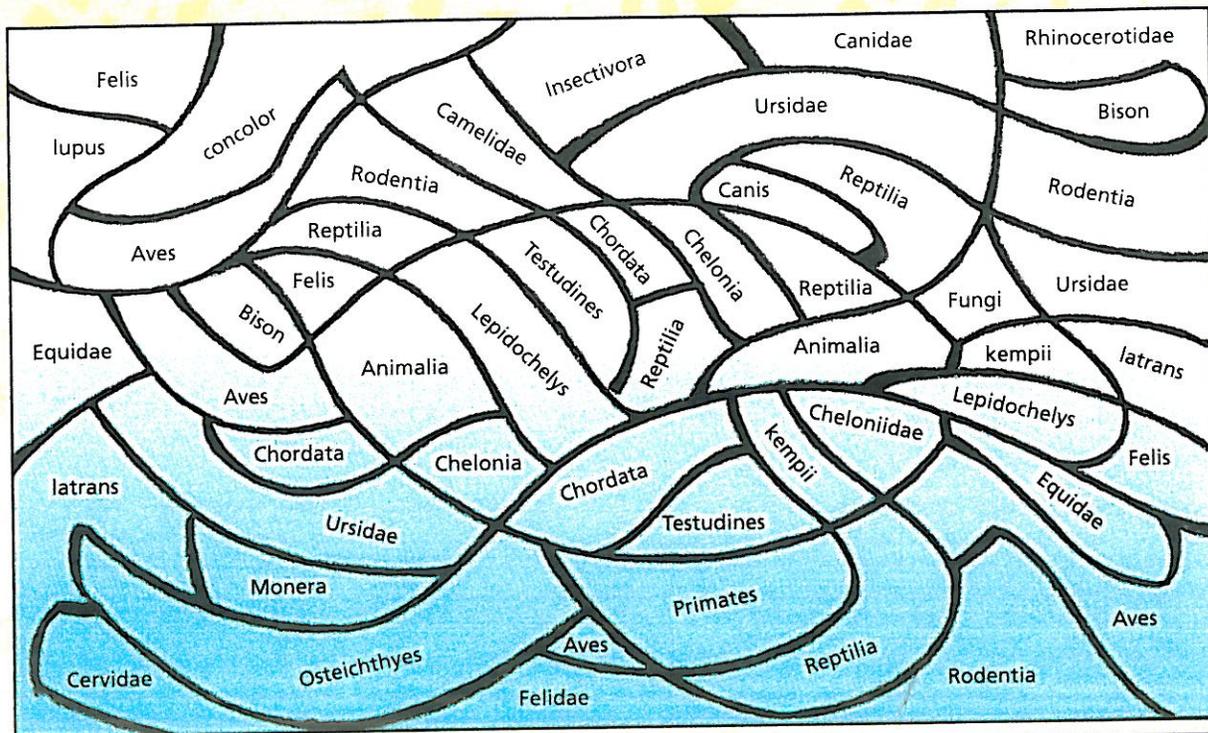
Leatherback sea turtles have been known to dive as deep as 3,280 feet (984 meters)—twice the depth of human deep sea divers in special gear.

Sex Determination

Unlike most animals, whether a sea turtle egg becomes a male or female hatchling depends on the temperature of the nest. Usually, the warmer the nest, the more females there will be.



Never shine a flashlight anywhere near a sea turtle.



Scientists **classify** all organisms by categories, starting with the broadest similarities to the most specific. The classifications in descending order are: kingdom, phylum, class, order, sub-order, family, genus, species. All sea turtles share the first four classifications. By putting together the genus and species you can come up with the scientific name for each species of sea turtle.



Never use flash photography on nesting beaches.

CLASSIFICATION COUNT DOWN

Classifications go from top down—from the biggest group to a single species. Look at the puzzle. Start with “kingdom.” Color every space in the puzzle with the Kemp’s ridley sea turtle’s kingdom (Animalia). Do the same for each level of classification listed below.

The Kemp’s ridley sea turtle is endangered, but if you classify it correctly, you can find it in this puzzle.

