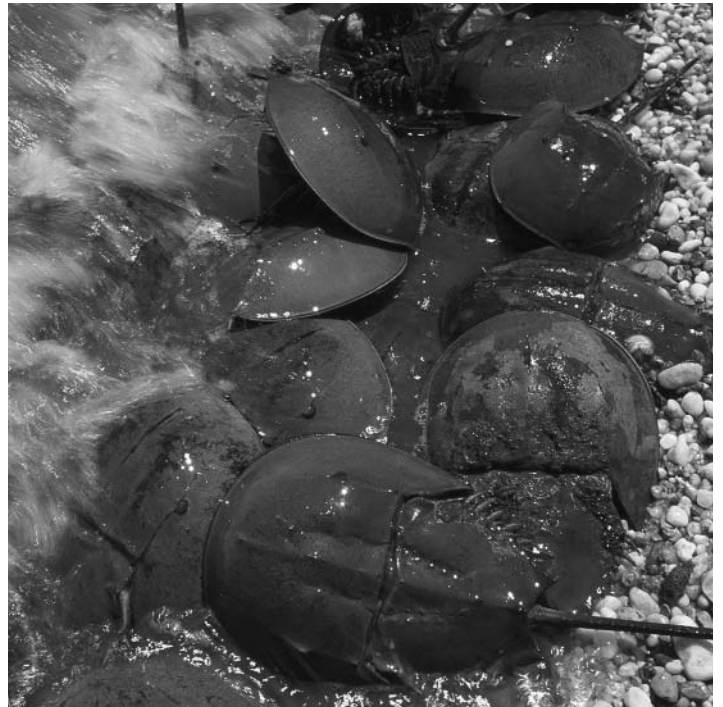


# Horseshoe Crab Animal Interview

Pre- and Post- Visit Activities

Grade Levels Pre-Kindergarten-Kindergarten





This booklet was prepared by the Conservation Education Department at The National Aquarium in Baltimore.

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The educational goals of The National Aquarium in Baltimore are supported by funding from the Jacob and Hilda Blaustein Aquatic Education Endowment Fund.

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March 2005

# Horseshoe Crab Animal Interview

A 15-minute program for Grades Pre-Kindergarten - Kindergarten at the National Aquarium in Baltimore.

## Program Description

In this 15 minute Animal Interview, students are introduced to a familiar but often misunderstood sea creature - the horseshoe crab. Through a class discussion using artifacts and pictures, as well as observing and touching a live horseshoe crab, students learn that they are harmless, gentle animals. Basic anatomical features are pointed out and the students discover where a horseshoe crab lives, how it sees, moves, eats, and protects itself.

## Planning for the Program

The Horseshoe Crab Animal Interview program takes place in one of the Aquarium classrooms where the students sit in a semi-circle around the instructor. Your assistance with the children throughout the program is appreciated. Meeting and touching a live animal for the first time is exciting! Please prepare your students for this experience by discussing the following:

1. The horseshoe crab is held by the Aquarium instructor. Students will have an opportunity to touch it.
2. The horseshoe crab is a gentle animal and cannot bite or pinch.
3. The horseshoe crab has 5 pairs of wiggling legs. The legs are for walking not pinching.
4. The horseshoe crab's tail is not a stinger, it is there to help the horseshoe crab flip over when it gets stuck upside down.

This booklet contains basic information for teachers about horseshoe crabs, as well as some suggestions for related activities which can be used in the classroom. The content pages contain much more information than you will want to present to young children. Since this program is designed for pre-k and kindergarten children, please modify the enclosed activities as necessary.

## Day 1

The day before your visit to the Aquarium introduce students to the horseshoe crab. Horseshoe crabs belong to a group of animals known as arthropods. All arthropods share two main characteristics:

- a. they have a hard exoskeleton
- b. they have jointed legs

Collect and show the children pictures or specimens of representative arthropods such as lobsters, shrimp, crabs, insects, spiders, scorpions,

## AAAS Benchmarks

1.0 Skills and Processes

K-2 #1:

Seek information through observation, exploration, and descriptive investigations.

