SEA TURTLE 360

A SCIENCE 3D ADVENTURE

MIDDLE SCHOOL

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symbio education™

KEY WORDS

BIOME

CARNIVORE

DECOMPOSER

EXTINCT

HERBIVORE

INCUBATE

MARINE REPTILE

NON-AVIAN DINOSAUR

NUTRIENTS

PHOTOSYNTHESIS

PRODUCER

UPWELLING

SCAVENGE

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BACK TO THE WATER

Turtles are amazing reptiles! Like other reptiles they are cold-blooded, breathe air, have scales, and lay eggs with a tough covering. They lay eggs on land or in holes they dig in the ground. Unlike most reptiles, turtles have a shell. Some are predators, while others are **herbivores**. Even though their ancestors lived on land, most of the living 350 species of turtles are adapted to live almost their entire lives in or around water!

FRESHWATER TURTLES

Maybe you have seen a turtle sunning itself on a log at a lake or pond? Most of the turtles that live in the world's freshwaters are relatively small and have small legs with webbing between their toes to help them paddle. They are slow and clumsy on land. Some get rather large! The alligator snapping turtle (*Macrochelys temminckii*) may live 50 to100 years and weigh more than 90 kilograms (200 pounds). Some softshell turtles in Asia may weigh over 200 kilograms (440 pounds)!

Alligator snapping turtle

Softshell turtle

TORTOISES

One group of turtles, the tortoises, are completely adapted to life on land. Some are huge, while others are really tiny! The Galápagos tortoise (*Chelonoidis nigra*) grows to 410 kilograms (900 pounds), while the speckled tortoise (*Homopus signatus*) only weighs 95 - 160 grams (less than half a pound) when fully grown. Tortoises are the longest living land animals in the world. Most tortoise species live to be between 80 and100 years old, but the Galápagos tortoise lives over 170 years!


Galápagos tortoise


Speckled tortoise

SEA TURTLES

Sea turtles are **marine reptiles** that have adapted to life in the ocean, but they still come to the surface to breathe air. Instead of legs, their front limbs are long flippers that help them power through the oceans. Sea turtles are more at home in the water than on land. When not exerting too much energy, they can hold their breaths for up to seven hours!


Green sea turtle

TURTLE WORLDS

Different types of major ecosystems on land, like rainforests and deserts, are called **biomes**. They are defined by the main plant life, which depends on seasonal patterns of temperature and precipitation. There are also a variety of freshwater and marine habitats!

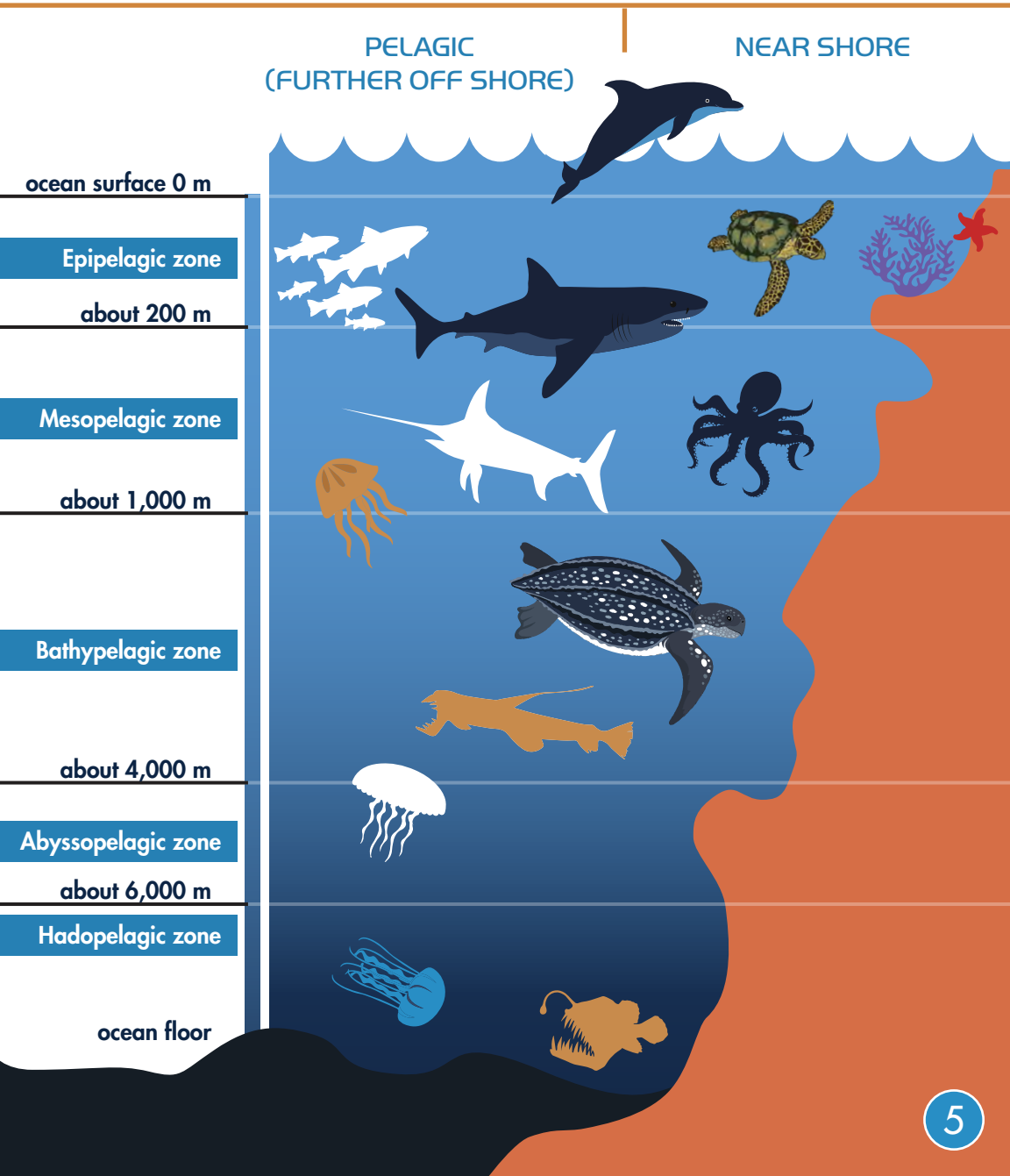
FRESHWATER HABITATS

The major types of freshwater habitat are defined by the speed of water movement and their size.


Red-eared slider

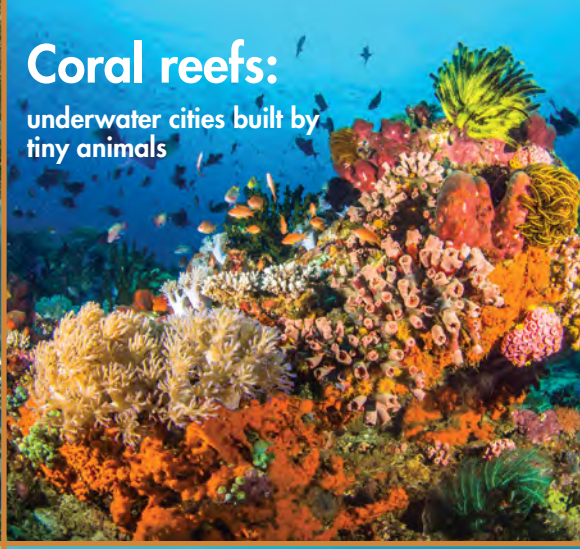
MARINE HABITATS

Ocean habitats are defined based on their depth and distance from shore. Different organisms live in each of these major habitat types. Sea turtles are found in most of them less than 1,000 meters (3,280 feet) deep.



Estuaries:

where rivers meet the sea



Coral reefs:

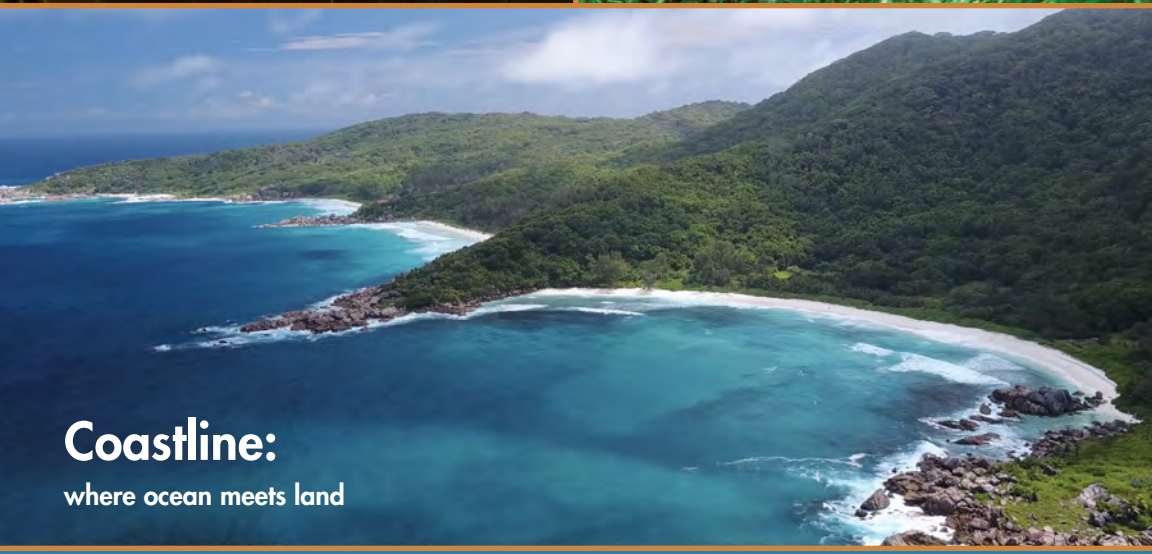
underwater cities built by tiny animals

Kelp forests:

huge algae that look like underwater trees

Seagrass meadows:

the savannahs of the sea



Coastline:

where ocean meets land

There are many different types of coastal ocean habitats.
Sea turtles inhabit all of these!

