

Turtle Talk

Grades 3 - 4



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Turtle Talk

Encased in an armor-like shell of bone, plodding along at a snail's pace or just basking on a log at the edge of a pond; these are all images that may come to mind when you hear the word turtle. Turtles are incredible creatures. They appeared about 200 million years ago and survived whatever ended the reign of their dinosaur relatives. They can be found in virtually every habitat. Turtles live in the open ocean, in freshwater streams and ponds, in forests and even in the most arid deserts. Long before they were made famous by four sewer dwelling teenage mutants, turtles were an important part of human culture. In Native American and Hindu mythology, a turtle's shell supports the earth. Turtles have provided humans with food and other products, have been kept as pets and have appeared in literature from around the world.

This booklet contains information to help you and your students prepare for your trip to The Wetlands Institute. The accompanying activities are designed for before and after sessions and are intended to enhance the learning experience of your visit. However, feel free to use the activities in a manner best suited to the needs of your students.

PRE-VISIT ACTIVITIES

1. What are scutes? Where is a turtle's carapace? Your students will discover the answers to these questions and many more in the anatomy activity **Turtle Topography**.
2. Each summer female terrapins undertake a fantastic journey away from the relative safety of the marsh and onto dry land. Bulkheads, speeding cars, and curious people are just a few of the obstacles they face in their search for the perfect place to deposit their eggs. **A-Maze-ing Terrapins** is a fun activity that will introduce your students to the annual odyssey made by female terrapins.

POST-VISIT ACTIVITIES

1. **Turtle X-ings** is a crossword puzzle that tests your students' knowledge of turtles, terrapins and tortoises.
2. Which species of turtle share your neighborhood? In the activity **Who are the Turtles in Your Neighborhood?** your students will delve into the lives of some North American turtles and discover where they live, what they eat and more.

BACKGROUND INFORMATION

Reptiles in a Box

Turtles belong to a class of vertebrate creatures called **reptiles**. They share with snakes and lizards, crocodilians and the tuatara one very important characteristic that separates them from other vertebrates and enabled them to colonize nearly every habitat away from the poles. Reptile skin is covered with scales composed of **keratin**. The scales provide a watertight barrier that amphibians, the ancestors of reptiles, lacked. Most amphibians can "breathe" through their skin. In order to accomplish this the skin must always be kept moist. When on dry land amphibians can dehydrate, a fact of life that keeps even the most terrestrial of amphibians close to a source of free water. Scales essentially freed reptiles from this critical tie to water and reptiles were able to colonize even the most arid deserts.

Externally, turtles have a head, tail, and four limbs each bearing five toes. Two obvious characteristics separate turtles from their reptile relatives. Turtles are the only reptiles that lack teeth. The jaws are covered by beak-like sheaths of keratin. However, the most striking difference is the shell. The shell is divided into two parts. The upper part is called the **carapace** and the lower part is the **plastron**. In most species, the shell is covered with scales called **scutes**. The scutes on the carapace are arranged in three basic groups. Running from front to back along the top of the shell are five scutes called **centrals**. On either side of the centrals are two sets of four large scutes called **laterals**. Around the edge of the carapace are twenty-five smaller scutes. The plastron is covered by two sets of six, fairly large, scutes.



Green Snake



Green Iguana



American Alligator

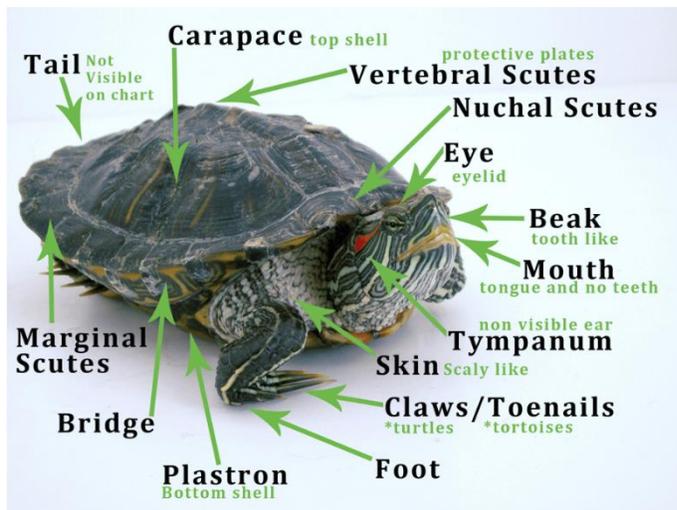


Diagram of a Red-Eared Slider Illustrating Basic Turtle Anatomy

Beneath the scutes the shell is composed of plates of bone. Under the central scutes are eight bones called **neurals**. These bones are fused to the vertebrae of the animal's backbone. The bones beneath the lateral scutes are called **pleurals** and there are eight of them, four on each side. The neurals are fused to the ribs. Twenty-four bones make up the edge of the carapace. The plastron is made up of nine bones. The plastron and carapace are attached by a bridge of bone on either side of the shell.

While most turtle shells conform to this basic pattern, there are a few noteworthy exceptions. Snapping turtles have a reduced plastron that is not strongly joined to the carapace. In sea turtles, the amount of bone in the carapace is reduced resulting in spaces between the ribs. The softshell turtle displays a radical departure from the basic turtle shell design. The number of bones around the edge of the carapace is reduced, or the bones are missing altogether. Instead of scales the shell is covered with leathery skin. The leatherback turtle, however, has the least "turtle-like" shell of all. The shell is composed of many small plates of bone embedded in a leathery skin. In addition, the bones of the shell are not fused to the vertebrae or ribs.



Green Sea Turtle

The shell is an excellent form of protection. When disturbed or alarmed, while on land, turtles usually just withdraw their heads and limbs within the protection of their shells. When the danger has passed, the turtle resumes whatever it was doing. Once pulled safely inside, if they are handled or bothered further, some turtles will open their mouths and hiss. This bluff is usually the extent of their aggression. However, snapping turtles and softshells are well known for their nasty dispositions and it is a good idea to stay clear of their mouths. If handled carefully, and by the tail, the business end of a snapping turtle can usually

be avoided. Softshells on the other hand can extend their heads clear over their shells to their tails. The shells of sea turtles have become reduced, making the animals more streamlined. This **adaptation** makes it impossible for sea turtles to retract their heads and legs into their shells. Adults depend on their great size to avoid danger, while young turtles often hide in vegetation, or rafts of floating seaweed.