## MD Voluntary Curriculum

### SCIENCE

1.0 Skills and Processes

Grades: PreK-K

A.1. Seek information through observation and exploration.

3.0 Life Science

Grades: K

A.1. Identify and describe living and non-living things.

D.1. Observe and describe characteristics, basic needs, and life cycles of living things.

centipedes or millipedes. Using the pictures, help the children look for the characteristics. Complete Activity 1 - All About Horseshoe Crabs: Steps A, B, and C.

## Day 2

During your visit to the Aquarium you will participate in the 15-minute program, Horseshoe Crab Animal Interview. Be sure to visit the Children's Discovery Cove exhibit in the Marine Mammal Pavilion. It contains live horseshoe crabs (only found on the Atlantic side of the U.S.), as well as other marine animals such as sea urchins, whelks, and spider crabs. Have the children observe the horseshoe crabs as they move about the Children's Discovery Cove.

## Day 3

The day after your visit, complete Activity 2 - Fun with Horseshoe Crabs: Steps A and B.

## Teacher Background

Many crab-like animals inhabit the Mid-Atlantic coastline and marshes. Some examples include the ghost crab, fiddler crab, lady crab, blue crab, and of course, the American horseshoe crab, *Limulus polyphemus*. All of these animals are members of the large Phylum Arthropoda (arthro-jointed, poda-feet), which contains at least 3/4 of a million species. Other familiar arthropods include barnacles, shrimps, lobsters, insects, centipedes, and millipedes.

Though crab-like in appearance, the horseshoe crab is not really a crab at all! It is more closely related to scorpions and spiders. Like a typical arthropod, however, it has jointed legs and is covered with a hard exoskeleton made of chitin. Horseshoe crabs have inhabited the oceans for 350 million years. For this reason, they are sometimes called "living fossils." Modern day horseshoe crabs look remarkably similar to their ancestors. They are named for the horseshoe shape of the carapace or shell. The carapace is the color of sand or mud. This allows the animal to blend in with the sandy bottom which it inhabits. These animals are typically found in shallow waters on the eastern edge of North America from Maine to the Yucatan.

The carapace of the horseshoe crab is flexible, but tough. It is divided into two segments separated by a joint. A joint also joins the tail, or telson, to the carapace. On the upper surface of the shell are several pairs of eyes. The large obvious eyes on each side of the carapace are compound eyes, like those of insects. These allow the animal to see in all directions. The second set of very small eyes is located close together on the front of the shell. These eyes, in addition to five others which are

## Teacher Background (continued)

distributed along the perimeter, are light receptors only, and do not form images. Beneath the shell are five pairs of walking legs. At the base of the legs is located the bristled, outer surface of the mouth. The bristles are actually small spines which help to collect and grind up worms, molluscs, and other organisms which *Limulus* scavenges. The mouth-parts will only function if the animal's legs are moving. Therefore, the horseshoe crab eats while it walks.

Behind the mouth and legs are the book gills and finally the telson. The book gills are flattened structures which overlap like the pages of a book. They enable the animal to remove oxygen from the water. However, *Limulus* is so hardy that it may survive out of water for one year if the gills remain damp!

Adult horseshoe crabs have a telson that is usually about five inches long. Some believe that the tail is filled with a nasty venom or that it is used to "jab" the unwary beachcomber. Actually, the tail is harmless, and is used as a lever to right an animal that has been flipped on its back. It is also used in swimming, as are the book gills. When the crab swims, it does so in an upside down position.

A good time to observe horseshoe crabs is in the late spring when they migrate in large numbers to the shallow waters of bays and estuaries to mate. The female crawls onto the beach, usually with one or several males in tow. The males grasp the larger carapace of the female using a specially modified first pair of walking legs. Female scoop out a depression in the damp sand and lay masses of green eggs, each measuring 1.5 mm. The male moves over the nest and covers the eggs with sperm. Every female will return to the beach on successive tides, each time laying 4-7 egg clusters with each tide. A female will lay 20 egg clusters every year, each cluster containing about 4,000 eggs. This accomplished, the pair leave the nest, allowing the eggs to incubate 5-8 inches below the surface. Thousands of eggs are laid but few develop into larvae. Most horseshoe crab eggs become food for shorebirds. Two weeks later, waves from the next incoming high tide rupture the eggs that remain and the larva emerge, resembling fossil trilobites, rather than adult horseshoe crabs. The trilobite larvae, as they are called, do not have a telson. This body part appears after molting. Eventually the animals settle to the bottom. Pre-adults will continue to molt every year, growing larger with each successive molt. A final stage molt occurs around age 9-12 years, when it reaches sexually maturity. They will then begin their annual spring migration to mate, doing this every year until the end of their lives, which may be up to 20 years or longer.