SEA MONSTERS

Archelon

an ancient giant sea turtle

Besides sea turtles, there aren't many other types of ocean-going reptiles alive today. But, during the Mesozoic Era, or the age of the dinosaurs, there were many amazing marine reptiles. How do we know? Paleontologists have pieced together evidence from fossils and the rocks they are found in. Some people might say that ancient marine reptiles looked like sea monsters. *Archelon* was a prehistoric giant sea turtle the size of a small car!

Shonisaurus

an ichthyosaur

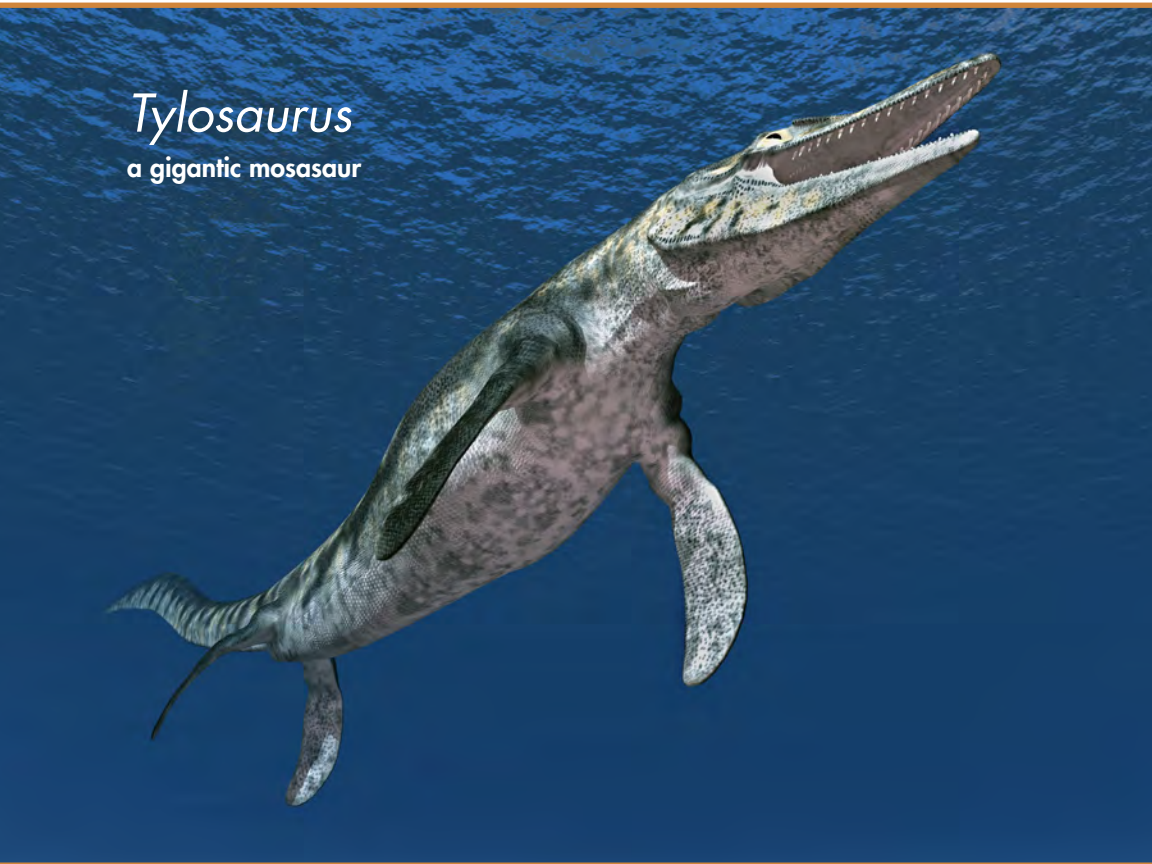
Ichthyosaurs are a group of ancient marine reptiles that likely were very similar to dolphins. They first appeared around 250 million years ago, and the last species disappeared around 90 million years ago. Ichthyosaurs, like *Shonisaurus* were predators that ate fish, squid, and shellfish. They looked similar to dolphins, with a long snout filled with small teeth that could grab slippery prey. They had small flippers and powerful tails, similar to a shark's tail fin. Even though they were reptiles, fossils show that ichthyosaurs gave birth to their young alive at sea. With their large tail fin and small flippers, ichthyosaurs would not have been able to move onto beaches to lay eggs!

Kronosaurus
a short-necked plesiosaur

Plesiosaurs were ocean-going reptiles that first appeared around 200 million years ago and went **extinct** about 65 million years ago along with all the **non-avian dinosaurs**. More than 100 species of long-necked and short-necked plesiosaurs have been discovered. Both types swam with four powerful flippers. Long-necked plesiosaurs had small heads and ate small prey. Some species may have reached 14 meters (46 feet) long! Short-necked plesiosaurs had heads more like crocodiles, and some may have reached more than 17 meters (56 feet) and weighed ten tons! They were strong swimmers and top predators in the prehistoric oceans.

Styxosaurus
a long-necked plesiosaur

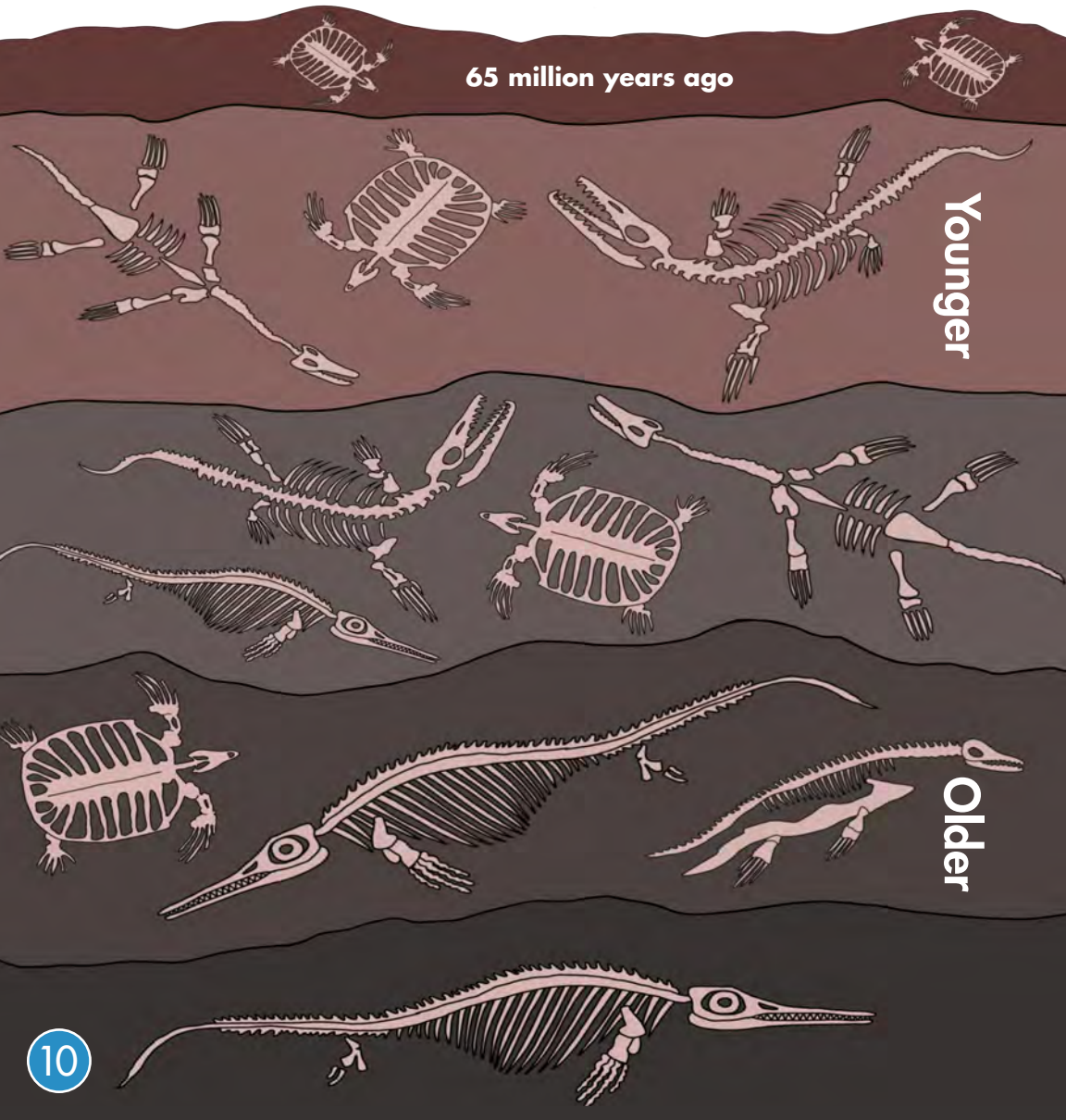
Mosasaurs were ocean-going lizards. Scientists have discovered dozens of species ranging in size from 1 meter (3 feet) to more than 15 meters (50 feet) long! Many species were the top predators in the oceans, equipped with massive heads and incredible teeth. They ate other marine reptiles, fish, sharks, sea turtles, and could crunch through the hard-shelled relatives of squid, called ammonites. Mosasaurs were so well adapted to the oceans that they gave birth to live young at sea. They swam through the water using powerful tails, like sharks. Mosasaurs first appeared in the early Cretaceous period, around 90 million years ago. When ichthyosaurs went extinct, and short-necked plesiosaurs became less abundant, mosasaurs dominated the oceans until they also went extinct around 65 million years ago.



Large mosasaurs were the top predators in the oceans when they were alive.

WHEN DID THEY LIVE?

Scientists can get an idea of when different animals lived by looking at the rock layers in which they are found. Because new rock layers form above older rock layers, animals from lower rock layers lived earlier in time. The fossil record lets scientists learn about past environments and provides information on how species have changed through time. Fossils also help determine the age of different rock layers. They also help explain how the continents have moved over millions of years.