On the Inside

While offering an excellent means of defense, the shell also creates a few problems for turtles. As a result, turtles have a few unique internal characteristics. The most profound effect of the shell is that the legs and their attachment to the skeleton, the **pectoral** and **pelvic** girdles, are located *within* the rib cage. In all other vertebrates, the pectoral and pelvic girdles are attached to the skeleton *outside* of the rib cage. This problem is worked out when the turtle is still in the egg. Like the migration of a young flounder's eye from one side of its head to the other, shifting the hips, shoulders and legs to inside the rib cage is an equally awe inspiring feat.

The simple act of breathing is made a bit more complicated by the presence of a shell. Reptiles lack a diaphragm. Most reptiles draw air into the lungs primarily by expanding the ribs and body wall. Turtles, with their rigid shell, cannot inhale in this fashion. Instead, movement of muscles near each leg and beneath the stomach and intestines aid in breathing. Air is drawn in through the **nares** or nostrils. Some aquatic turtles can also

supplement the air breathed through their noses. An area of the throat is lined with a thin membrane filled with many blood vessels. When water is drawn into the throat oxygen moves across the membrane and enters the blood stream. The oxygen absorbed through these membranes allows turtles to remain submerged for extended periods without having to surface for a breath.

Like most other reptiles, turtles have a three chambered heart. Birds, mammals and crocodilians have hearts with four chambers. The three chambered heart is less efficient. It allows oxygenated blood from the lungs to mix with deoxygenated blood returning from the rest of the body. Cold-blooded is a term that most people associate with reptiles. This is very misleading. Desert reptiles often have body temperatures warmer than our own. Even the turtles in your neighborhood hauled out on a log to bask in the sun may have fairly warm blood. The term scientists use for reptiles and other so-called "cold-blooded" creatures is **ectotherm**. The body temperature of ectotherms is influenced greatly by the temperature of their environment. A turtle in a cool pond or stream will have a body temperature, perhaps, only a few degrees warmer than the water. But turtles and other reptiles have ways of warming themselves up. The turtle in the pond might haul out on a log and bask in the sun to warm up. Or, it might climb onto a warm rock and absorb some of the rock's heat. If the turtle starts to get too hot, which could be fatal, it simply slides back into the water to cool down.

Turtle brains, while more advanced than those of fish and amphibians, are not as well developed as the brains of birds and mammals. As the late Archie Carr, the world's foremost authority on turtles, stated: "*Turtles it must be said are not very intelligent.*" This does not, however, imply that turtles are ill suited for survival. In fact, turtles are armed with an array of senses that have served them well for hundreds of millions of years. Sight and smell are the most important and best developed of the senses. Turtles, like most other reptiles have large, well-developed eyes. They have relatively good eyesight and can see colors. Turtles are able to smell both in air and under water. The nose is used to smell airborne odors; while underwater, a special area of the throat called Jacobson's Organ is used to detect odors. Turtles, even with their heavy armor, have a good sense of touch. The remaining two senses, hearing and taste are poorly developed in turtles. Only a few species of turtles possess taste buds. While all turtles have ears they can only hear very low frequency sounds. The outer ear, or **tympanic membrane** is covered with scales. In most species they can be seen as obvious round spots on either side of the head.

Where Do Turtles Come From?

While amphibians were the first vertebrates to colonize the land, they remain beholden to the watery world they left behind. Even toads, which can stay relatively moist by burrowing into leaf litter, must return to the water to mate and lay eggs. However, the shelled eggs of reptiles do not need to be deposited in water and, if they were, the embryo would drown. Instead, each egg is a miniature watery world in which the embryo develops. The embryo is surrounded by two membranes which aid the embryo in "breathing" and

reduce evaporation. In some reptiles, the eggs develop inside the female's body. However, all turtles lay eggs that are encased in a protective **calcareous** shell.



*Northern Diamondback Terrapin Sexual Dimorphism
Adult Male (Top), Adult Female (Bottom)*

In order to produce eggs, male and female turtles must find each other and mate. Most turtles exhibit **sexual dimorphism**. This means that the males and the females look different. In most turtles, the male has a longer, thicker tail. Males may also be smaller and more vividly marked, or brightly colored. Males often have a depression in the plastron. In some species of freshwater turtles, the males have extremely long nails on their front feet. In some species, adult females have larger, thicker heads, while in others, males exhibit this characteristic. Most turtles find one another by sight, but some may use special scents to attract mates.

Once males and females find one another courtship takes place. Courtship may involve a simple chase or an elaborate ritual of biting, bumping, head nodding and rubbing. In some aquatic turtles, the male waves his large front claws in front of the female and may use them to stroke the female's face. Courtship is consummated by mating. Fertilization is internal. This is no easy feat for heavily armored turtles. Most aquatic and marine turtles mate in the water. Tortoises and other terrestrial turtles mate on land. Males of these species tend to have more pronounced indentations in the plastron, an adaptation for mounting the female. A few species are known to vocalize while mating. Male Galapagos tortoises roar during copulation.

Female turtles can store sperm for up to four years after mating and, therefore, do not need to mate every year. However, the number of fertile eggs produced in this manner decreases each year. All female turtles lay their eggs in the ground. Depending on the species, the nests are dug in sand, soil or decaying vegetation. Generally, turtles use their hind feet for digging, though one species of tortoise uses the front feet. A female may travel long distances in search of a suitable nest site. Once she starts digging, she may stop and leave if the substrate is not suitable, or if she is disturbed. Turtle nests are usually flask shaped, with a narrow neck and a round egg chamber. The depth of the nest is most determined by the length of the female's outstretched hind legs. While digging the nest, or when finished, some species of turtles urinate in the nest. This may help to soften the ground to make digging easier, or may provide moisture for the eggs.

When the nest is completed, egg laying begins. Once a female has begun laying, she will not leave the nest until she has completed her task. The number of eggs laid varies from one to as many as 200 or 300 depending on the species. A female may lay more than one clutch of eggs in a single season. Some sea turtles may lay up to seven clutches of a hundred or more eggs. The eggs are dropped, one by one, into the nest and positioned by one of the rear legs.