## Resources

The National Aquarium in Baltimore website provides information about education programs that focus on horseshoe crabs and the Chesapeake Bay.

<http://www.aqua.org>

The horseshoe crab is a familiar sea creature to beachgoers. It is enjoyed by naturalists and studied by scientists. Explore this website to discover more about this remarkable creature.

<http://www.horseshoecrab.org>

Introduce your students to horseshoe crabs through Harry's exciting story. The book contains engaging pictures and basic information about horseshoe crabs.

**Harry Horseshoe Crab**  
by Suzanne Tate  
Nags Head Art, 1991.

An educational book that brings together twenty scientists who have worked on all aspects of horseshoe crab biology to compile the first fully detailed, comprehensive view of the species. An indispensable resource, the volume describes the horseshoe crab's behavior, natural history, and ecology; its anatomy, physiology, distribution, development, and life cycle; the puzzle of its immune system; and its present management and future conservation.

**The American Horseshoe Crab**  
edited by Carl N. Shuster  
Harvard University Press

# Activity 1 - All about Horseshoe Crabs

## Step A: A Horseshoe Crab Tale

### Description

Horseshoe crabs are fascinating animals that live along the coasts. To children, however, they can be scary or odd looking. In order to prepare the children for meeting the horseshoe crab, some for the first time, read the story, "A Horseshoe Crab Tale" to the students.

### Procedure

1. Ask if any students have been to the beach and are familiar with horseshoe crabs. Have them relate their experiences. Emphasize that these animals are interesting and harmless.
2. Show pictures of a horseshoe crab and read the story.

### A Horseshoe Crab Tale

One morning in early June, a brother and sister went on a trip to the Delaware shore with their mother. The day was warm, the sun was bright and the water was sapphire blue--a perfect day for the beach!

As soon as they had laid out the beach blanket, weighting down the corners with a few small stones, Jessie and Jamal peeled off their socks and shoes, wiggled their toes in the sand and scampered off to explore. "I'll be along in awhile," Mother called out as she settled down in her beach chair.

Jessie was the oldest and was bigger and faster than Jamal. She ran down the beach, stopping now and again to do a cartwheel or backflip while her younger brother hurried to catch up. So it was Jessie who saw the strange animal first. It looked like a large brown helmet lying upside down in the sand. Lots of legs thrashed about, and a long tail stabbed at the air. "Don't touch it!" Jessie warned as Jamal finally caught up to her. "It might sting you with its tail." "What is it?" asked Jamal between breaths. "It's scary looking!" "It looks like some sort of a crab," Jessie answered. "I don't think it can turn itself over."

The children were still looking at the animal when their mother strolled over to them. "Oh, you found a horseshoe crab!" she exclaimed, bending close to see. "Don't touch it, Mom. Won't it hurt you?" Jamal asked anxiously. "Oh no," Mom said. "Horseshoe crabs are harmless animals. Many people think their tails are weapons and can sting, but that's not true. They use their tails to help right themselves when they are overturned in the water. If they lose their tail or get stranded when the tide goes out, like this horseshoe crab did, then they are as helpless as turtles are when they are turned on their backs!" Jamal's curiosity overcame his fear of this strange animal. "I want to hold it," he said. "How do you pick it up?" "Never pick up a horseshoe crab by the tail," Mom explained. "You might hurt the joint where the tail attaches to its body." "You might even pull it off!" Jessie chimed in. "And then it wouldn't have any way of turning over." "Instead," Mom continued, "hold it on each side of the shell. If you want to look at its underside, support the top of the shell in the palms of your hands." After they had held and inspected the horseshoe crab Jamal said, "Let's bring it down to the water and watch it crawl back to the ocean where it belongs!"

