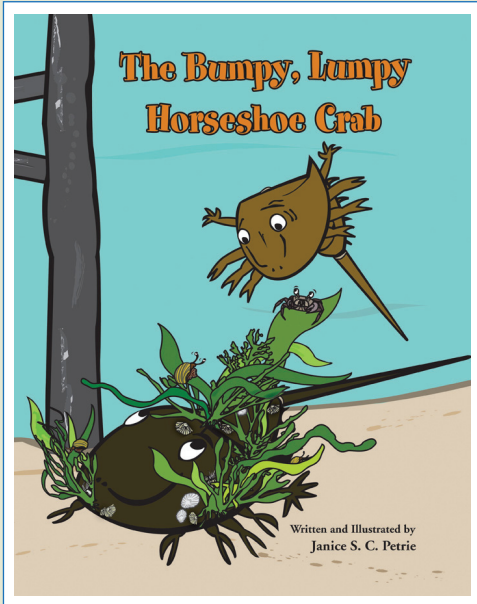


Story Elements for the book: *The Bumpy, Lumpy Horseshoe Crab*



Title: The Bumpy, Lumpy Horseshoe Crab

Author: Janice S. C. Petrie

Illustrator: Janice S. C. Petrie

Main Characters: a young, smaller horseshoe crab; a large, older horseshoe crab

Setting: the salty water underneath Powder Point Bridge in Duxbury, Massachusetts

Problem: A sleek, little horseshoe crab hasn't learned to camouflage himself in the sea, and is easily captured by a hungry seagull.

Solution: The little horseshoe crab wiggles his way out of the seagull's beak and drops back to the sea, where he collects seaweed and sea creatures on top of his shell to keep himself safe from predators.

Events:

A. A sleek, little horseshoe crab meets a larger horseshoe crab whose shell is covered with seaweed.

1. What did the little horseshoe crab think the larger horseshoe crab looked like at first?
(a rock, a hunk of seaweed) Fact
2. Was the little horseshoe crab happy to see the large horseshoe crab? Why?
(Not really. He was surprised, curious, and a little startled. He didn't know what to think of this horseshoe crab whose shell was covered with seaweed.) Inference
3. What are "gills"?
(Sea animals use gills to breath, and horseshoe crabs also flap their book gills to propel themselves through the water.) Vocabulary

B. The little horseshoe crab takes a close look at the large horseshoe crab and finds more than seaweed on her shell.

1. What were some of the things that were hitching a ride on the larger horseshoe crab's shell?
(crabs, periwinkles, barnacles) Fact
2. What do you think the word, "debris" means?
(flotsam and jetsam, remains, litter, pieces of this and that, bits of something left over) Vocabulary

C. The little horseshoe crab shows why he wouldn't want to live with sea life on his shell.

1. Why didn't the little horseshoe crab want his shell covered with lots of things from the sea?
(He thought they would weigh him down and prevent him from flipping over and gliding easily through the sea.) Fact
2. What is a "rudder"? (used to steer a boat, a horseshoe crab uses his tail to steer himself in the same way a boat uses a rudder) Vocabulary

D. The large horseshoe crab tells about horseshoe crabs she's seen that were covered with sea creatures.

1. What did the other horseshoe crabs look like that the larger horseshoe crab had seen?
(one was polka-dotted; the other's shell was pea green) Fact
2. Of the limpets, algae, and barnacles mentioned in the story, which sea creatures made the horseshoe crab look polka-dotted? pea green?
(Polka dots were made by limpets and barnacles. Pea Green coloring was caused by algae.) Inference
3. Which horseshoe crab do you think is older, the smaller one, or the larger one? Why?
(The larger one is older. The larger horseshoe crab is bigger and darker in color. The book mentions the sleek horseshoe crab is young. The larger horseshoe crab seems to know more about the world and has had more experiences.) Fact, Inference

E. Low tide approaches, and the large horseshoe crab digs under the sand and rests.

1. Why did the horseshoe crab dig under the sand?
(to take a nap, to stay cool and sheltered from the hot sun) Fact
2. What could happen to a horseshoe crab that was out in the open, with very little water around him?
(a predator could eat him, he could become too hot and not feel well, he could dry out in the sun) Inference

F. A seagull swoops down, grabs the little horseshoe crab in his beak, and flies away with him.

1. Does the hungry sea gull notice the sleeping horseshoe crab and her friends who are napping? Why or why not?
(No, they aren't moving around, they look like a rock with seaweed growing on it, the smaller sea animals blend in with the seaweed, they are camouflaged) Inference
2. How do you think the seagull felt when he snatched the horseshoe crab out of the ocean?
(happy, proud, glad to have found food) Inference
3. How do you think the little horseshoe crab felt when the seagull grabbed him?
(scared, unhappy, surprised) Inference
4. What does "disguised" mean?
(hidden or masked so something won't be recognized) Vocabulary

G. The little horseshoe crab escapes from the seagull and lands back in the sea. He starts collecting seaweed, and creatures and critters to ride on top of his shell right away.