- Kingdom—Animalia** Every animal on Earth is part of this.
- Phylum—Chordata** Any animal with a backbone belongs here.
- Class—Reptilia** All 7,500 reptiles are included here.
- Order—Testudines** This includes 250 species of turtles on Earth.
- Sub-Order—Chelonia** All seven species of sea turtles are here.
- Family—Cheloniidae** Every hard-shelled sea turtle is here.
- Genus—Lepidochelys** Only the Kemp’s ridley and olive ridley sea turtles belong here.
- Species—kempii**

Lepidochelys kempii (Kemp's ridley sea turtle)

ASSIFY?

Sea Turtle Habitat

As animals that inhabit the world's oceans, sea turtles are part of a global community. Just like people in any community, they have needs in order to live and thrive there. Although sea turtles are cold-blooded reptiles adapted to living in the ocean, they share some basic needs with warm-blooded mammals such as humans.

TRY THIS

Circle the needs sea turtles have in common with people from the following list:

- Air
- Clean water
- Bathing
- School
- iPod
- Computer
- Skateboard
- Shelter
- Clothing
- Sunlight
- Sports
- Swimming lessons

Different species of sea turtles play different roles in helping keep ecosystems in balance. Without them, communities can experience changes that can affect the well-being of many other animals and plants. Here are some of the ways sea turtles are good neighbors.

Maintain Their Grass

Green sea turtles are great grazers of sea grass. Because they create plots where younger, more nutritious blades of grass grow, they make their environment a better place for other species too.

Good Eggs

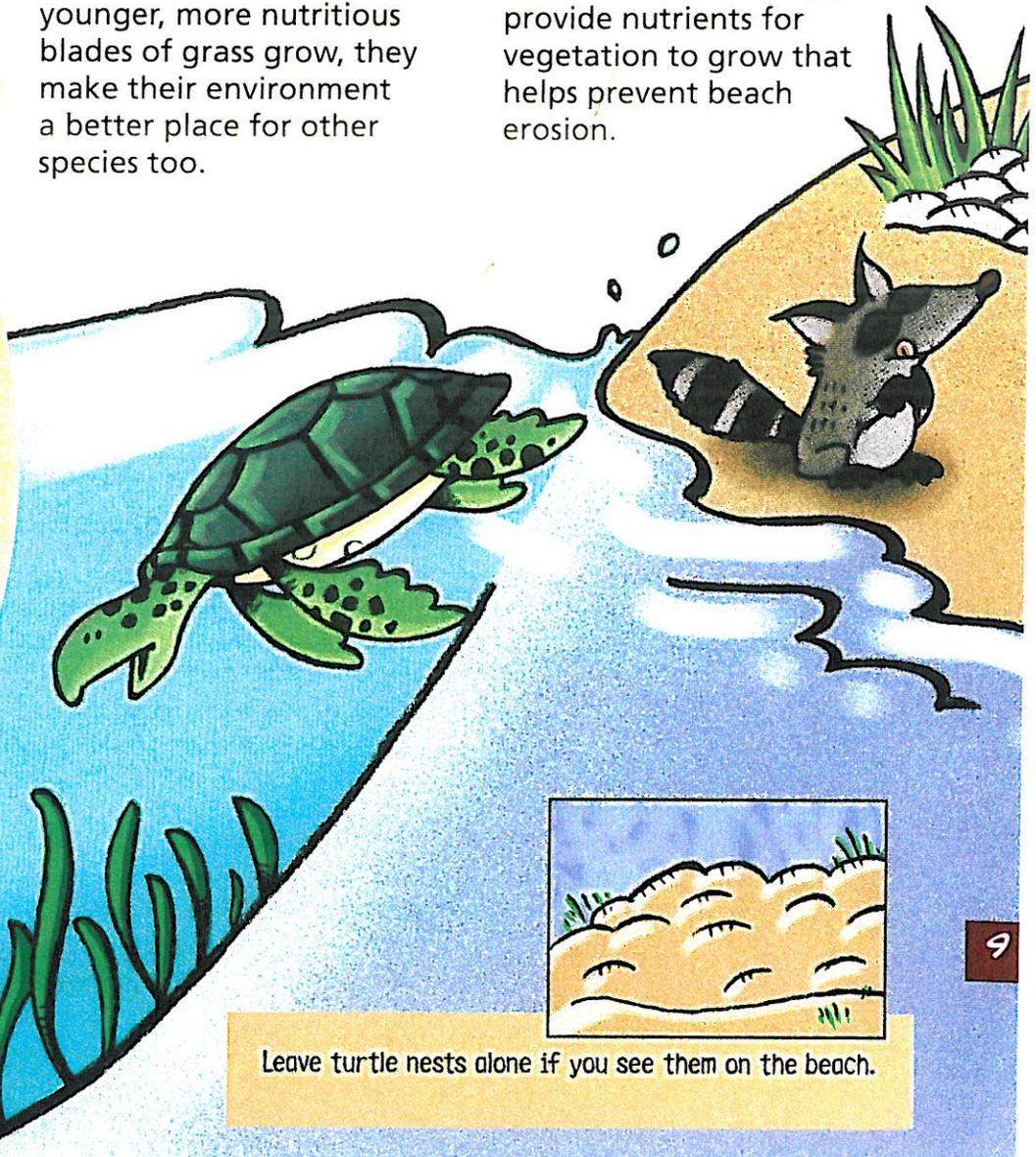
Sea turtle eggs are a nutritious food for natural predators such as raccoons.