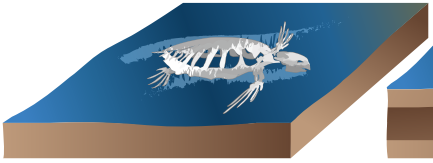


Fossils only form in one kind of rock, called sedimentary rock. Can you guess why? Mud, sand, and other sediments cover and harden on top of dead organisms, fossilizing them. The other two types of rock, igneous and metamorphic, don't contain fossils. Igneous rocks are created when lava or magma cools and solidifies. Metamorphic rocks are formed when extreme heat or pressure transforms igneous or sedimentary rocks.

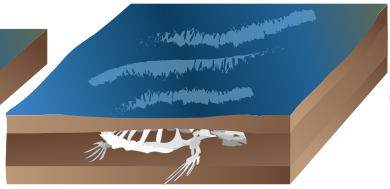
FOSSIL FORMATION

A turtle dies and sinks to the ocean floor.

The soft tissues decompose or are eaten by scavengers.



The skeleton gets covered by sediments.



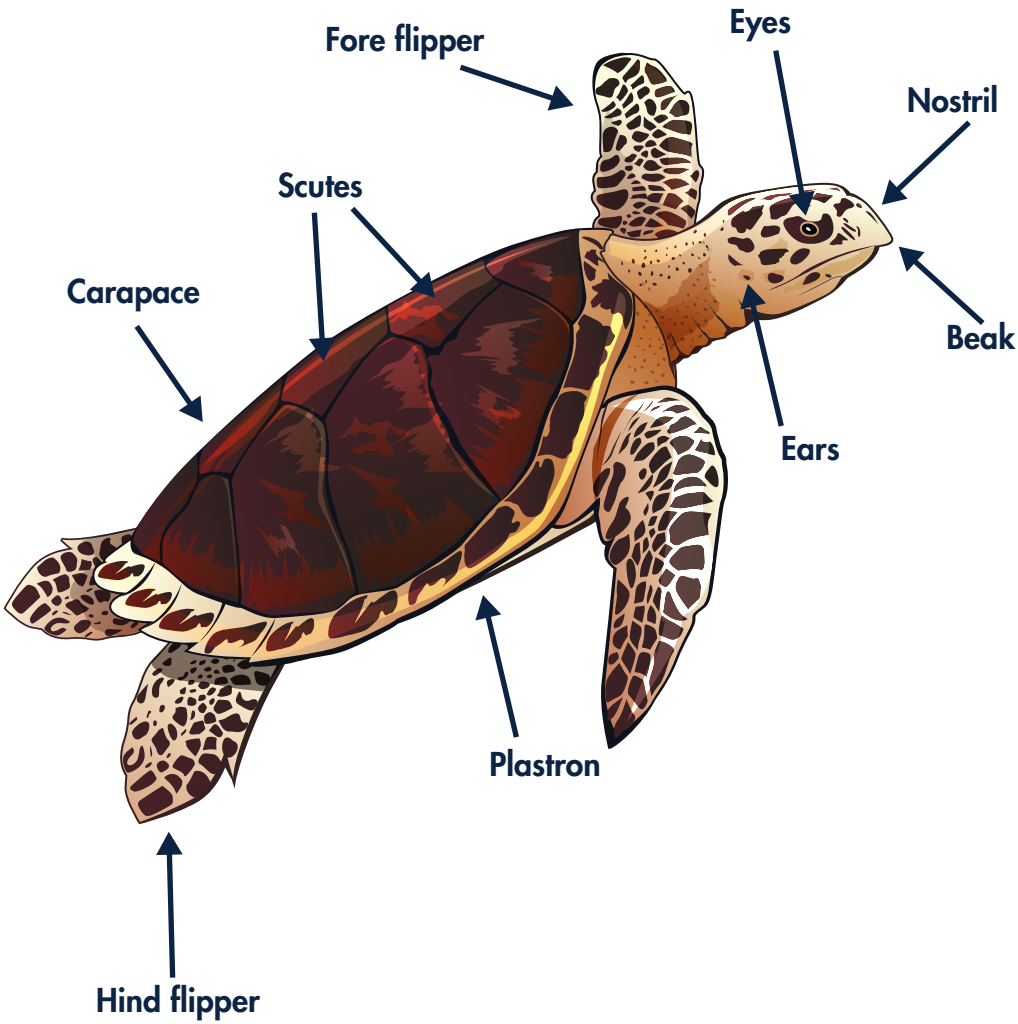
More sediments bury the entire skeleton and turns to rock.

Over time, erosion exposes the rock layer containing the fossilized turtle bones.

SEA TURTLES OF THE WORLD

Sea turtles first appeared around 150 million years ago. Although many species are now extinct, there are seven species of sea turtles alive today. The sea turtle body plan is adapted for life in the ocean.

SEA TURTLE ANATOMY



Leatherback turtles (*Dermochelys coriacea*) are humongous! They are the largest living sea turtle and can grow to more than 2.2 meters (7 feet) long and weigh up to 700 kilograms (1,500 pounds). Unlike other sea turtles, that have a hard carapace, leatherback turtles have thick leathery skin. Leatherback turtles live in deep waters around the world from warm waters near the equator to cold waters. Because of their size, they can bask in the sun at the surface to warm up and then maintain their body heat for a relatively long time. They also have a layer of fat and a special arrangement of blood vessels to help retain heat. Staying warm is important when diving to cold deep waters to hunt their jellyfish prey. They can hold their breath for a really long time as they dive up to 1,000 meters (3,300 feet) underwater!

Leatherback turtle

Leatherback turtles are adapted to living in the open ocean and diving deep to eat jellyfish. To keep slippery jellyfish from sliding back up their throat, leatherback turtles have long, backwards pointing spines inside their esophagi.

Kemp's ridley turtle

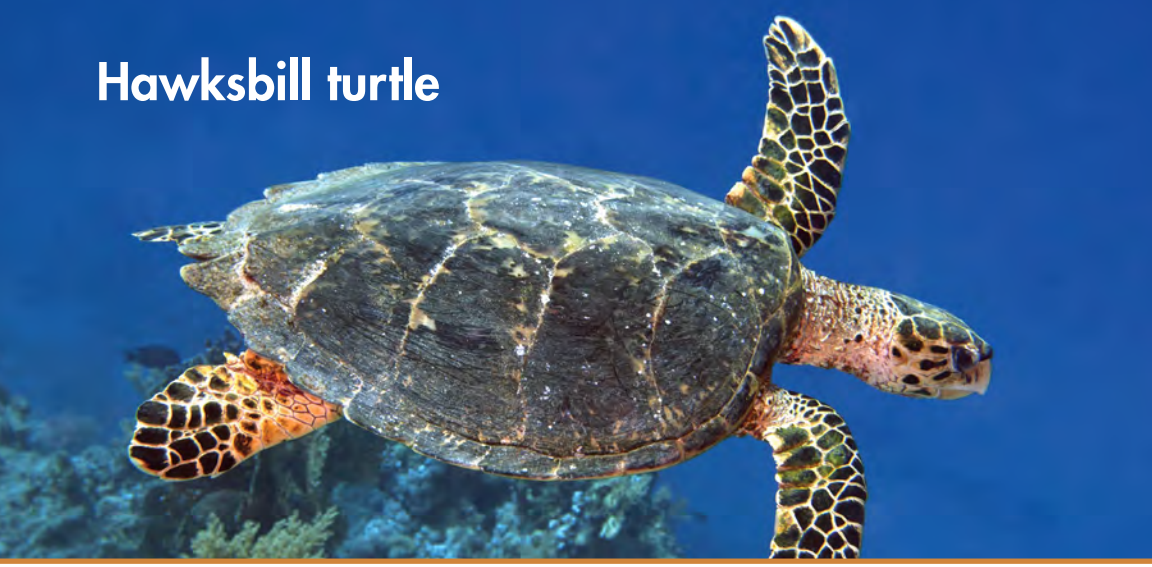
Olive ridley turtle

The two smallest sea turtles are the Kemp's Ridley (*Lepidochelys kempii*) and the Olive Ridley (*Lepidochelys olivacea*) respectively. They eat crabs, clams, shrimp, fish, squid, sea urchins, and jellyfish. Kemp's Ridley turtles are critically endangered and tend to be found in shallow waters. Olive Ridley turtles can be found in both coastal and oceanic habitats.

Flatback turtles (*Natator depressa*) live in the waters of northern Australia and Papua New Guinea. They are found in shallow and often murky waters near the shore where they eat sea cucumbers, jellyfish, shrimp, other invertebrates and algae. Unlike other sea turtles, they lack a thick, domed carapace.

Flatback turtle

Hawksbill turtle



Hawksbill turtles (*Eretmochelys imbricata*) are found on coral reefs around the world. They have sharp, hooked beaks and are one of the few animals that can eat sponges! Many smaller fish wait for hawksbill turtles to start eating a sponge in order to grab a meal from the fragments that break off. Hawksbills also eat squid, anemones, bubble corals and other invertebrates.

Green turtles (*Chelonia mydas*) and loggerhead turtles (*Caretta caretta*) are some of the most common sea turtles in warm waters near coastlines. They can be found around coral reefs, seagrass meadows, and in open waters. Green turtles mainly eat seagrass and algae. Loggerhead turtles have huge and powerful jaws that they use to crush shellfish and crabs, but they will also eat fish and squid and **scavenge** dead fish.

Green turtle

Loggerhead turtle

OCEAN TRAVELS

Sea turtles start their lives buried in the sand on a beach. After about two months of **incubating** in their eggs, the young turtles hatch and start digging their way out of the nest. Interestingly, the temperature each egg experiences during incubation, determines whether the baby turtle that hatches is a male or a female. Warmer temperatures produce females, and cooler temperatures produce males. What do you predict might happen if temperatures on beaches keep rising?