When the clutch is complete the female fills in the nest, periodically stamping down the earth with the rear legs. Finally the female covers the nest with pebbles, leaves, sticks or whatever debris is within reach of the hind legs, and leaves the nest. One species of tortoise remains in the vicinity of the nest for a few days. She may offer some protection, but after a few days, wanders off, leaving the developing young on their own.

Many factors influence the length of the **incubation** period. Temperature and humidity are the most important. Temperature is especially influenced by nest substrate, depth and location. Temperature plays a key role not only in the length of the incubation, but also in determining the sex of the young turtles. The sex of most vertebrates is determined **genetically**. In turtles, and some other reptiles, sex is determined by the temperature in the nest during a critical period of incubation. In some species of turtles, a clutch of eggs that incubates above a certain temperature will produce all females. Eggs that incubate below a lower temperature will produce all males. A clutch of eggs that incubates between these two temperatures may produce both males and females. In other species, females develop at high and low temperatures, and males develop in intermediate range of temperatures.

Generally, it takes about two to three months for young turtles to develop and hatch. Eggs often remain unhatched through the winter. Turtles that hatch in the fall often remain in the nest through the winter and emerge the following spring. **Hatchling** turtles break the egg shell with a special **egg tooth**. Not a real tooth at all, but a growth of keratin, the egg tooth falls off shortly after hatching. The hatchling breaks free of the shell by squirming and stretching the head and limbs. This process may last from several hours to a whole day. Usually the young turtles all leave the nest at once. In sea turtles, the young seem to erupt from the nest and immediately dash for the sea. The run across the beach exposes the hatchlings to predation by a host of predators. By emerging in force, the chances of at least a few individuals surviving the journey across the beach is increased. Some young turtles wait for the cover of darkness to leave the nest.



*Northern Diamondback Terrapin
Hatchling*

When hatchlings first emerge, they carry a kind of “lunch box” to tide them over until they can find food. Growth in the egg was fueled by the yolk. A small amount of yolk can be seen in a small sac on the bellies of young turtles. It provides food for the first few days after hatching. By the time it has been absorbed, the hatchling should be able to find food on its own. The foods eaten by turtles are as varied as turtles themselves. Green sea turtles, tortoises and some aquatic turtles are herbivores, feeding on a wide range of plant material from algae and sea grass to leaves, flowers and fruits. A few turtles are strictly carnivores. Leatherback turtles prey only on jellyfish and hawksbill turtles feed on sponges, anemones and other encrusting invertebrates. Most turtles are omnivores, usually feeding on animals,

both alive and dead, but taking advantage of plant material when animal prey is scarce or when high-energy plant foods are abundant.



Common Snapping Turtle

How food is acquired also depends on the species. Snapping turtles, for example, lie in ambush on pond and stream bottoms snapping up prey that comes within striking distance. The alligator snapping turtle of the southeastern United States goes a step farther. It has a flap of skin on its tongue which it uses as a lure. It lays on the bottom with its mouth open wiggling the flap to make it look like a worm. Green sea turtles, which eat the young shoots of sea grasses, graze in underwater "pastures."

If young shoots aren't available the turtles simply bite the older stems close to the base, let it float away and then wait for the young shoots to grow back. Most other turtles actively search for plant foods or hunt for their animal prey.

Since the Age of Dinosaurs

The first reptiles appeared between 250 and 300 million years ago. They lived in a world of steamy swamps, the remains of which are now great veins of coal buried deep within the earth. From these first lizard-like animals developed dinosaurs, flying reptiles, huge marine reptiles, as well as, crocodiles, lizards, snakes and turtles. The first turtles in the fossil record are nearly 200 million years old, and possess a well-developed shell. The groups of turtles that inhabit our world began to appear about 25 million years ago.

While many species have come and gone in that time, more than 300 species of turtles inhabit the world today. Turtles are found on every continent, except Antarctica, and in nearly every marine, freshwater and terrestrial habitat. While the word turtle is regarded as a general term for all shelled reptiles some go by other names. Tortoises are turtles which are mostly terrestrial in nature and have no webbing between their toes. At one time, however, all turtles were called tortoises. Early Spanish explorers named the Tortuga Islands in the Florida Keys for the sea turtles that were abundant there. Terrapin is a term that was originally used by Native Americans for the turtles that they considered good to eat. Today, it is used for several species of aquatic turtles. Regardless of what humans call them all turtles can be placed in one of two groups based on how the turtle folds its neck when it retracts its head into its shell. The nearly 60 species of sideneck turtles of the southern hemisphere fold their necks into a horizontal S-shape. The matamata turtle of South America and the snakeneck turtles of Australia are members of this group.

Members of the larger, second group of turtles fold their heads in a vertical S-shape. This large group is further divided into four smaller groups. One group includes the snapping turtles of America and the Asian, big-headed turtle. The second group includes the seven species of sea turtles and are found in **temperate** and **tropical** oceans around the world. The third group includes: musk and mud turtles of the Americas, the wide-ranging softshell

turtles found in North America, Africa and Asia; the river turtle of Central America; and the "sea turtle-like" pig-nosed turtle of southeast Asia. The fourth group is a diverse group of turtles found on all continents except Australia and Antarctica. It includes aquatic, semi-aquatic and terrestrial turtles. Members of this group include familiar species, such as painted turtles, red-eared sliders, box turtles and the giant Galapagos tortoise; and not so familiar species like the leaf turtle and spiny turtle of southeast Asia and the pancake tortoise of Africa.

Turtles and Humans

Turtles have played an important role in the lives of humans for ages. In the Hindu creation story the earth is a hemisphere supported by four elephants standing on the back of a great tortoise. In Native American mythology, before the creation of the earth, all animals lived on the carapace of a giant turtle floating in the sea. The turtle's shell was eventually covered with mud, carried from the bottom of the sea, and become the earth. In many Native American societies, one turtle species or another was considered sacred, and was the totem for clans in several tribes. In Chinese religions, the turtle was revered for its wisdom and benevolence. The Greeks believed the gods held the turtle to be sacred. The Roman naturalist, Pliny the Elder in his 37 book encyclopedia on the natural world, *Historia Naturalis*, attributed medicinal properties to turtles and described 60 remedies made from them. Turtle eggs and parts of turtles are considered by the males of some cultures to have aphrodisiac powers.