## A Horseshoe Crab Tale (continued)

The children carried the horseshoe crab down to the water's edge and put it on the sand. Slowly it crawled into the water, pushing against the incoming waves, gradually moving deeper and deeper until they couldn't see it anymore. As Jamal watched the horseshoe crab tail disappear he said thoughtfully, "Horseshoe crabs aren't so scary looking now. I think they're neat." Jessie agreed, saying, "I think they're kind of cute."

That morning as the two children played on the beach they gently helped stranded horseshoe crabs slip back into the cool waters of the Delaware Bay.

# Activity 1 – All About Horseshoe Crabs

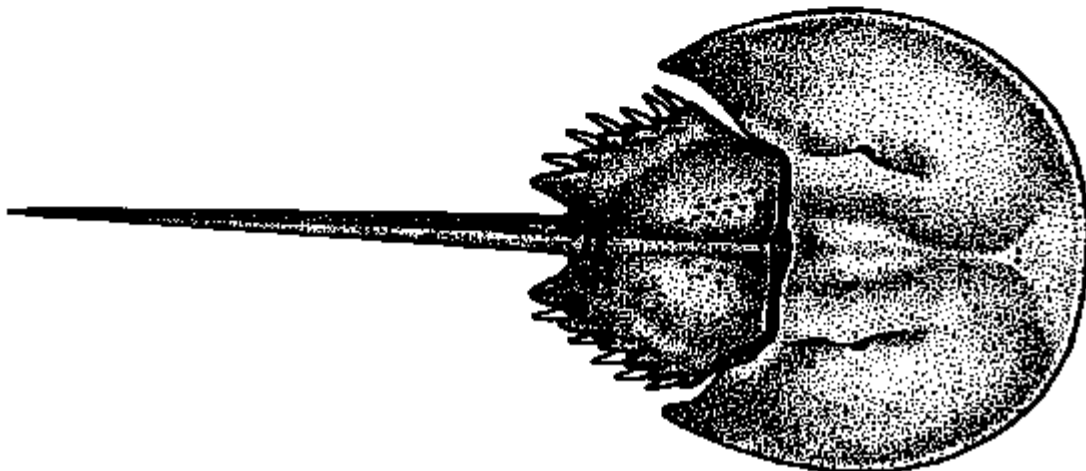
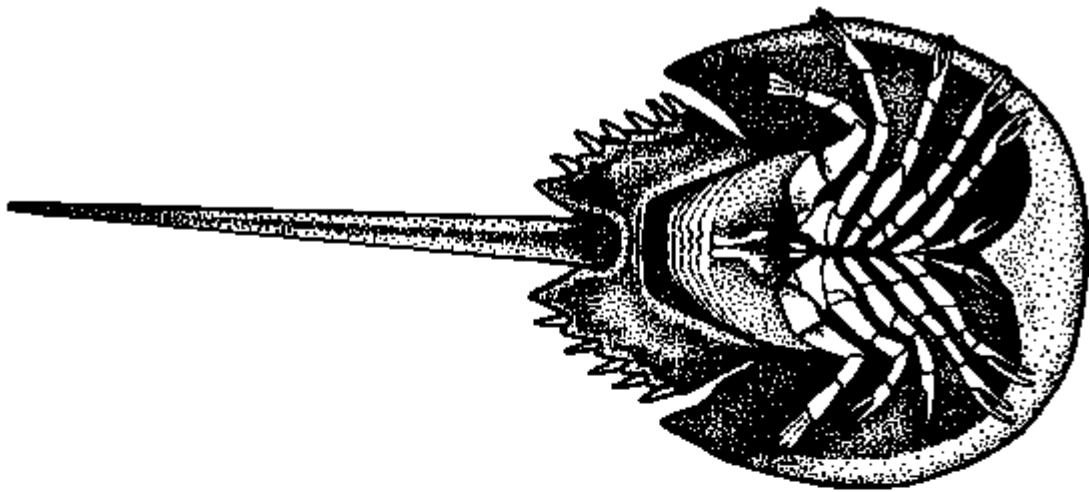
## Step B: Connect-the-dots

### Description

In this activity, students will become familiar with the shape of the animal and the spelling of its name.