Food Source

Hatchling turtles are a food source for many fish, crabs and sea birds. Larger sea turtles are preyed upon by few animals; sharks are the exception.

Good Beachgoers

The remains of the eggs provide nutrients for vegetation to grow that helps prevent beach erosion.



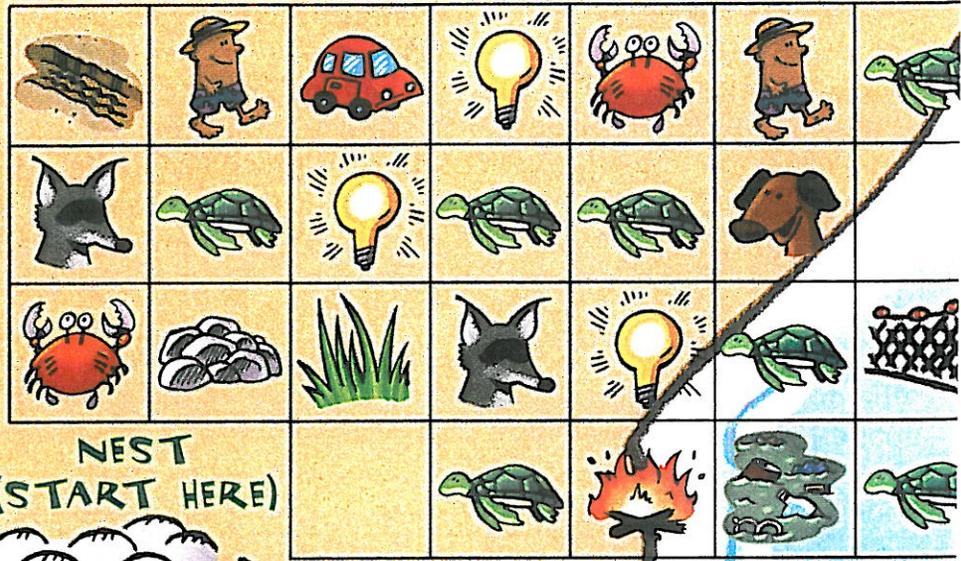
Leave turtle nests alone if you see them on the beach.

TURTLE

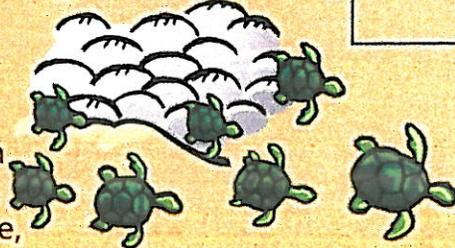
COAST OF JAPAN * Not to scale

Of the estimated 100 eggs the mother turtle lays, very few hatchlings survive. Some eggs never hatch and some eggs are eaten by predators. There are many dangers for hatchlings: dogs or raccoons digging up nests; bright lights that confuse hatchlings and cause them to crawl in the wrong direction; crabs that eat them; beach cleaning machines or vehicles that drive over small turtles; car ruts that trap them. Because nesting females and their hatchlings rely on darkness to find the ocean, lights on shore (for example, from hotels or homes) can confuse them. In some areas, humans collect eggs for consumption.