Loggerhead turtle

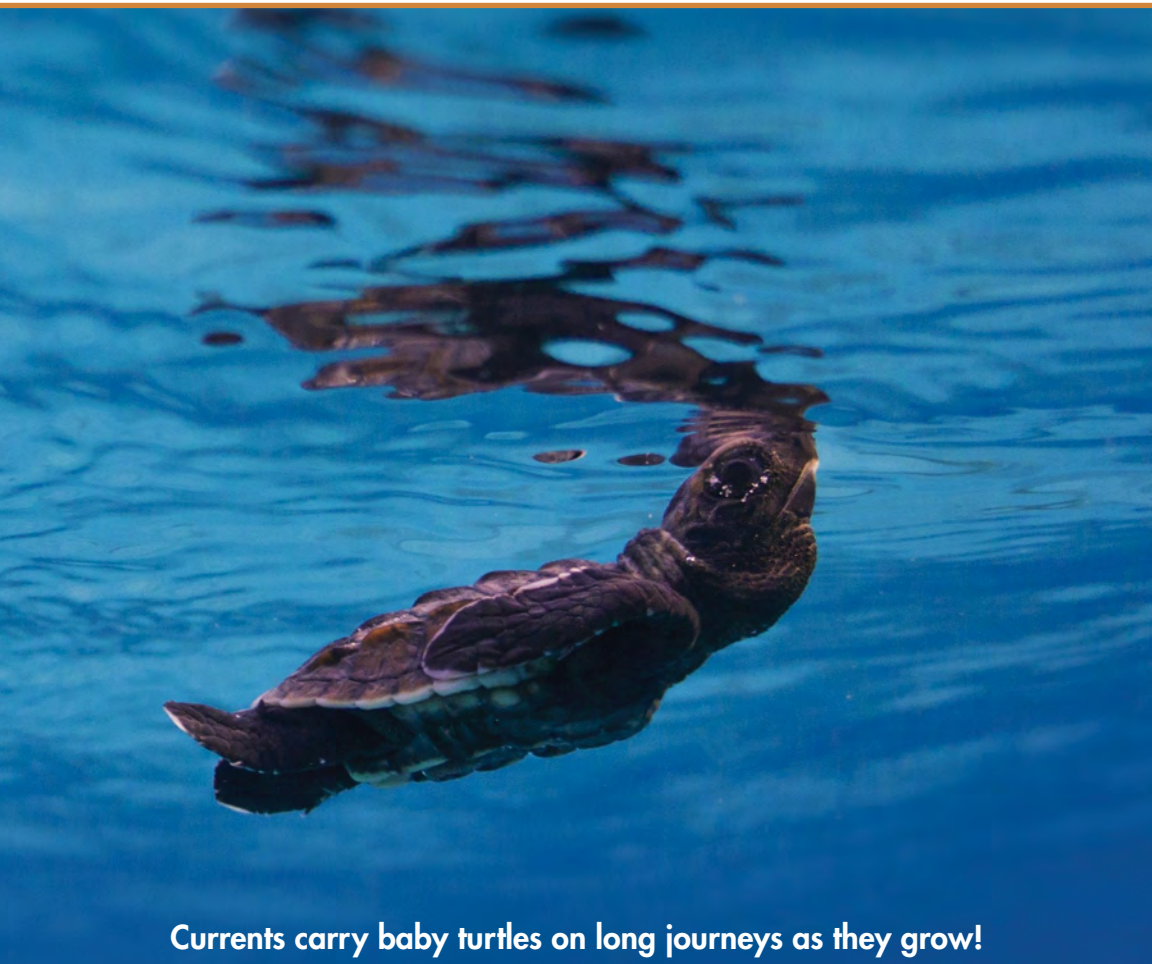
Leatherback turtles

Green turtle

Once sea turtles hatch, it may take them a couple days to reach the surface. Dozens of baby turtles from a single nest emerge together at night. The cover of darkness hides them from many potential predators, but they still have to make a sprint for the water to avoid crabs, raccoons and seabirds. The danger doesn't end once they hit the waves. As soon as they are in the water, fish try to eat them. They start a frenzied swim to get offshore as fast as possible! Baby flatback turtles stay fairly close to the shores where they hatched. Other species travel much further offshore.

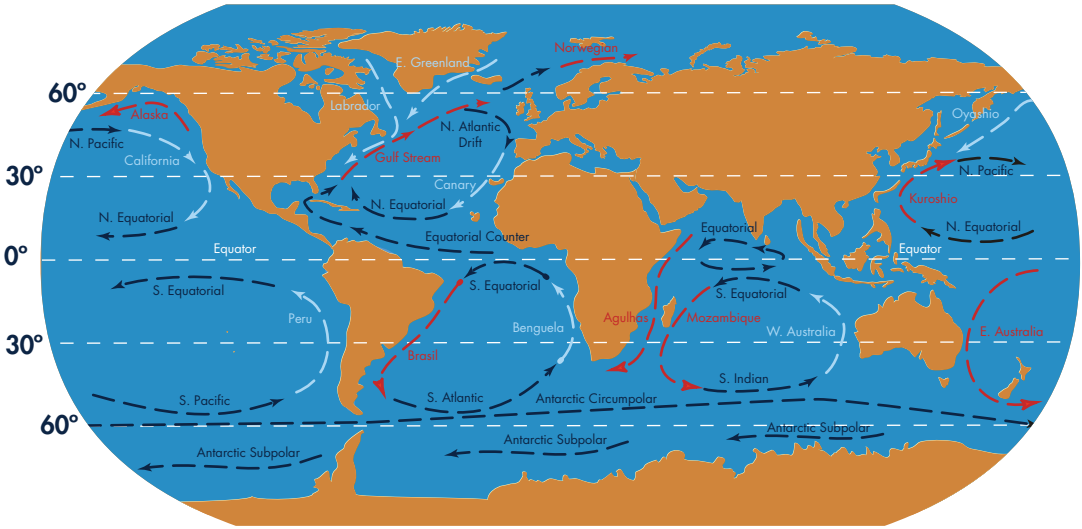
For many decades scientists didn't know where most baby turtles went when they left the beach. They just seemed to disappear until they grew to about the size of a dinner plate! They called these first mysterious years of sea turtles' lives the "Lost Years." Slowly, using observations from scientists at sea, reports from other people traveling across the oceans, and information from new technologies, scientists uncovered what happens during these lost years!

For species that head offshore, the hatchlings eventually find patches of floating algae where they can hide from predators and eat snails, small crabs, fish, shrimp, jellyfish, and algae. The baby turtles sometimes float around an entire ocean in the currents, spending most of their time riding algae rafts that provide food and shelter from predators like big fish and sharks. Understanding ocean currents is helpful for understanding turtle floating patterns. Here's how they work:

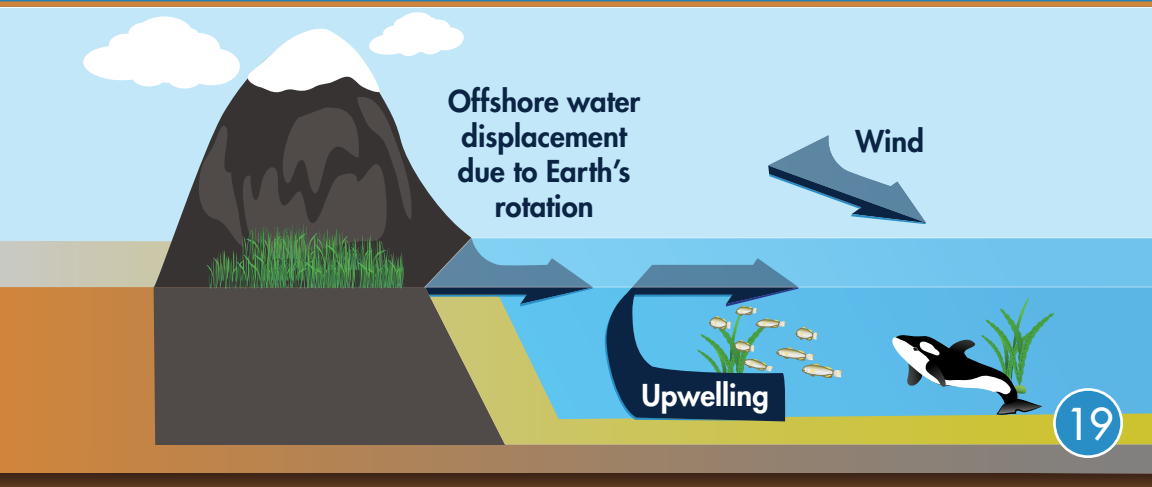


Currents carry baby turtles on long journeys as they grow!

Major current systems occur in every ocean in the world. In the northern hemisphere currents turn clockwise. In the southern hemisphere they rotate counterclockwise. That means warm water tends to move along the east coast of continents and cold water moves along west coasts of continents.



Ocean currents play an important role in oceans and on land. They redistribute heat around the world, which affects local climates. (above). Along coasts, where surface waters move offshore, water moves upward from the deep ocean. This upwelling brings cool water and nutrients to the surface (below).