### Procedure

1. Photocopy and distribute the connect-the-dots worksheet, page 11.
2. Have students complete the worksheet. Review the horseshoe crab's shape and the spelling of its name.



# Activity 1 – All About Horseshoe Crabs

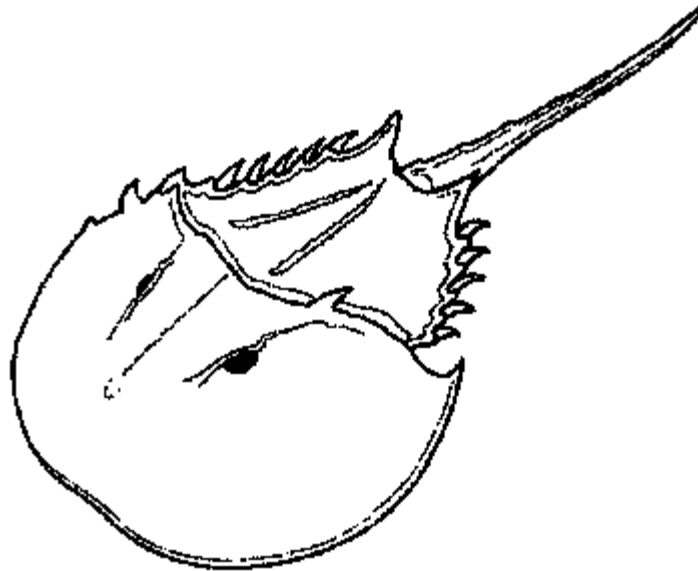
## Step C: Get Ready to Interview!

### Description

Visiting the Aquarium and meeting an animal may be a new experience to students. Asking the Aquarium instructor questions about the horseshoe crab could be difficult for some students. By preparing them to ask questions, the program will be more enjoyable for the students.

### Procedure

1. Ask the children to think of and share one or two questions they might ask about the horseshoe crab during the program.
2. Write down all of the questions, so after the program you can review the answers.



## Activity 2- Fun with Horseshoe Crabs

### Step A: Horseshoe crab puzzle

#### Description

Engage students in a fun activity to review the animal's basic anatomy using the puzzle sheet enclosed. Students can recall what the animal looked like by piecing together the parts of a horseshoe crab.

#### Procedure

1. Enlarge the pictures of the horseshoe crab body parts, page 12. You can either make copies for each student or do one large puzzle as a group.
2. Have students color the puzzle pieces and glue each piece to a large piece of posterboard. Cut out the pieces, then laminate or cover with clear contact paper.
3. Have children fit together the pieces of the puzzle while explaining what the different body parts are and its function. This is a two-sided puzzle, so some pieces are the top side of the horseshoe crab and some pieces are the bottom side of the horseshoe crab.