Once they survive the trek to the water's edge, for many turtles there is a long journey ahead. For example, North Pacific loggerhead sea turtles travel over 7,000 miles from Japan, where they hatch, to Baja California Sur, Mexico to feed and grow. They may spend several years in these



NEST (START HERE)



feeding grounds near the shore before they return to Japan to breed and nest. Along the way, there is an ocean full of human-caused threats: **fishing nets** that may drown turtles, **boats** that may strike them and **marine debris** to entrap them. Every year tens of thousands of sea turtles are accidentally injured or killed during fishing operations; this is known as **bycatch**.

Other threats include:

Pollution. Toxic chemicals and heavy metals that find their way into the sea can cause health problems.

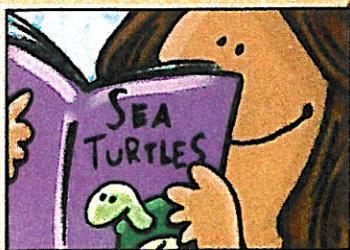
Excessive Nutrients.

Fertilizers and sewage can lead to algal blooms that reduce oxygen levels in water. This decreases the quality of the habitat for turtles.

Oil spills. When sea turtles come in contact with oil, a wide range of health problems can occur.

Illegal Trade. Though it is against international law, some people trade sea turtle parts. Scutes have been used to make jewelry, combs and hairbrushes. Eggs and meat have been used for food. Sea turtle skin has been used in making leather goods such as boots.

Over-harvest of prey. If we consume too much of the food that turtles rely on, such as crabs and conchs, what will turtles eat?



Learn all you can about sea turtles by reading about them and visiting aquariums and museums.

HURDLES

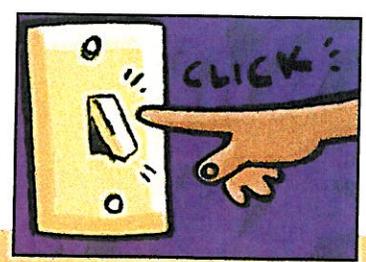


FEEDING
GROUNDS

Game Directions:

Take a sack, mark it "#1" and fill it with pieces of paper numbered 1 to 3. Take a second sack, label it "#2" and fill it with pieces of paper with the following numbers: 0, 0, 0, -1, -2, -3, -4, -5, -6. Use different coins or buttons to represent turtles. Each player gets 25 tokens and these represent turtle hatchlings. You continue to play as long as you have at least one hatchling remaining.

Draw a number from bag #1 and move ahead that number of spaces. You may move in any direction forward on the grid. If the space you land on is a picture other than a turtle, draw a piece of paper from bag #2. If the paper has a (- number), that is how many hatchlings are lost and you must give up that many tokens. If you draw a 0, you escaped the danger and lost no hatchlings. When you are out of tokens, the game is over for you. The goal is to make a round-trip, from your nesting beach in Japan to feeding grounds in Mexico, and then back to Japan to nest.



Support programs to darken coastlines. During the turtle nesting and hatching season, turn off lights and close blinds or curtains in houses and hotels.

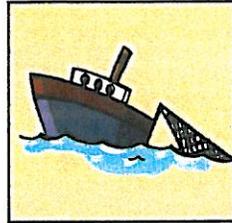
WORKING FOR

RESEARCHERS FISH FOR ANSWERS

Using science, researchers look to help sea turtles overcome some of the many challenges they face. Draw a line connecting the research or activity and the question researchers are trying to answer.

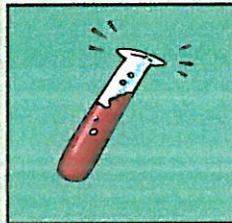
Turtle Excluder Devices (TEDs)

While trawling for fish, commercial fishermen can accidentally catch sea turtles, too. By equipping the back of trawl nets with TEDs, which are rigid grids that deflect turtles through an opening in the net, sea turtles can escape back into the open water.



