

For Creative Minds

This section may be photocopied or printed from our website by the owner of this book for educational, non-commercial use. Cross-curricular teaching activities for use at home or in the classroom, interactive quizzes, and more are available online.

Visit www.ArbordalePublishing.com to explore additional resources.

Horseshoe Crabs

Horseshoe crabs are weird. They are not true crabs (crustaceans). They are more like spiders and scorpions. We call horseshoe crabs “living fossils” because they look just like their dinosaur ancestors. They have hardly changed in millions of years.

Horseshoe crabs have ten eyes. They even have eyes on their tails that can detect light.

Once she is ten years old, a female horseshoe crab can lay 70,000 to 100,000 green eggs every year.

Horseshoe crabs have six pairs of legs. They use five pairs of legs for walking.

The sixth pair of legs brings food (like baby clams and sea worms), to the horseshoe crab’s mouth.

Long tails help the horseshoe crabs steer or right themselves when they get flipped over.

Horseshoe crabs’ blood is bright blue, not red like humans’.

Horseshoe crabs have a shell (exoskeleton) to protect them from predators.

Tiny hairs all over the horseshoe crabs’ bodies help them feel and smell.



Meeting in the Bay

The Atlantic horseshoe crab (*Limulus polyphemus*) lives in coastal waters in the Gulf of Mexico and along the east coast of the United States. There are four species of horseshoe crabs in the world. The Atlantic horseshoe crab is the only one in the Americas. The other three live in East and Southeast Asia.

In the spring, Atlantic horseshoe crabs travel (migrate) from the bays and ocean to beaches along the Eastern Seaboard. They meet on the shore under the full and new moons in May and June. In some areas, they meet as early as February or as late as August.

Female horseshoe crabs crawl up the beach to the high tide line. Male horseshoe crabs hang onto her back. The female horseshoe crab digs holes in the sand. She lays up to 20,000 green eggs in each hole. The male horseshoe crab fertilizes the eggs in the hole. This process is called **spawning**. After the horseshoe crabs leave, sand covers the nest.

The Delaware Bay is the largest spawning area for Atlantic horseshoe crabs. Over one month each year, tens of thousands of horseshoe crabs fill the beaches of the Delaware Bay. While horseshoe crabs lay their eggs on the beach, other animals come to eat the tasty green eggs. Eleven types of shorebirds, including the red knot, come to the Delaware Bay to eat the eggs.

Red knots are a threatened species. This means that if humans do not protect red knots, they could become endangered or even go extinct. When an animal is extinct, there are no more of that animal left anywhere in the world.

Every year, red knots migrate from their winter homes in South America to their summer nesting grounds in the Arctic. About halfway through their journey, red knots reach the Delaware Bay. After so much flying, they are hungry! The birds fly onto the beaches to slurp down as many horseshoe crab eggs as they can.



Dr. Neeti Bathala, Ecologist

As long as I can remember, I have loved nature. As a child, animals and plants fascinated me. How did the sun make plants grow? Why did some species live in water and others on land? I was lucky to work in my father's garden where I could see something grow from a seed into a plant that fed the caterpillars that became butterflies. I especially wanted to know more about water, which seemed magical because it fed plants and made homes for animals. I knew I wanted to protect the earth because this is the secret to keeping all species safe.

As I grew up, I loved my biology classes. I learned to measure and to observe organisms, from the smallest bacteria to the largest whale. Having numbers showed me how things changed. I could see how populations got bigger when they had more area to expand. I learned that changing a factor like light could affect how big an organism became.

I grew my own plants and kept aquariums of fresh and saltwater animals. I learned why each species needs the best environment to thrive. I became an ecologist—a scientist who studies nature—so that I could go into the field and see how changes in the environment affect living things.

I have a special appreciation for species that have been around for a long time and have survived change. The horseshoe crab is such a creature. Its survival affects many other species, including our own.

Ecologists lead very exciting lives! We study plants, animals, and environments on the land and in the water so we can get jobs with the goal of conserving species. I have monitored bald eagle chicks, tagged butterflies, protected sea turtles nesting on the beaches, tracked dolphins, and looked for seahorses in mangroves. I study plants from the desert to the dunes to the tropical rain forests. I even dive in the ocean to observe fish and corals.

To become an ecologist, it is important to study science and math so you can learn to count species and understand individuals and groups in small areas and on the whole planet. Especially as our climate changes, studying nature is an important job. Starting now, you can even help in your own backyard or schoolyard, by gardening and planting flowers to help species thrive.

Every day is an adventure!

—Neeti Bathala



Citizen Science

Many scientists study horseshoe crabs, but they can't be everywhere to count them all. They often rely on **citizen scientists**, like Leena and her mom, to help. There are many different projects, all around the world and online, where citizen scientists can help with research. Would you like to be a citizen scientist?

Put the following steps in order to discover what is involved with being a citizen scientist. The answer will spell a body part found on horseshoe crabs. Which step are Leena and her mom doing in this story?

L Citizen scientists send their results to the professional scientists.

S Professional scientists analyze and learn from data collected by citizen scientists.

T Professional scientists design a project and ask for volunteers.

I Citizen scientists make observations and collect data.

A Volunteer citizen scientists are trained to collect and report data.

How can you help horseshoe crabs?

If you find a horseshoe crab with a tag on her shell, write down the tag number, where you found her, and how she is doing. Then call the phone number on the tag. This helps scientists track the horseshoe crabs.

If you find a horseshoe crab that has been flipped over by waves, flip her back over! She is not dangerous and may just be stranded. Do not hold the animal by her tail because this can hurt her.

If you live along the Eastern Seaboard (the East Coast from Maine down to Florida) and want to count—or survey—horseshoe crabs, call your local nature center, Conservancy Center, or Department of Natural Resources to learn more about volunteering.

