

No Crabbing Around [MS]

Adapted from Discovering Barnegat Bay and New Wave of Learning

Grades: 3-5

Time: 45 minutes to 1 hour

Goals: To explore the morphology and life history of *Limulus polyphemus*, the horseshoe crab.

Objectives:

Students will be able to: identify and describe the morphological features of a horseshoe crab and explain their function; describe the Great Atlantic Flyway and the horseshoe crab's biological importance; and discuss why the horseshoe crab is important to humans.

Materials:

- Horseshoe crab model (pre-purchased)
- Live species, if available (horseshoe crab, spider, and true crab)
- Horseshoe crab body cut-outs (provided)
- Scotch tape
- Glue sticks
- Paper fasteners
- Craft eyes
- Scissors

Procedures:

1. Pre-Activity (introduction): Using the model or a live specimen of the horseshoe crab, describe the morphological features and explain what they are used for. Ask the students to count the number of legs on the horseshoe crab and think about an animal that has that many legs as well. When they have concluded that it is a spider, explain that even though we call it a crab, it is more closely related to spiders and scorpions. Discuss how the horseshoe crab is considered a "living fossil" because it has survived unchanged for 500 million years. Point out any distinctive features, such as the difference between male and female, as well as the book gills and the telson, which is not used for defense.
2. Activity: In this activity, students will be creating their own "living fossils" by putting together each of its different body parts. Pass out each of the cut-outs and correlate them to the parts on the model or the live species. Have them draw in the other morphological features including book gills, walking legs, and chewing mouth. While their body parts are upside down, use the tape to connect the prosoma with the abdomen, so that the body can bend, and use the paper fasteners to attach the telson to the abdomen. They can color their horseshoe crabs and add eyes using the craft supplies.



3. Post-Activity (review): Once their horseshoe crabs are completed, explain the reasons why they are so important to other wildlife: migrating birds feed on their eggs, true crabs and gulls feed on their fatty tissue, and humans use their unique blue blood for disease control. As you describe their importance, instruct the students to write one unique fact about horseshoe crab species on their models.

Key Words:

Horseshoe crab
Exoskeleton
Telson
“Living Fossil”

Arachnid
Prosoma
Book gills

Crustacean
Abdomen
Compound eyes

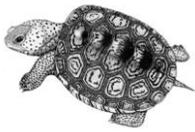
Background Information:

Adapted from New Wave of Learning

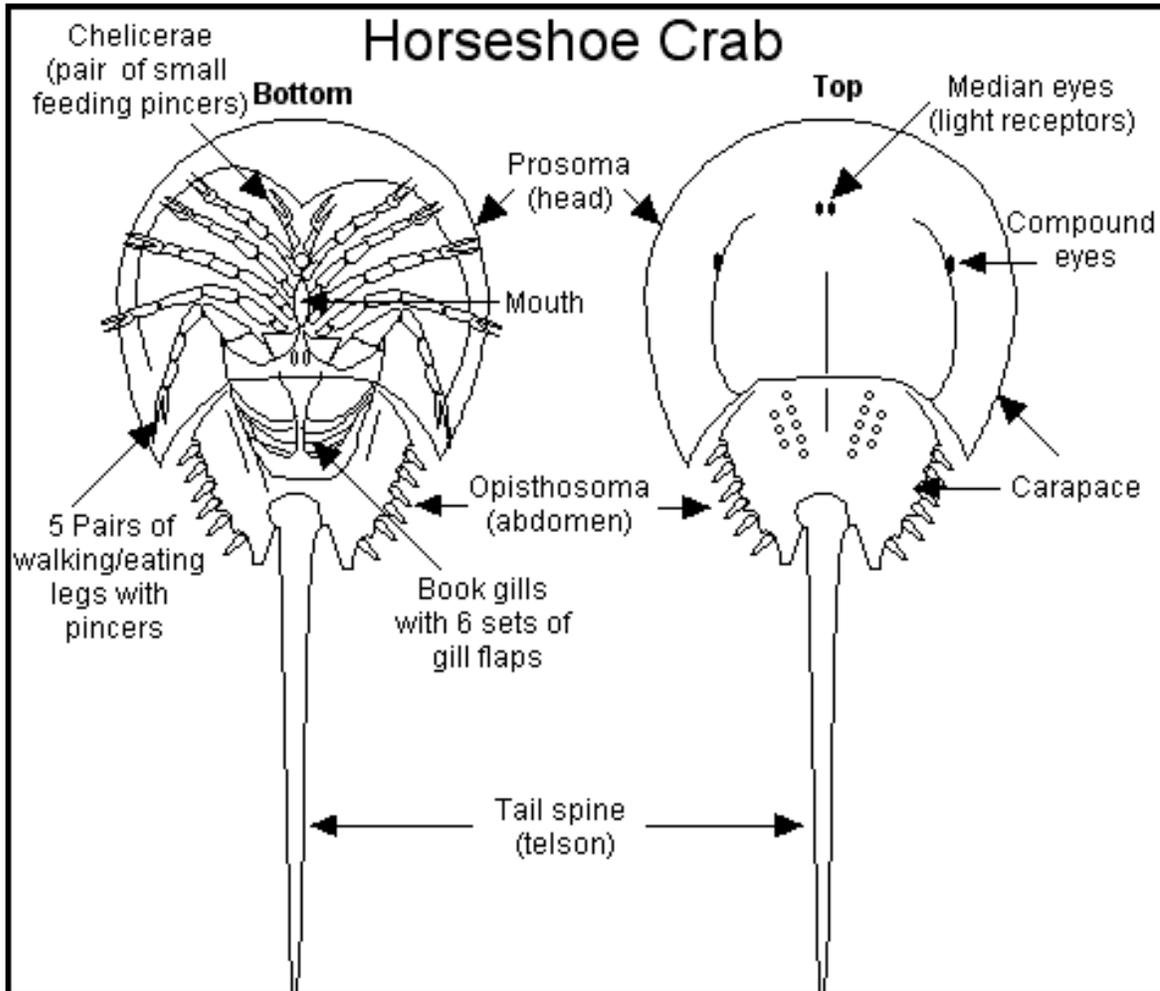
There are three major external features to a horseshoe crab: the prosoma (or top end), the abdomen (or middle), and the telson (or tail). The prosoma is made of a hard exoskeleton to aid in the protection of the soft interior from predators. The abdomen houses the book gills and is hinged with a very strong muscle to allow the horseshoe crab to curl up and protect its gills from predators. The telson does not contain a stinger (like a stingray tail) but is used for both protection and to flip its body over when it is turned upside down onto its back. They are harmless to humans.

There are other important body parts to note including the walking legs, a chewing mouth, and compound eyes. It is not a true crab because it has eight legs instead of six, making it more closely related to the family of Arachnids (spiders and scorpions). The walking legs are not only used for movement on the bottom of the sand, but to push particles of food (usually dead and decaying animals) into its chewing mouth, located in the center of its legs. There are ten eyes sitting on top of the exoskeleton: two compound eyes and eight light sensory eyes. The book gills look like the pages of a book and are fanned to keep water flowing over them. The main differences between a male and female are that the male is much smaller and has two club-like appendages with claws on them to hook onto the female during mating.