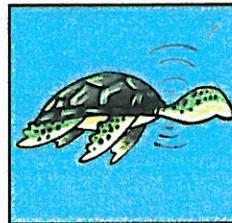
Genetics Research

Scientists take blood and tissue samples to extract **DNA** (the genetic code of all living organisms) from individual turtles. This is compared to DNA taken from sea turtles from known nesting beaches. By studying a turtle's DNA, scientists can figure out where adult turtles are born and if they are related.



Telemetry

By attaching small transmitters to sea turtles, researchers can follow turtles around the globe via orbiting satellites. Data from these devices provides details about migration, navigation, foraging areas and even the speed and depths at which turtles swim.



Monitoring Populations

Scientists survey turtles in the water and on land. Nesting populations of different species of sea turtles are regularly monitored at nesting beaches. Sea turtles usually return to nest at or near the beaches where they were born. An increase in nests can mean the population is increasing; a decrease in nests may mean the population is declining. More studies are needed in the marine environment.



ACTIVITY

Questions

- 1- How can we improve our understanding of the migratory patterns of sea turtles so that countries can work together toward conservation?
- 2 - How do we design fishing gear that allows us to catch fish, but not turtles, as fishermen trawl the seas?
- 3 - How do we determine if a sea turtle population is declining in order to take steps to help reverse the situation?
- 4 - How could we discover where adult turtles are born and whether turtles feeding in the same coastal area are related?

If you live where turtles nest, remove all recreational equipment such as chairs or umbrellas from the beach at night—they can trap hatchlings and keep them from reaching the ocean.

SEA TURTLES

CAREER MATCH

There are many different career paths that you can take to help sea turtles. Play this game of memory to see if you discover your career match!

How to Play:

You can play this game with others or by yourself. Take a blank piece of paper and cut it up into squares to cover each square on the game board. Cover the entire game board with the squares. Pick up one of the pieces of paper and see what is underneath. Try to match the career picture with its description. If you don't make a match, cover up the spaces and let the next player try. Once you get a match, hold onto the squares of paper. When the board is clear of paper squares, the player with the most matches wins. Maybe the career that you uncover is in your future!

A

I design and conduct studies to learn more about sea turtles.

B



Film Maker

C

I help to keep nesting areas and beaches clean of trash for sea turtles and other marine life.

D



Naturalist

E

I enforce laws that keep threats to sea turtles at bay.

F



Law Enforcement

G

I make laws that protect areas where sea turtles nest and feed.

H



Fishery Observer

I

I work aboard fishing vessels to monitor bycatch of sea turtles.

J



Researcher

K

I make documentaries about sea turtles so people can learn more about them.

L



Elected Officials

M

I work for a wildlife center teaching others about sea turtles.

N



Environmental Educators

O

I work with other nations where sea turtles are found to make sure turtles are protected in their range.

P



Policymakers

Q

I teach people about sea turtles.

R



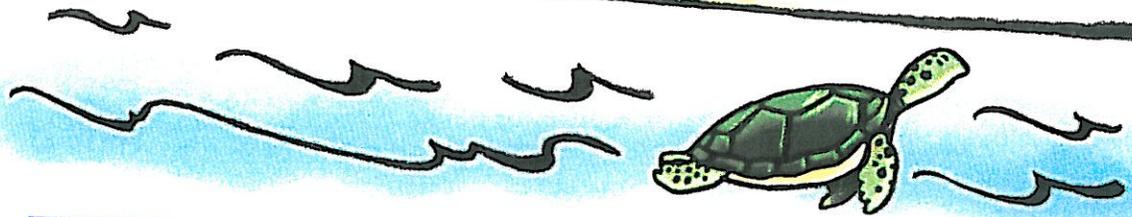
Volunteer



Do not build campfires on the beach during turtle nesting season—the light from the fire may attract hatchlings.

WHAT TO DO?

Here are some real-life examples of several issues facing sea turtles today. After reading the case study, write down any thoughts you might have to address them. Then, compare your solutions with the answers below (and upside down). Did you think of additional solutions?