ALL GROWN UP

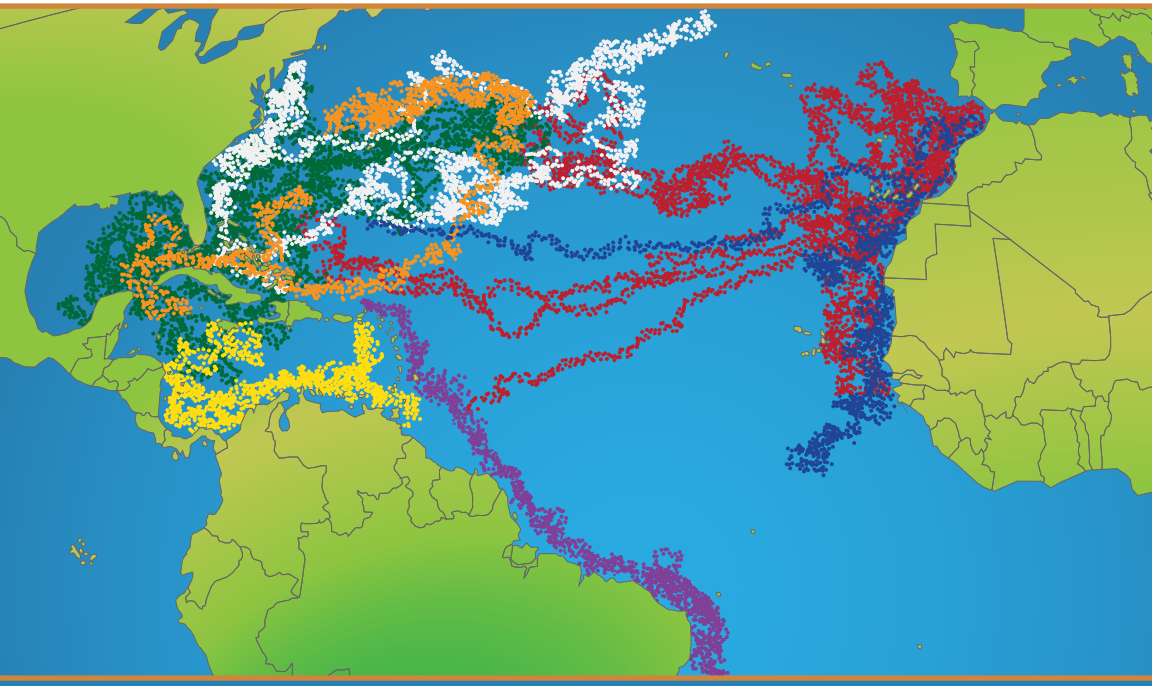
It may take a couple years, but eventually the baby turtles, now about the size of dinner plates, travel close to the coast again. They abandon their floating home and move into habitats where they can feed and grow to adulthood. These are "foraging habitats", the areas where sea turtles spend a lot of their time looking for food and eating. Sea turtles do not only eat at their foraging habitats; they also interact with other turtles and species. For instance, some turtles like to get cleaned by small fish. The fish get a meal, and the turtles get parasites removed! Other turtles may skip the cleaner fish and rub against sponges to scrape algae off their shells.

Large juvenile and adult sea turtles have few predators due to their size and the protection of their shells. But, sharks – especially tiger sharks (*Galeocerdo cuvier*) – are still a threat! In areas where there are many tiger sharks, turtles are very careful to stay safe because it takes many years and a lot of energy to reach adulthood. In fact, it takes between 15 and 50 years for sea turtles to mature! Scientists still don't know exactly how long sea turtles can live, but they think it may be more than 80 years!

Green turtle

BACK TO THE BEACH

When it is time to lay their eggs, female sea turtles return to the beaches where they hatched. But, most species don't make the trip from foraging areas to nesting beaches every year. Instead they take one or more years off between migrations to lay eggs. Some migrations between feeding areas and nesting beaches aren't very far, but most are hundreds or thousands of kilometers, and may even cross entire oceans!



Tracking individual sea turtles shows us they can travel thousands of kilometers from their nesting beaches. Some swim across entire oceans, but they always return to the same beach as adults to lay eggs. To learn more about sea turtle migration, check out http://seamap.env.duke.edu/swot.

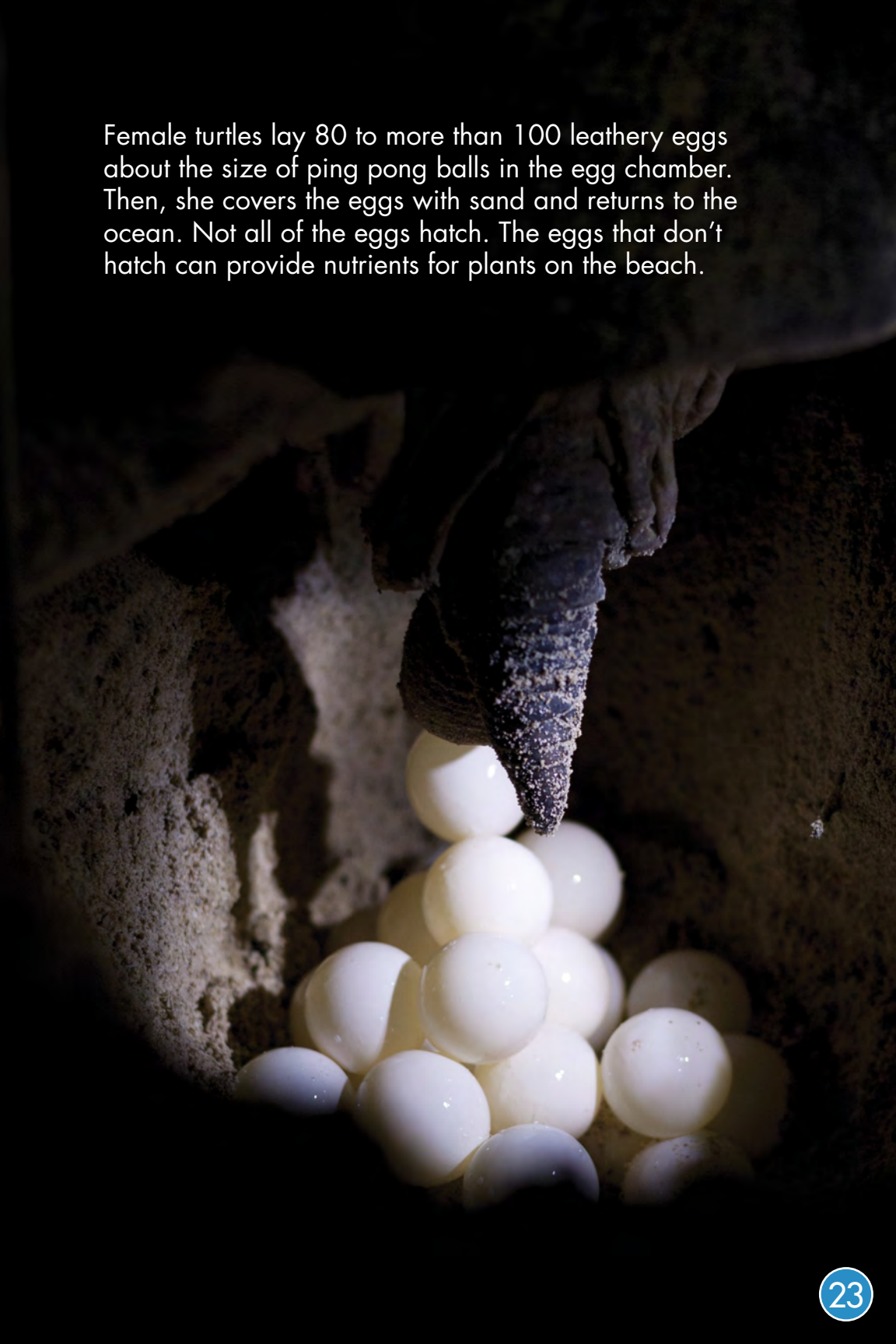
Leatherback turtle

Female turtles nest several times when they travel to nesting beaches. They rest in shallow waters near the beach in between their crawls onto shore.

Once a female reaches the nesting beach, she spends weeks to a few months in the nearby waters. Every 10 to 14 days she comes ashore to lay eggs. Sometimes if she is disturbed, she crawls back to the water without laying eggs. When she does lay eggs, she digs a nest. Nest depth varies by species, but is often 1 meter (3 feet) deep or more.

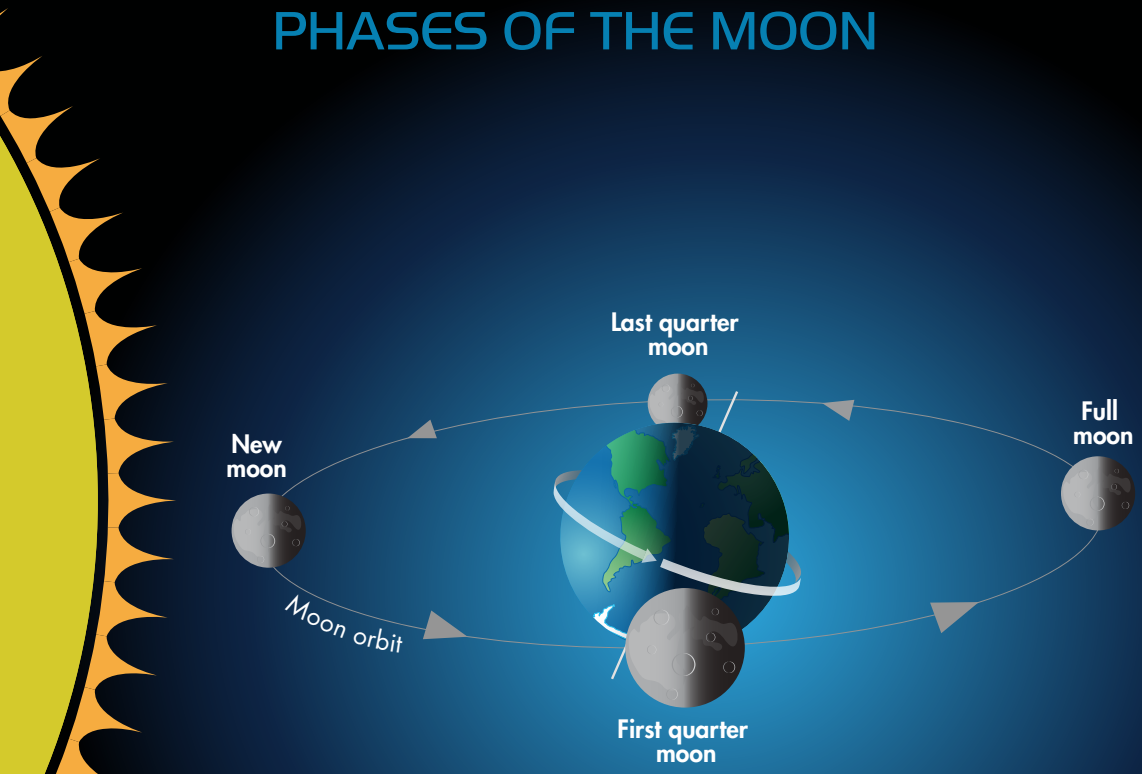
Loggerhead turtle

Female turtles lay 80 to more than 100 leathery eggs about the size of ping pong balls in the egg chamber. Then, she covers the eggs with sand and returns to the ocean. Not all of the eggs hatch. The eggs that don't hatch can provide nutrients for plants on the beach.