The relationship between turtles and humans goes beyond religion and medicine. Turtles have appeared as important characters in the literature and folklore of many cultures. Products made from various turtle parts are many. Native Americans produced rattles from the shells of snapping turtles for use in ceremonial dances. Sea turtles have been exploited for centuries for leather and tortoise shell for jewelry. In some countries, stuffed sea turtles are hung as wall ornaments. Sea turtle products are illegal in the United States today but are readily available in many countries around the world. Turtles are also kept as pets.

By far the most important relationship between humans and turtles is dietary. While most species of turtles and tortoises have probably been eaten by someone at one time or another, there are a few species which stand out as gastronomic delicacies. The giant tortoises of the Galapagos Islands and the islands of the Indian Ocean were an important food item for whalers and explorers. Sea turtles, especially the green sea turtle, are especially prized for their meat and eggs. The softshell turtle is highly prized as a dietary item in Japan. Two turtles have gained great notoriety in the United States. Snapping turtle is the key ingredient in snapping turtle soup, a delicacy made famous in Philadelphia on the east coast and St. Louis in the midwest. The diamondback terrapin was at one time the most important ingredient in terrapin stew, a dish that was all the rage in the 1890s and early part of the twentieth century. The fad was made popular by millionaire financier "Diamond" Jim Brady. At the height of their popularity, terrapins were selling for as much as \$10 each. While Baltimore and the Chesapeake Bay are intimately associated with terrapin stew, Delaware Bay terrapins were regarded as the best. High demand for

terrapins eventually lead to their decline and they may have disappeared altogether if their popularity had not waned in the late 1920s.

The Northern Diamondback Terrapin



Adult Female Northern Diamondback Terrapin

Northern Diamondback Terrapin populations rebounded in most areas when demand for terrapin stew declined. Terrapins can be found along the Atlantic and Gulf coasts, from Cape Cod to Mexico. It is the only brackish water turtle in North America. Terrapins spend most of their lives in the tidal creeks of salt marshes and mangrove swamps, occasionally venturing into the ocean. Except for nesting females, terrapins very rarely venture forth onto land. Diamondback terrapins are attractive turtles exhibiting very distinctive coloration and markings. The shell

ranges in color from light brown to almost black. The scutes of light colored shells are usually marked with dark concentric lines. Skin color varies from black to light gray and is marked with black lines, spots or specks. Adult terrapins vary greatly in size. Females are much larger than males. The shell of a large female from an Atlantic coast salt marsh would be about eight inches long. A male's shell would be about five and one half inches long. Females also have short, stubby tails, and large rounded heads. Males have relatively long tails, and narrow, pointed heads.

Terrapins are very shy creatures and are rarely seen in the marsh. The person lucky enough to see one usually gets only a quick glimpse of the turtle's head just before it disappears below the surface. Terrapins eat small crabs, shrimp, salt marsh snails and periwinkles. They may occasionally scavenge dead fish they happen upon as well. In captivity terrapins readily eat fish, but in the wild this can have deadly consequences. Many terrapins die each year in commercial crab traps. Whether attracted by the captured crabs or the bait, they get caught inside the trap and cannot get to the surface to breathe. If the trap is left untended for more than a few hours trapped turtles drown.

In late fall, terrapins bury themselves in the mud at the bottom of marsh creeks and ponds and **hibernate** until spring. They emerge in the spring when warm weather returns to the marsh. Around the beginning of June, female terrapins leave the marsh and wander about in nearby upland areas. These females are not just out for a leisurely stroll, they're on a mission. They are looking for suitable locations to lay their eggs. The nesting season lasts through August. Once a female finds a suitable



Nesting Adult Female Northern Diamondback Terrapin

location, she digs a hole about five to six inches deep with her hind legs. If she hits a stone, or the soil is too hard, or she is interrupted while digging, she will move off and look for another spot. Once she has begun laying eggs however, she will not stop until all the eggs are laid and the nest is filled. Usually eight to twelve, leathery, oval shaped eggs about one inch long, are laid. When the eggs are laid and the nest is covered the female returns to the marsh.



Northern Diamondback Terrapin Hatchlings

The eggs hatch in about sixty days. In terrapins, all of the hatchlings in a nest will be female if the nest temperature is at or above 30 degrees Celsius during a critical period. Eggs that incubate at or below 26 degrees Celsius during that period produce all males. If the nest temperature falls between these two temperatures both male and female hatchlings result. Young turtles that hatch in late summer and early fall struggle out of the nest and make their way to the nearest marsh creek. Each hatchling carries with it a small sac of yolk on its

plastron to tide it over until it can start catching its own food. Turtles that hatch later in the fall hibernate in their nests through the winter. When the ground warms up in the spring they emerge from the nest and head for the marsh.

Female and hatchling turtles face many obstacles in their journeys between the nest and the marsh. At one time they nested primarily in the dunes on barrier islands above the level of the highest tides. **Bulkheads** erected along the bay sides of barrier islands are obstacles that terrapins cannot overcome. On one New Jersey island, female terrapins must swim out into the ocean and come up onto the beach in order to lay eggs. Predators, such as foxes, raccoons, large birds and even dogs pose a threat to terrapins on land. Adult females can usually take care of themselves, but hatchlings, which are only about the size of a quarter, are easy prey. Hatchlings and eggs in the nest are also dug up and eaten by raccoons, foxes, skunks, rats and dogs.

By far the greatest threat to terrapins are humans. People have destroyed terrapin habitat by draining and filling marshland. Barrier islands once covered only by maritime forest and wild dunes, are covered today with homes, stores, miniature golf courses, driveways, parking lots and roads. This doesn't leave much land for nesting. Female terrapins, looking for a place to nest, have to cross busy streets and roads. Thousands of female terrapins are killed by cars every year. Hatchlings that are found by people are often taken and kept as pets. Many of these hatchlings die because the people who found them, while well meaning, don't know how to properly care for salt marsh turtles. ***It is also against the law to take a terrapin from the wild for a pet.*** In some areas, terrapin populations are declining because of these human pressures.