## Activity 2- Fun with Horseshoe Crabs

### Step B: Certificate of completion

#### Description

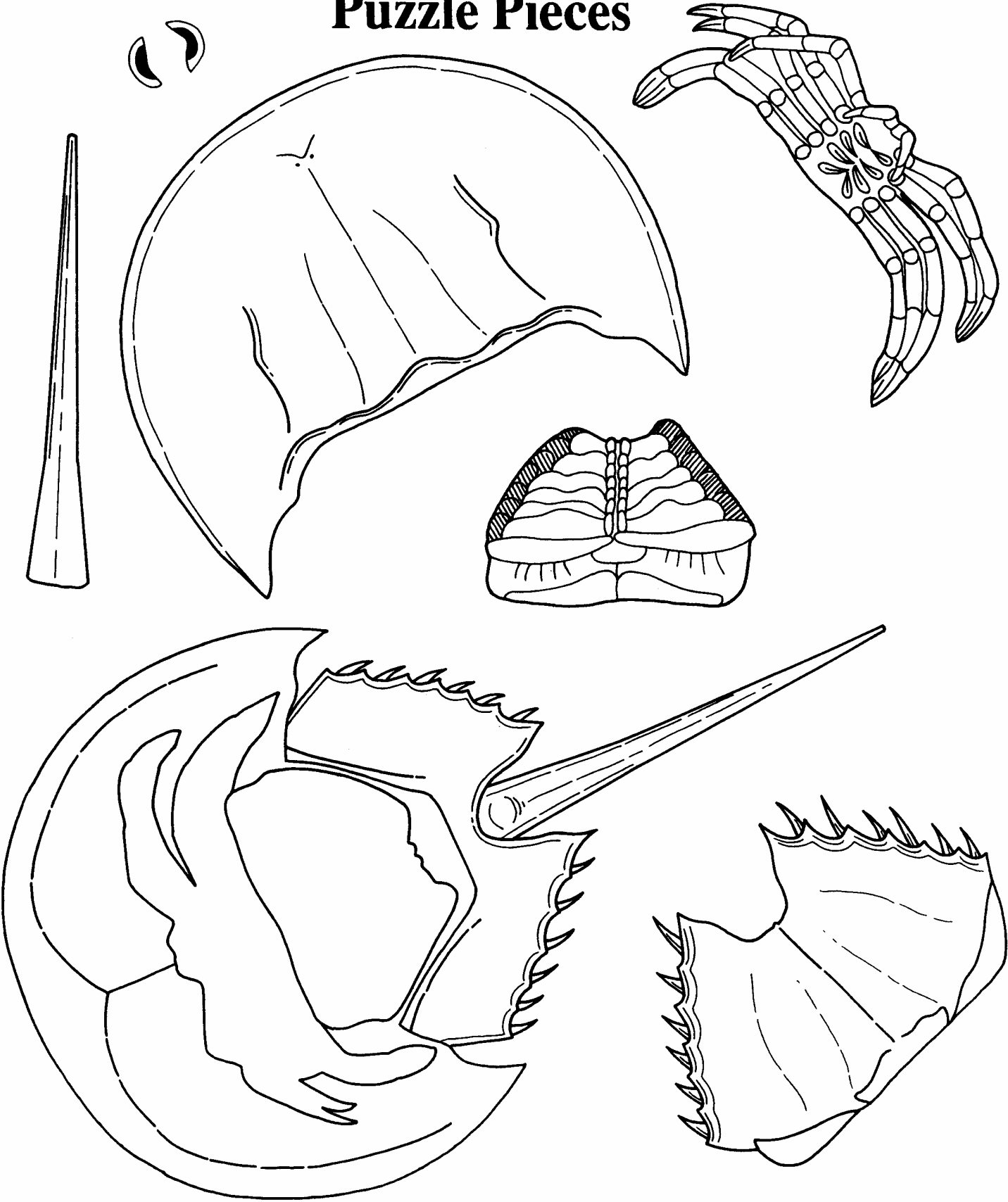
A coloring certificate will complete their visit and experience with these amazing animals. The “I Interviewed a Horseshoe Crab at the NAIB” certificate can be colored, signed, dated, and displayed as a reminder for the students.