Even though female sea turtles may emerge on nights with a full moon, new moon, or any other moon phase, they are still influenced by the moon. If a sea turtle digs a nest in an area that will be flooded by a high tide, the eggs will never hatch. So, sea turtles need to nest on beaches beyond the reach of the highest high tides and tides are driven by the moon!

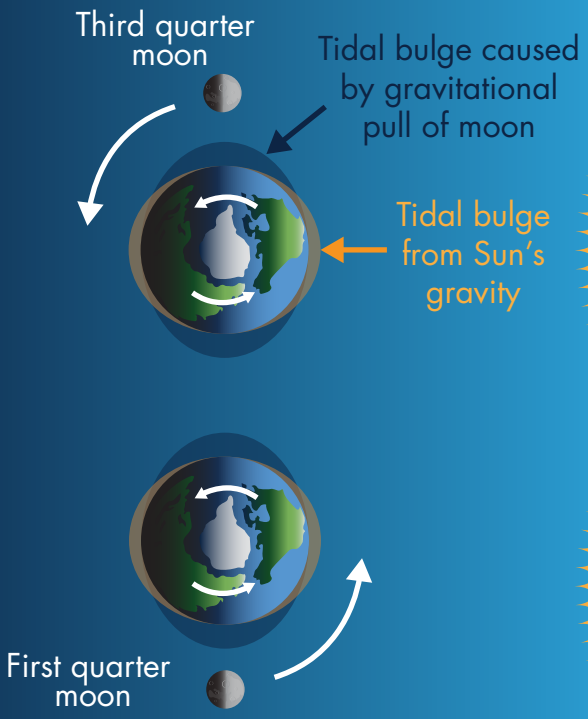
PHASES OF THE MOON



About every 28 days, the moon completes an orbit around Earth. As it orbits, different parts of the moon are either illuminated by the sun or darkened by shadow when viewed from Earth. This causes the appearance of the moon to change shapes, known as the phases of the moon.

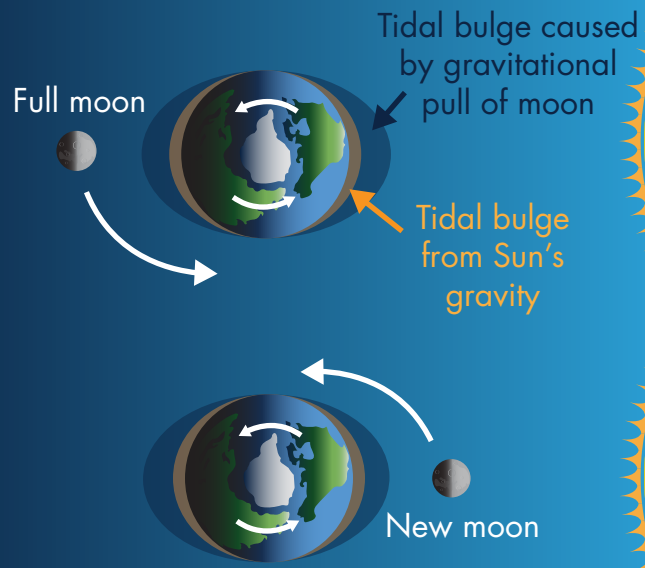
Neap Tides

The lowest high tides and highest low tides occur when the sun, Earth and moon are not in line. During neap tides, the tidal bulges caused by moon and sun are in different places on Earth.



Spring Tides

The highest high tides and lowest low tides occur when the sun, Earth and moon are all in line. During spring tides, the tidal bulges caused by the moon and sun add together making these tides more extreme.



Neap tides occur twice per month, during the quarter moon phases. These tides are more moderate because the tidal bulges of the moon and sun are not in line. Spring tides also occur twice per month, during the full and new moons. The gravitational pull from the moon, sun, and Earth being in alignment causes these extreme tides.

COWS OF THE SEA?

Green turtle feeding habitats are found in tropical and warm temperate waters all over the world, including the United States and The Bahamas. Baby green turtles that live in the floating algae are mainly **carnivores**, but when they return to coastal waters their diets change. In fact, once they reach the shallows, they are the only sea turtle that primarily eats seagrass and algae. In some places, green turtles appear to be strict herbivores, but new studies using cameras mounted on turtles show that in some places they also eat, jellyfish, comb jellies, and sponges.

OCEANS OF GRASS

Seagrasses are flowering plants that live underwater. They can form huge pastures. Even though seagrasses reproduce with flowers and produce seeds, a single seagrass plant can cover a huge area. It grows by extending stems under the sediment with its leaves sprouting up through the mud or sand.

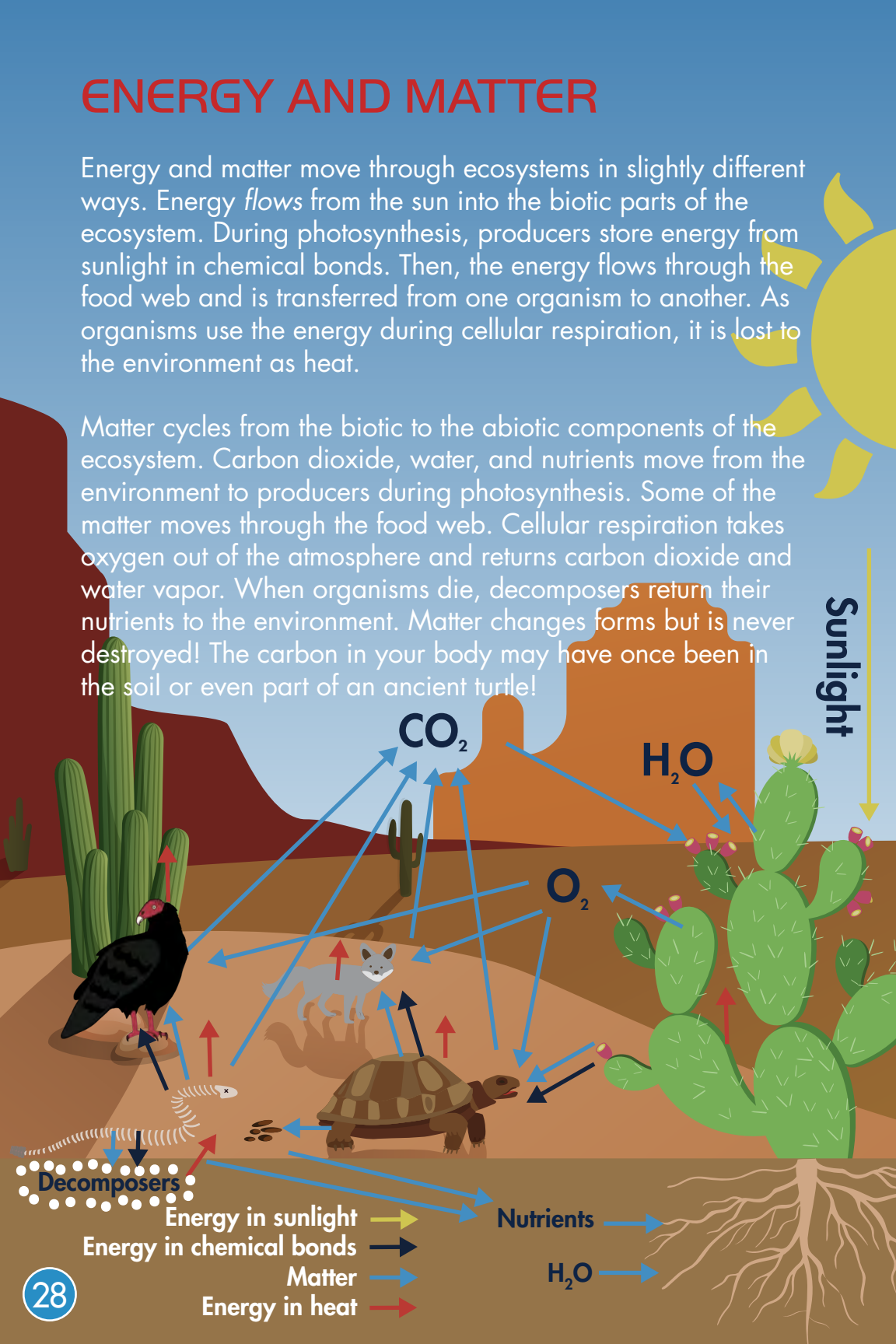
Seagrasses are very important for many reasons. They can help improve water quality by removing pollution from the water. Their roots can stabilize the bottom of the ocean. As **producers**, seagrasses are at the base of the food web. They are eaten by herbivores such as green turtles, manatees, fish, and invertebrates. Energy flows from the herbivores to predators like larger fish, squid, sharks, birds, and dolphins. Seagrasses are also beneficial because they provide safety to other species. Small fish, shrimp, and crabs hide among seagrass leaves where they can search for food and grow. When they get bigger, many of these species move out of seagrass beds and become important food for other animals and for people. Seagrasses are also important because during **photosynthesis** they take carbon dioxide out of the air and release oxygen as a waste product. They use carbon to build their bodies. Because they can reduce the amount of carbon dioxide, scientists think that regrowing seagrass beds might help slow climate change.