The Wetlands Institute Scientist with Male Northern Diamondback Terrapin

The news isn't all bad though. Researchers at The Wetlands Institute are involved in several projects involving diamondback terrapins. For several years interns and volunteers have collected eggs from road killed terrapins. The eggs are incubated and the hatchlings are kept in special tanks where they stay awake and eat all winter. When they are released in the spring, they are big enough to avoid most predators. In another project, terrapins were captured, marked and released. By counting the number of marked terrapins that are recaptured, scientists can estimate the size of the population. Research was also conducted to find a way to keep terrapins from drowning in crab traps. It was discovered that rectangles made from wire coat hangers, placed in the entrances of crab traps, keep turtles out and may even increase the number of crabs caught.

Turtles have been around for at least two hundred million years. In that time, they have colonized nearly every habitat on earth. While many species seem to be doing just fine, others are dwindling in numbers, unable to cope with problems, such as habitat destruction and overhunting, created by humans. Hopefully research projects like the ones conducted at The Wetlands Institute and the increased public awareness about terrapins and other turtles can help solve these problems.

For more information on how The Wetlands Institute is helping conserve Northern Diamondback Terrapins, please visit our website at:

[Terrapin Conservation - The Wetlands Institute](#)



The Wetlands Institute Scientist with Northern Diamondback Terrapin Hatchling

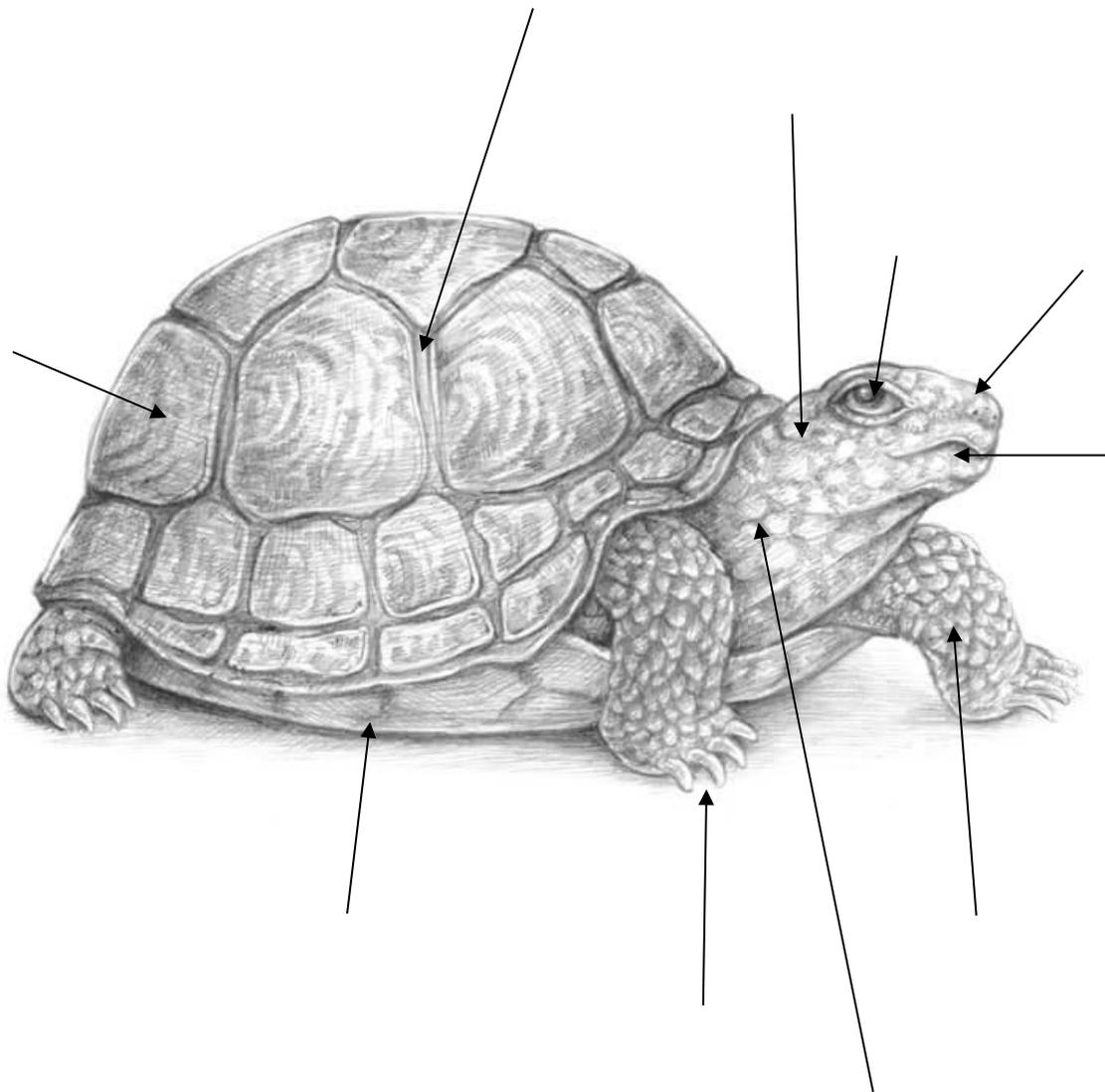
Turtle Topography

Identify and label the parts of the turtle.

Word Bank

Carapace Nostril Scute Head Claw

Mouth Eye Leg Neck Plastron



A-maze-ing Terrapins



Diamondback terrapins are the only reptiles that spend their entire lives in salt marshes. They occur along the Atlantic and Gulf coasts from Cape Cod to Texas. The shells of terrapins range in color from light brown to almost black. Light brown shells are usually marked with dark concentric lines. Skin color is also variable, ranging from black to light gray, marked with black specks or lines. Adult females and males differ from each other. Females are larger. The shells of females average about eight inches long. Average shell length in males is five inches. Females also have larger, broader heads, deeper shells, and shorter tails.