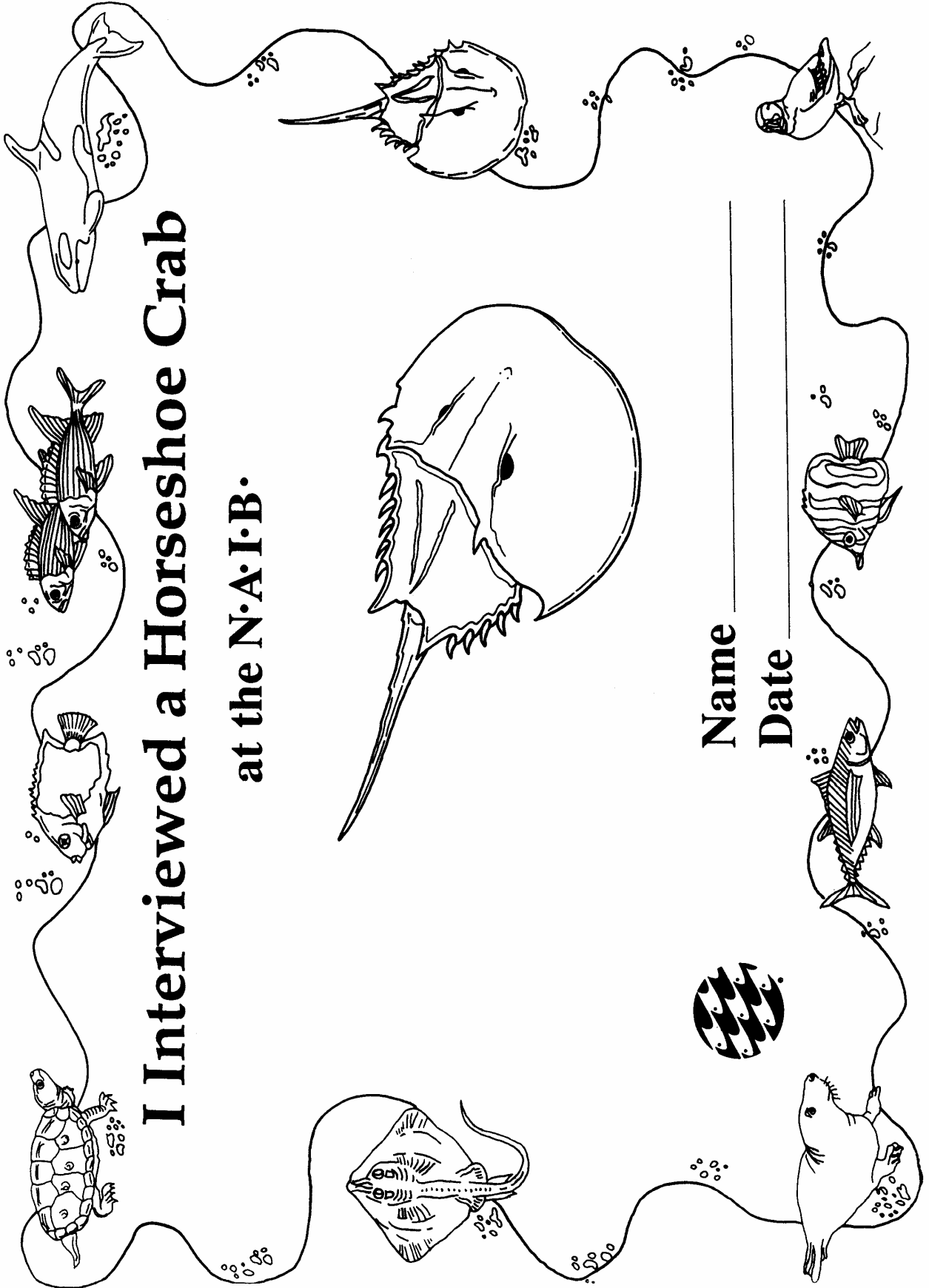
#### Procedure

1. Photocopy and distribute the “I Interviewed a Horseshoe Crab at the NAIB” certificate, page 13. Have students color the drawings, write their name and date.
2. Once complete students can display in the classroom or take the certificate home.



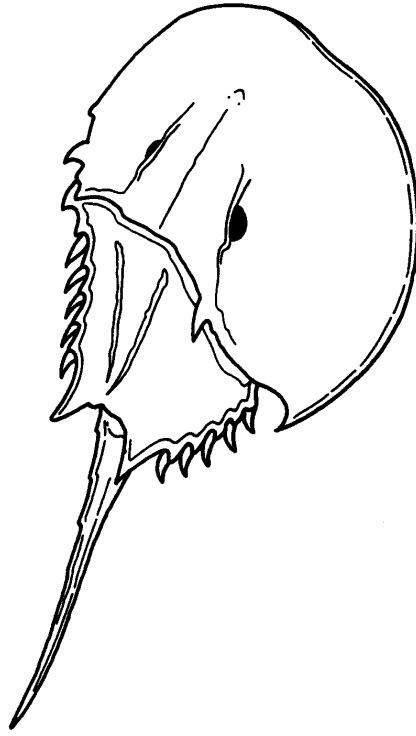
# Puzzle Pieces





# I Interviewed a Horseshoe Crab

at the N·A·I·B·



Name \_\_\_\_\_

Date \_\_\_\_\_