SEA TURTLE TIMES

The Glaring Problem of Beach Lighting

In a beach community where a declining population of sea turtles has nested for thousands of years, several new oceanfront projects will triple the use of nighttime beach lighting in the next five years. Because sea turtle hatchlings need darkness to find the ocean, this poses a problem. As a biologist working with the community planning board, what can you do to protect the turtles?



- Possible Solutions**
- Launch education and outreach efforts to convince people who live on the beach to turn off their lights at certain hours during nesting season.
 - Put up shields to block beachfront lighting.
 - Pass laws restricting lighting.
 - Relocate future development projects away from fragile coastlines.



Protect sand dunes—a healthy dune system is important for suitable turtle nesting habitat.

T'S UP TO YOU.

Time to Write a Report About Illegal Hunting

You're an anthropologist studying the culture of a small island where sea turtles are honored, and the local government has taken steps to preserve their population. In spite of a ban on poaching sea turtle eggs, monitoring indicates that the practice continues. What are the top three recommendations that you will file in your report to the government regarding this issue?

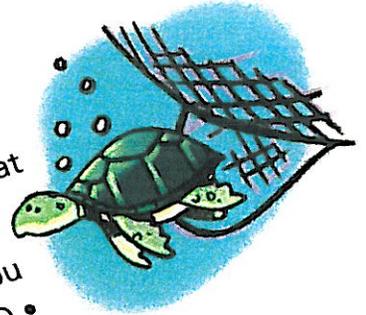
- Increase enforcement of existing laws on nesting beaches.
- Establish marine protected areas in vital sea turtle habitats.
- Develop outreach and education programs to discourage sea turtle egg poaching and benefits of eco-tourism.



On The Hook

You've just developed a new type of fishing gear. Its hooks and lines are great for catching a certain bottom-dwelling fish species. There's a snag, though. When you tested your gear, you accidentally caught several loggerhead sea turtles, as well. You're eager to market your gear as being environmentally friendly. What should you do?

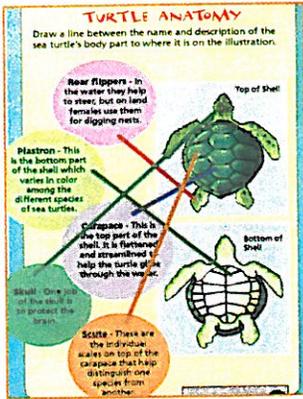
- Consider using a different fishing technique that would not catch turtles.
- Work with local sea turtle biologists to determine whether there are certain fishing times and areas in which sea turtles are not or entangled.
- Modify the gear to prevent turtles from becoming hooked.



On land or water, enjoy sea turtles from a distance—so we can enjoy them forever.

ANSWER KEY

WHAT IS A SEA TURTLE? P. 2-3



Sea Turtle or Land Tortoise

1. land tortoise
2. sea turtle
3. sea turtle
4. land tortoise
5. sea turtle
6. land tortoise
7. sea turtle

Try This!

You should have circled these words:
Air, clean water, shelter, sunlight

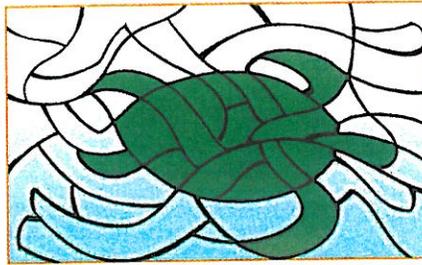
WORKING FOR SEA TURTLES, P. 12-13

Activity Questions:

- Question #1 – Telemetry
- Question #2 – Turtle Excluder Devices (TEDs)
- Question #3 – Monitoring Populations
- Question #4 – Genetics Research

WHY CLASSIFY?, P. 8-9

Classification Count Down



Career Match

- | | |
|-----|-----|
| A-J | G-L |
| B-K | N-Q |
| C-R | O-P |
| D-M | I-H |
| E-F | |

SEA TURTLE LIFE HISTORY, P. 6-7



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ISBN 978-1-8886-3165-4



Printed September, 2009 by Johnson Printing



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www.fsc.org Cert no. SW-COC-003100
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