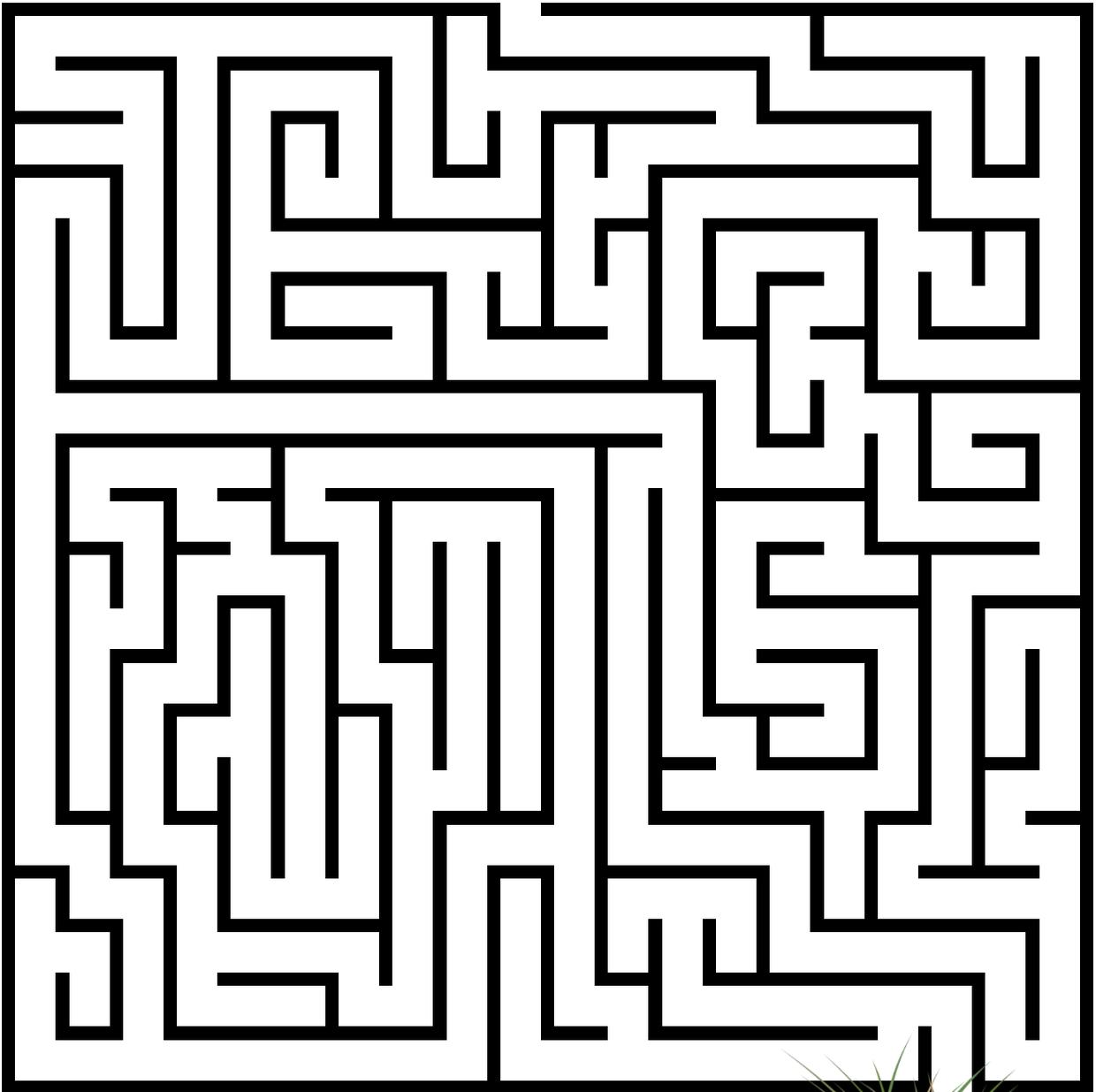
The diet of terrapins is mostly crabs, salt marsh snails (periwinkles), and tiny bivalves (mussels and clams). They may occasionally scavenge dead fish. Terrapins spend most of their time basking in the sun on mud banks like pond turtles. Females leave the marsh each summer in search of sandy areas above the reach of the tide in which to lay their eggs. A shallow hole is dug with the hind legs. Eight to twelve eggs are laid. The female returns to the marsh after filling the nest hole and covering it with debris to hide it from predators. Many nests, however, are still found and dug up by animals like raccoons, skunk and fox.

The eggs hatch in about sixty days. If they hatch in the summer when it is still warm, the hatchling turtles, each about the size of a quarter, emerge from the nest. If the eggs were laid in July and hatch in the fall, the hatchlings may remain in the nest through winter and emerge in the spring. Hatchlings must face many dangers in the marsh. Small mammals (raccoons, foxes, skunks), large fish, crabs, small sharks and some birds (bald eagles, seagulls) eat baby terrapins. Other dangers include drowning in crab traps or being hit by boat propellers. Tragically, many females are run over and killed by automobiles as they search for suitable nesting sites.