Without seagrasses, coastal ecosystems wouldn't be as vibrant. In order to survive and grow, seagrasses need water that is the right temperature, plenty of light, and **nutrients** like phosphorus and nitrogen. In many places, the amount of seagrass depends mostly on the amount of available nutrients. More nutrients usually result in more thriving seagrass beds.

ENERGY AND MATTER

Energy and matter move through ecosystems in slightly different ways. Energy *flows* from the sun into the biotic parts of the ecosystem. During photosynthesis, producers store energy from sunlight in chemical bonds. Then, the energy flows through the food web and is transferred from one organism to another. As organisms use the energy during cellular respiration, it is lost to the environment as heat.

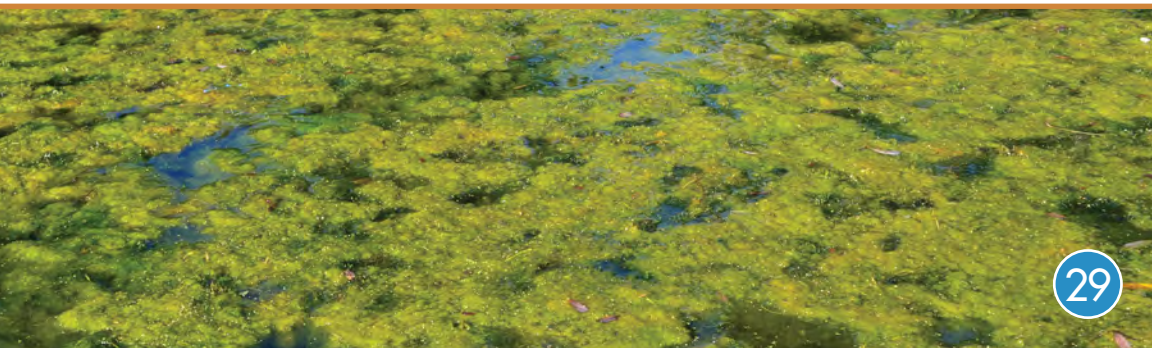
Matter cycles from the biotic to the abiotic components of the ecosystem. Carbon dioxide, water, and nutrients move from the environment to producers during photosynthesis. Some of the matter moves through the food web. Cellular respiration takes oxygen out of the atmosphere and returns carbon dioxide and water vapor. When organisms die, decomposers return their nutrients to the environment. Matter changes forms but is never destroyed! The carbon in your body may have once been in the soil or even part of an ancient turtle!



TOO MUCH OF A GOOD THING

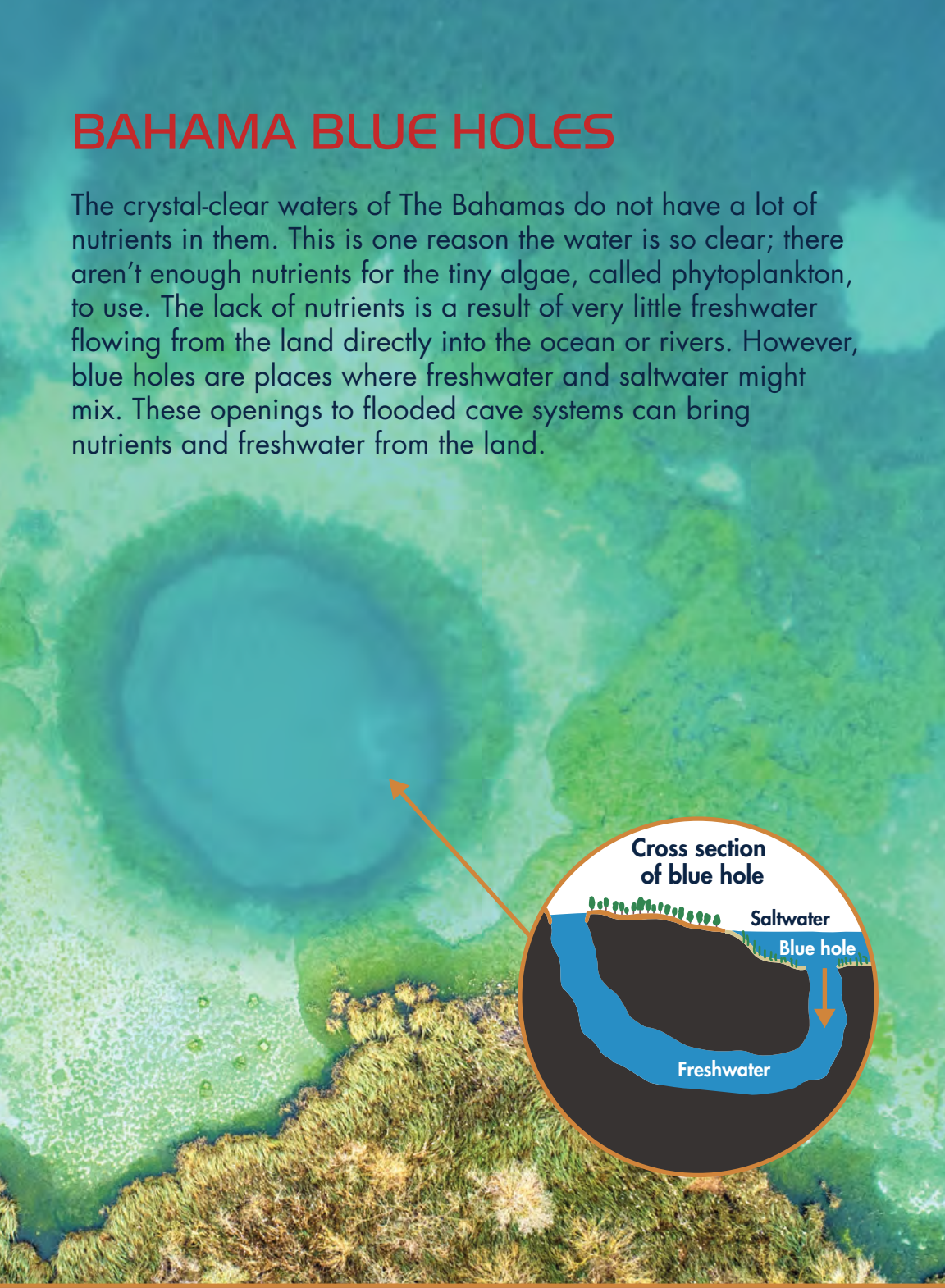
Nutrients help plants grow, but bad things can happen to ecosystems if too many nutrients enter oceans, lakes, or rivers. Why? The algae that live in these waters can grow and reproduce much more quickly with those nutrients. Algae can grow so quickly that it creates large mats or blooms on the surface. The algae shade the waters below, which can kill seagrass and other underwater plants that need light for photosynthesis. Also, when the algae use energy during cellular respiration, they remove oxygen from the water. **Decomposers** that consume the dead algae also remove oxygen. If too much oxygen is removed, fish and other animals can't survive. Around the world, these "dead zones" are growing in size and occurring more often.

What is the cause of the extra nutrients? Usually it is from runoff from agriculture or towns and cities. The extra nutrients running into the Mississippi River and eventually into the Gulf of Mexico causes an annual dead zone that can be the size of Massachusetts! Many scientists from around the world are working to find ways to reduce nutrient pollution. Solutions include better water treatment, designing fertilizers that won't run off the land, and creating wetlands where plants will use the nutrients before they flow into rivers and streams. More creative solutions are still needed! Without them, sea turtle nesting beaches might get smothered by dead algae washing ashore. Even worse, the ecosystems in which they live may collapse without enough oxygen for the species they rely on.



BAHAMA BLUE HOLES

The crystal-clear waters of The Bahamas do not have a lot of nutrients in them. This is one reason the water is so clear; there aren't enough nutrients for the tiny algae, called phytoplankton, to use. The lack of nutrients is a result of very little freshwater flowing from the land directly into the ocean or rivers. However, blue holes are places where freshwater and saltwater might mix. These openings to flooded cave systems can bring nutrients and freshwater from the land.



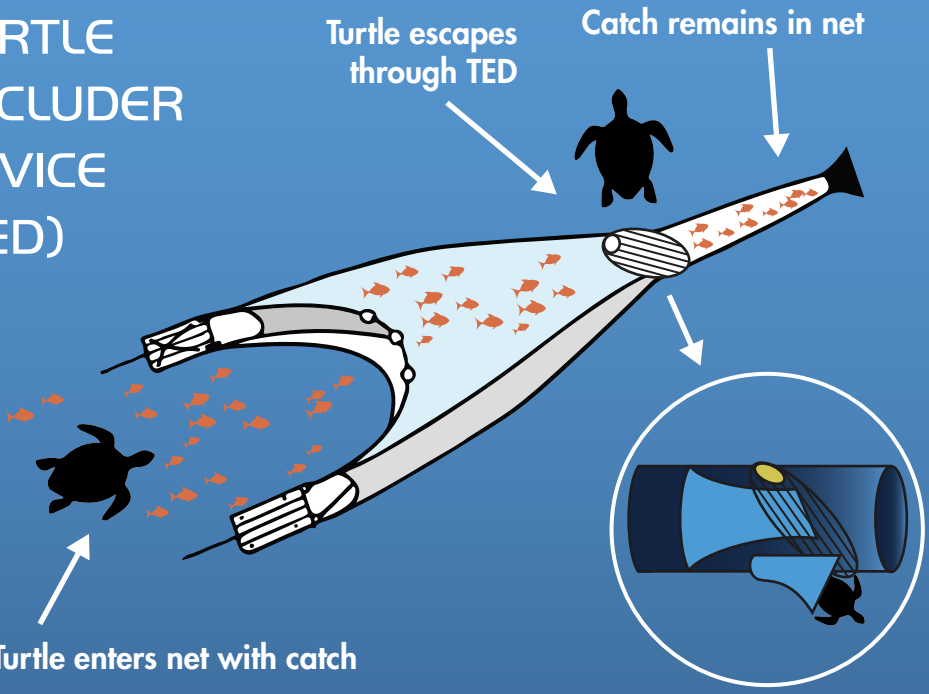
Could these blue holes bring enough nutrients to the ocean to help seagrasses grow and produce more food for green turtles? Scientists are trying to find out!