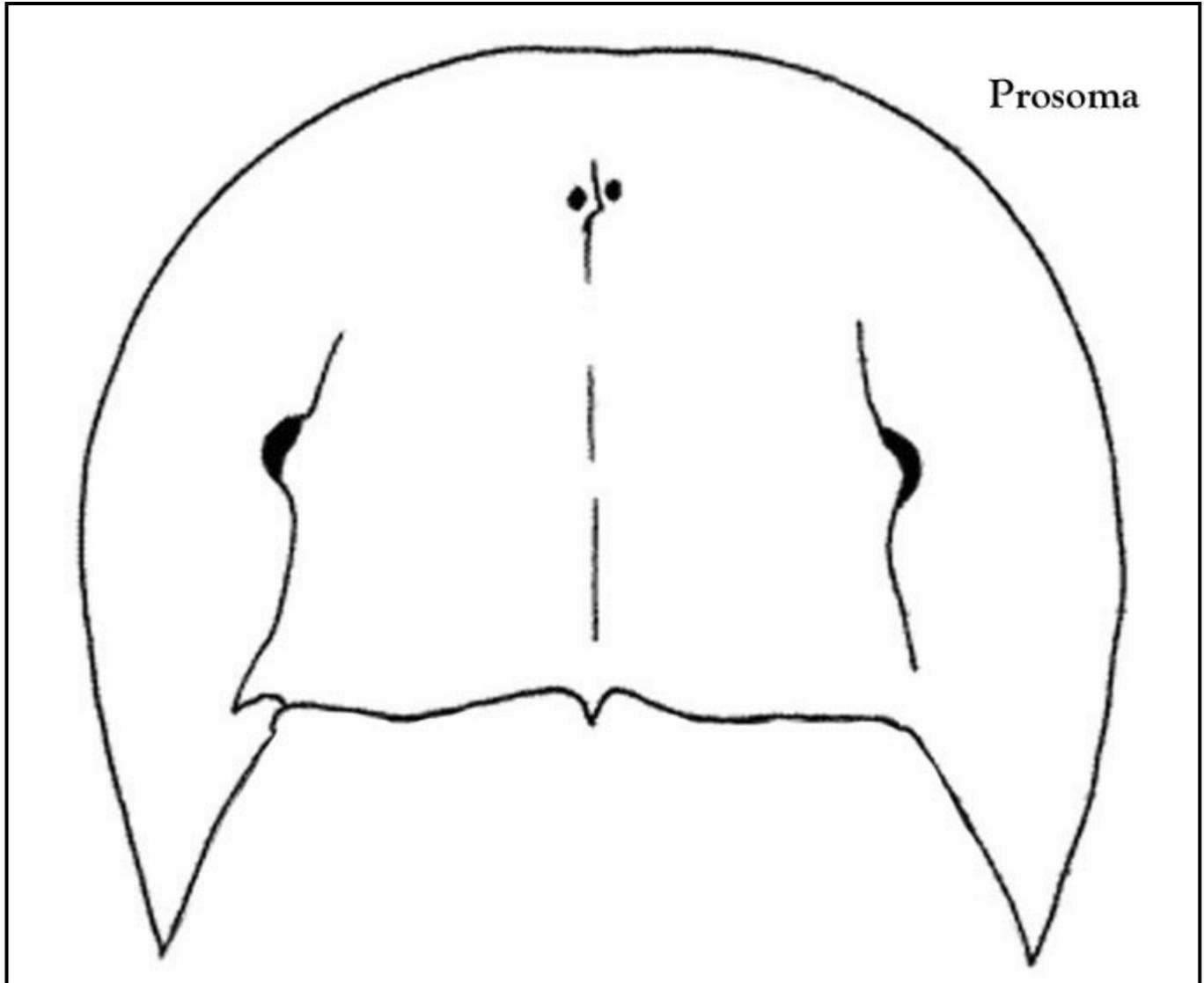
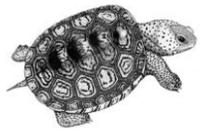
The horseshoe crab is considered a “living fossil” because its lineage dates back 500 million years. They have become valuable to both humans and other animals. During their migratory stopover along the Great Atlantic Flyway from South America to North America, many species of birds will feed on their green, protein-rich eggs. Since they’ve been around for millennia without having to adapt to earthly changes, their blue blood is now being tested for certain types of human disease control and cures.



HORSESHOE CRAB DIAGRAM



HORSESHOE CRAB MORPHOLOGY



Prosoma