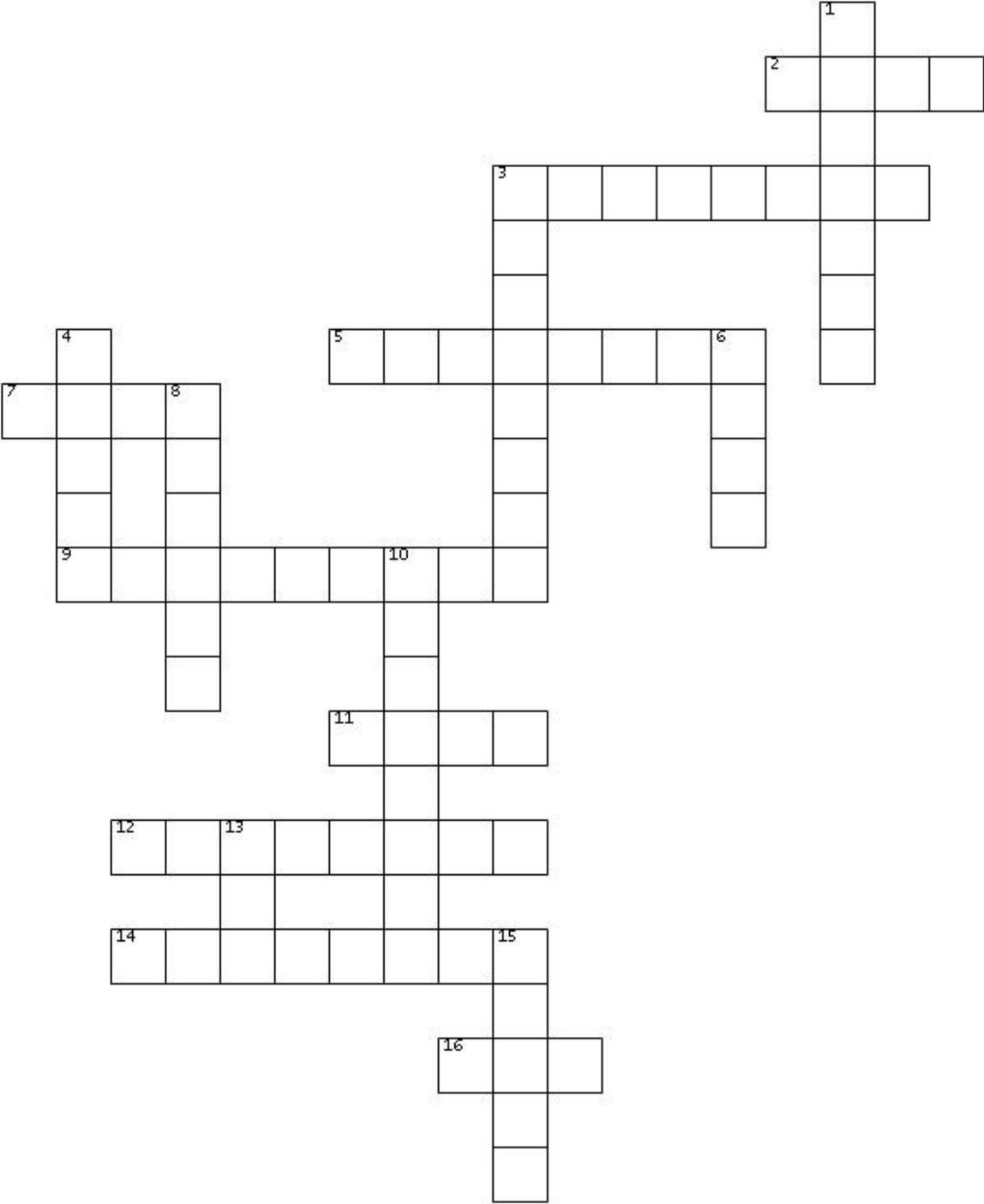




Help our terrapin find its way back to the marsh by finding its way out of the maze! Beware of hazards and dead ends that may slow our terrapin down!