DANGER ZONES

During their lives, sea turtles face many threats other than struggling to find a meal and avoiding predators. In fact, six of the seven species of sea turtles are endangered or vulnerable to extinction. Scientists do not yet have enough data on the seventh species, the flatback turtle, to know if they are endangered. Why are almost all sea turtles threatened? People's actions can be very dangerous for sea turtles, and a lot of the harm starts on beaches. In many places of the world, too many sea turtle eggs were harvested by people and not enough babies hatched. In most of these places, sea turtle eggs are now protected! But, if temperatures rise too quickly, all the hatching turtles may be females. If the turtle populations don't adapt, climate change could drive them to extinction.

Another more immediate danger is development along beaches, which destroys turtle nesting places. Also, people may accidentally destroy nests by walking or driving over them. Scientists and volunteers now mark nests in an attempt to prevent these accidents. Lights from houses and buildings near turtle nesting beaches can confuse baby turtles that use moonlight reflecting off the water to choose which direction to crawl. If the turtles crawl toward the lights of a building or a streetlight, they won't ever make it to the water. Now, many communities near nesting beaches have rules about the kinds of lights people can have and how bright they can be during times of the years when turtles hatch.

TURTLE EXCLUDER DEVICE (TED)



Advances in engineering have helped save sea turtles in the oceans! Every year, many turtles used to drown in fishing nets meant to catch shrimp. Engineers designed a "Turtle Excluder Device" that can be put in nets that keep shrimp in and allow turtles to escape! Fishing lines are another danger for sea turtles. Many turtles, like leatherback turtles, are caught by longlines in the open ocean. New hook designs reduce the chances that these turtles get hurt.

Plastics are a major threat to sea turtles. Turtles may eat plastic bags, floating plastic debris and balloons because they think they are food. These can kill turtles! To help turtles and other animals, be sure to use as little plastic as possible and always recycle or dispose of them properly!

STUDYING SEA TURTLES

For many years, most of what we knew about sea turtles came from observing them on their nesting beaches. Scientists were able to learn a lot, but they were not studying the entire lives of sea turtles. Many scientists still study nesting turtles. These studies are very important since understanding this part of their life cycle is critical to knowing how to protect their populations. When scientists encounter nesting females, they take measurements of them, put tags in their flippers so they can identify them every time they come ashore, and collect samples of blood or small pieces of tissue. They also can count the number of nests laid on a beach, the number of eggs turtles lay, and how many hatchlings emerge. They can follow hatchlings for the first few minutes or hours of their lives and determine how many are male and how many are female. These studies provide important information, but still only a tiny portion of sea turtle life. Female sea turtles only spend a few hours on the beach every couple of years! The males never come ashore in most places.

Satellite tags are an important technology for studying sea turtles. These tags can tell scientists where turtles travel for a year or more after they leave the beach!

Scientists are becoming more knowledgeable about sea turtles on their foraging habitats. They capture them and collect samples to help learn about their health and diets. They put special tags on turtles' shells to record the depth and length of their dives, their speed, and even the number of bites of food they take! Scientists also use satellite tags to see where they roam at sea. Some of the latest tags have video cameras and other sensors to record what turtles eat and how they interact with other turtles and other species. This shows scientists what habitats sea turtles like and what areas they avoid.

You are now ready to join a science expedition to study green sea turtles in The Bahamas!

GLOSSARY

BIOME
a large area, defined by its climate and the type of organisms that live in it

CARNIVORE
an animal that eats meat

DECOMPOSER
an organism that feeds on and breaks down organic material

EXTINCT
a species or group of organisms no longer in existence

HERBIVORE
an animal that eats plants

INCUBATE
develop at the right temperature for eggs to hatch

MARINE REPTILE
a reptile that lives primarily in the ocean

NON-AVIAN DINOSAUR
dinosaurs that lived in the Mesozoic era and are now extinct

NUTRIENTS
substances that provide nourishment essential for growth and life

PHOTOSYNTHESIS
the process that producers use to convert sunlight, water, and carbon dioxide into sugars and oxygen

PRODUCER
an organism (like a plant) that uses photosynthesis or another process to make its own food

UPWELLING
the process of deeper colder water rising to the surface

SCAVENGE
to feed on eat dead animals

PHOTO CREDITS

Abbreviation Key: SS = Shutterstock.com; NASA = National Aeronautics and Space Administration; GI = Getty Images; NPS = National Park Service

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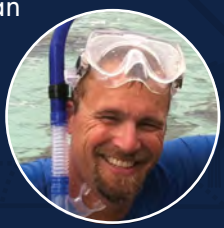
SCIENCE 3D

Thanks for exploring with us! Our science adventures take us around the world to uncover secrets of the most amazing animals and places. Our mission and passion is to share these scientific discoveries with you. There are so many cool things to see out there, even in your own backyard, so get outside and explore!

MIKE HEITHAUS PH.D.



Dr. Mike Heithaus is a scientist, explorer, author, educator, and television host. He is a professor of biology and Dean of the College of Arts, Sciences & Education at Florida International University. Mike and his students study sharks, whales, sea turtles, and other large marine animals around the world. They also work with people to help protect these species. Mike loves sharing his work with others. He has written text books and helped create programs for students in elementary, middle, and high school. He has been on television programs including on PBS, National Geographic, and Discovery Channel's Shark Week.

PATRICK GREENE

As a wildlife filmmaker, Patrick has always had a passion for animals. He started to draw pictures of sharks and whales when he was just five years old. Later, he went to college to become a marine biologist and learned a lot about science. Then he got a job in television and learned how to make videos, too. Since then, he's gone all over the world studying and filming wild animals. He's made shows for National Geographic, PBS and ABC, and even won an Emmy Award. He loves making videos to teach students about science and about the many creatures that share our world.

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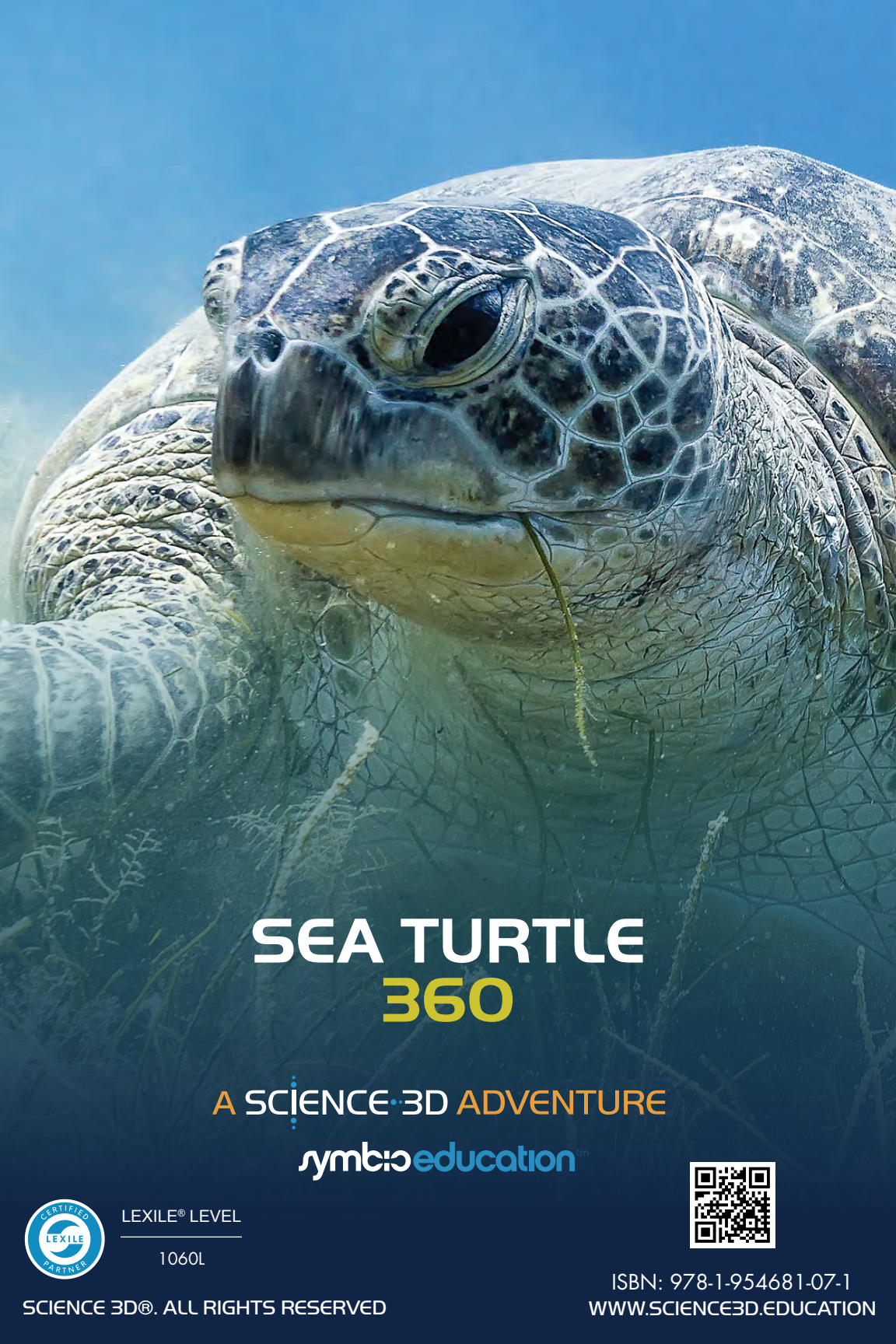

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