Turtle X-ings: Crossword Puzzle



Turtle X-ings: Crossword Puzzle Clues

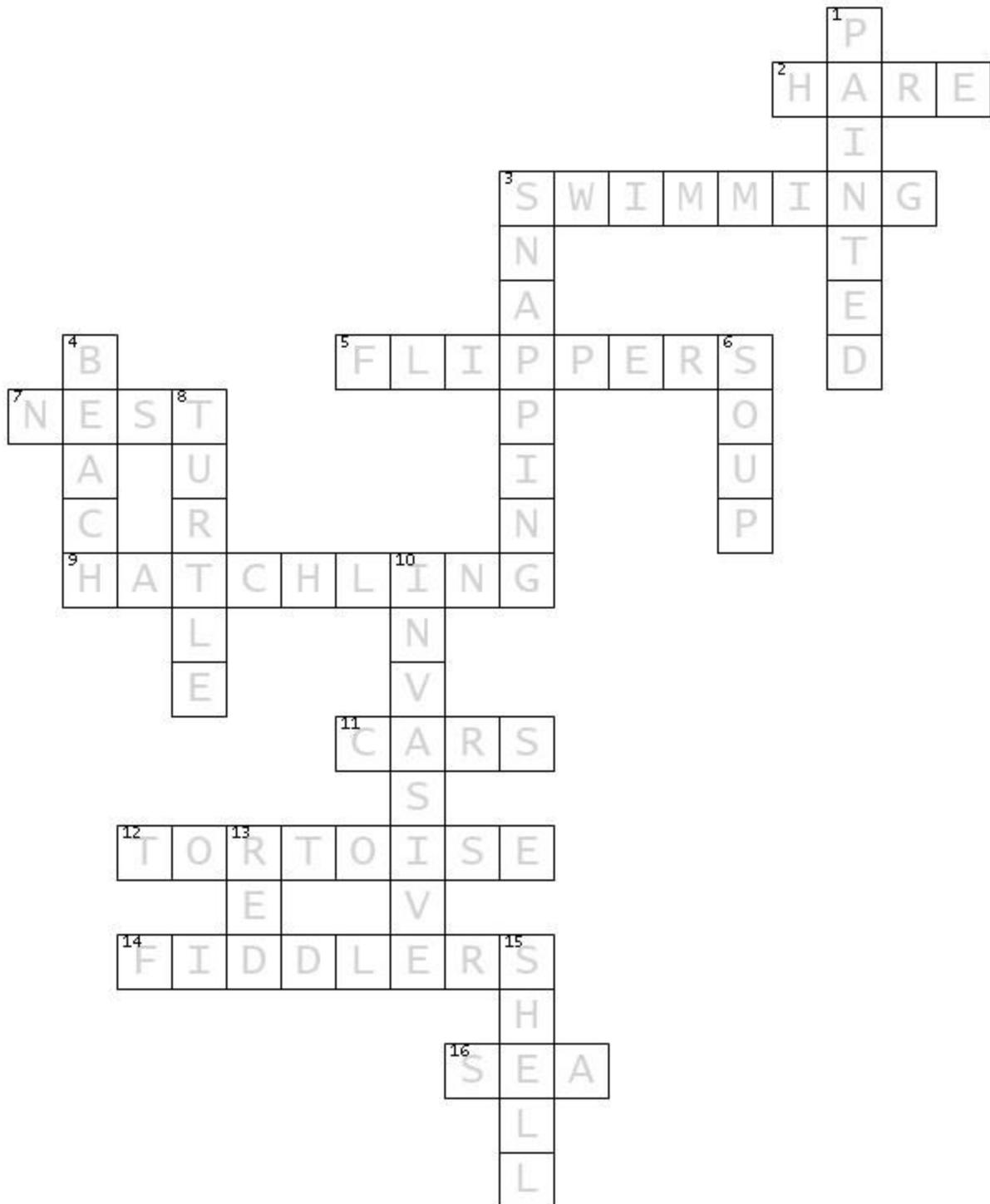
ACROSS

2. In a famous story, a tortoise lost a race to a _____.
3. A turtle's rear feet make good paddles for _____.
5. A sea turtle's legs are called _____.
7. A female terrapin digs her _____ above the level of the high tide.
9. A baby turtle is also called a _____.
11. Female terrapins are sometimes hit by _____ when they are looking for a place to nest.
12. A _____ is a turtle that lives on dry land.
14. One of the diamondback terrapin's favorite foods are _____.
16. The loggerhead _____ turtle visits the Delaware Bay in the summer.

DOWN

1. The _____ turtle lives in ponds and has red and yellow marks on its shell.
3. The _____ turtle is an ugly turtle with a bad temper.
4. Sea turtles lay their eggs in nests on the _____ in the southern United States.
6. Diamondbacks were once an important part of the recipe for turtle _____.
8. A reptile with a shell is called a _____.
10. The red eared slider is an _____ freshwater turtle in New Jersey.
13. Male box turtles have _____ eyes.
15. When a turtle is frightened, it pulls its head and legs into its _____.

Turtle X-ings: Crossword Puzzle Answer Guide



Who are the Turtles in Your Neighborhood?

There are over 300 species of turtles in the world and over 50 of those are native to North America. Most people have probably heard of painted, box and snapping turtles. Have you ever heard of stinkpot, map, and chicken turtles? Some turtle species are fairly easy to find. The painted turtle is commonly found in small ponds and frequently hauls out to bask on half submerged objects. Other species are more secretive and are very rarely seen.

This activity will introduce your students not only to the diversity of North American turtles, but also to their habitat requirements, geographical distribution and behavior. Below is a list of twenty turtles which can be found in the United States.

| | |
|---------------------------|--------------------------|
| Snapping Turtle | Bog Turtle |
| Alligator Snapping Turtle | Chicken Turtle |
| Eastern Mud Turtle | Red-bellied Turtle |
| Common Musk Turtle | Spiny Softshelled Turtle |
| Wood Turtle | Loggerhead Turtle |
| Box Turtle | Leatherback Turtle |
| Diamondback Terrapin | Green Turtle |
| Map Turtle | Hawksbill Turtle |
| Painted Turtle | Desert Tortoise |
| Spotted Turtle | Gopher Tortoise |

Procedure:

1. Assign one species of turtle to a student or a pair of students.
2. Give each student or pair of students a copy of the accompanying worksheet.
3. Have the students do some research to complete the worksheet.
4. When the students have completed their worksheets have them report their findings to the class.

Extensions:

1. Have your students complete worksheets for the turtles that can be found in the area around your school. Put them together in a binder to create a field guide to the turtles in your town, county, state etc. *Peterson's Guide to Reptiles and Amphibians* is an excellent source for locating which turtles may be found in your area. Contact your State Fish and Game agency and ask for a checklist (if one is available) or more information about the turtles that are found in your area.
2. Adopt an Terrapin! For more information on this program, you can visit our website at: [Adoption Programs - Be a Part of Conservation \(wetlandsinstitute.org\)](http://wetlandsinstitute.org)

Turtles in your Neighborhood!

Name: _____

Draw a picture of the turtle



Kind of Turtle?

A decorative illustration of a leafy branch with small flowers, located in the top right and bottom left corners of the box.

Description

A large, empty rectangular box with a thick black border, intended for drawing a picture of a turtle.

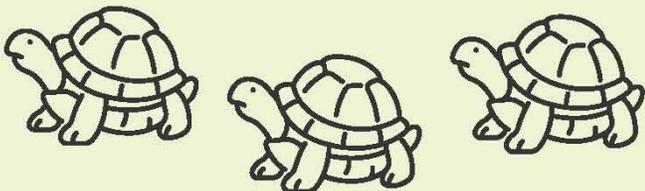
This turtle eats

plants

animals

plants & animals

Describe this turtle's habitat



Vocabulary

Adaptation any physical, or behavioral characteristic that enhances survival and reproductive success of an organism.

Bulkheads limiting walls of stone, wood or concrete along the shoreline.

Calcareous rich in calcium salts.

Carapace the upper portion of a turtle's shell.

Centrals at or near the center, in reference to a type of scute.

Ectotherm an organism whose body temperature is determined primarily by the temperature of the surrounding environment.

Egg tooth a structure on the beaks of hatchling turtles used to break open the eggshell.

Genetic(ally) having to do with genes, the basic units of inheritance.

Hatchling term used for newly hatched reptiles and birds.

Hibernate to spend the winter in a dormant state.

Incubate to keep in a favorable environment for hatching or developing.

Keratin a tough fibrous protein that makes-up hair, nails and horn.

Laterals of or relating to the side, in reference to a type of scute.

Nares the nasal passages, nostrils.

Neurals eight bones located under the central scutes.

Pectoral of or located in or on the chest or breast.

Pelvic the region of the body associated with the pelvis, the point of attachment of the rear appendages.

Plastron the lower portion of a turtles shell.

Pleurals bones located beneath the lateral scutes.

Reptiles mostly four-legged, five-toed, ectothermic, scaled vertebrates whose young mostly develop inside a shelled egg.

Sexual dimorphism marked differences between males and females of the same species.

Scutes reptilian scale unique to turtles.

Temperate region of the globe between the Tropics of Capricorn and Cancer and the poles; climates with alternating long warm summers and short, mild winters.

Tropical the region of the globe between the tropic of Cancer and the Tropic of Capricorn; climate characterized by high temperature, humidity and rainfall.

Tympanic membrane a thin membrane that separates the middle ear from the external ear; the eardrum.