1. How did the horseshoe crab escape from the seagull?
(He wiggled and jiggled, and the seagull lost his grip on the horseshoe crab's shell.) Fact
2. What kinds of sea creatures did the little horseshoe crab collect?
(limpets, barnacles, crabs, periwinkles, seaweed) Fact, from the illustration.
3. Why did the little horseshoe crab decide to let these critters and creatures ride on the top of his shell?
(So he would blend in with his surroundings and be safe from predators.) Inference

H. The two horseshoe crabs live happily-ever-after, camouflaged from predators.

1. What is it called when animals blend in with their surroundings, which makes it hard for predators to see them?
(camouflage) Vocabulary

Vocabulary

Powder Point Bridge: a bridge in Duxbury, Massachusetts that crosses a habitat of tidal flats or mud flats

currents: the flow of water in a particular direction

tide: The rise and fall of the ocean water caused by the attraction of, primarily, the Moon, but also the Sun.

gills: an organ that fish and other sea animals use to breathe.

horseshoe crab: a marine animal found in the waters off the eastern United States that have a pointed tail and a rounded body shaped like a horseshoe. (For more information see the last page of the book, or The Bumpy, Lumpy Horseshoe Crab section of this website.)

lingering: to be slow in leaving, to hang around, to remain for some time

debris: flotsam and jetsam, remains, litter, pieces of this and that, bits of something left over

sleek: smooth, shiny

rudder: used to steer a boat

barnacles: a sea animal with feathery, jointed legs that sticks itself to hard surfaces forever

algae: a plant-like organism that grows in water

limpets: a sea mollusk that has a cone shaped shell. (See the next to last page of The Bumpy, Lumpy Horseshoe Crab for more information.)

periwinkles: a marine snail (See the next to last page of The Bumpy, Lumpy Horseshoe Crab for more information.)

crabs: A crustacean with a flat, broad body, antennae, a small abdomen, and five pairs of legs. (See the next to last page of The Bumpy, Lumpy Horseshoe Crab for more information.)

disguised: hidden or masked so something won't be recognized

Prior Knowledge and Predicting

1. Students look at the cover of the book and identify the author, the illustrator, and the title of the book.
2. Ask students if they've ever been to the beach? What things do students see at the beach? What creatures have students found in the water? Have students ever found a horseshoe crab in the salty, ocean water? What was it like?
3. Students look at the two horseshoe crabs on the book's cover.
 - What does the larger horseshoe crab at the bottom have on her shell?
 - What does the smaller horseshoe crab have on his shell?
 - Do students think the seaweed and other creatures on top of the larger horseshoe crab's shell could help her in any way?
 - Look at the expressions on the horseshoe crab's "faces." What do students think each horseshoe crab is feeling? Why?
4. The larger horseshoe crab digs a cool napping place under the sand. Why do students think she burrows in the sand? Do students think she might also be hiding from something? Do students think there are predators that might want to eat a horseshoe crab? What kinds of creatures might eat a horseshoe crab?
5. The seagull drops the sleek, little horseshoe crab, who falls back towards the water. What do student's think the first thing the little horseshoe crab is going to do once he's safely underwater?

Compound Words

horseshoe
something
seaweed
herself
anything
whenever

Rhyming Words

bumpy - lumpy	down - town	treat - eat - meet - greet
tide - wide	whenever - never	away - day - say - way
long - wrong	seen - green	beak - week
ease - seas	galore - more	wiggled - jiggled
sea - debris - see - be - free	water - hotter	flopped - dropped
look - mistook - shook	sand - land	about - doubt
there - share - care	sky - spy	walk - rock

Activities for Elementary and Preschool Students

Lesson One: Take a Ride on the Back of a Horseshoe Crab: Writing (Reading, Language Arts)

Objective: Students will read, *The Bumpy, Lumpy Horseshoe Crab*. Then students will imagine they're one of the crabs the little horseshoe crab invited to take along for a ride on his shell, and write a five sentence story about their experience.

Elementary Students:

Materials Needed:

paper
pencil or pen
crayons, markers, or colored pencils
hamburger paragraph organizer

After reading the story, *The Bumpy, Lumpy Horseshoe Crab*, imagine you're one of the crabs that the little horseshoe crab invites to take along for a ride on his shell. Write a story about what it's like to ride on the back of a horseshoe crab.

- What does it feel like as you glide through the water?
- What kinds of things surround you on the shell?
- What sights do you see?
- What adventures do you have under the sea?

Be sure to write a great hamburger paragraph, with the top bun consisting of a great topic sentence, plenty of fixings or details in the middle, and a bottom bun, or concluding sentence, that wraps everything up. When finished, draw an illustration for your story and give it a title. Read your finished story to the class, if you'd like to share.

Preschool Students:

Materials Needed:

chart paper
easel
marker
paper
crayons, markers, or colored pencils
pencil

After reading the story, *The Bumpy, Lumpy Horseshoe Crab*, students, as a group, will imagine they're one of the crabs that was invited to take a ride on top of the little horseshoe crab's shell. Using a large sheet of lined, chart paper on an easel and a marker, the teacher will scribe a story the students take turns building, sentence by sentence, about their voyage riding on the back of a horseshoe crab. The teacher will ask students questions such as:

- What does it feel like as you glide through the water?
- What kinds of things surround you on the shell?
- What sights do you see?
- What adventures do you have under the sea?

When finished, each child can draw an illustration on their own separate piece of paper of their favorite part of the story they created as a group, dictating one sentence to their teacher that tells about their illustration. The teacher will write this sentence on the student's paper as a caption for their illustration. If desired, students can share their illustrations when completed.

Hamburger Paragraph Organizer

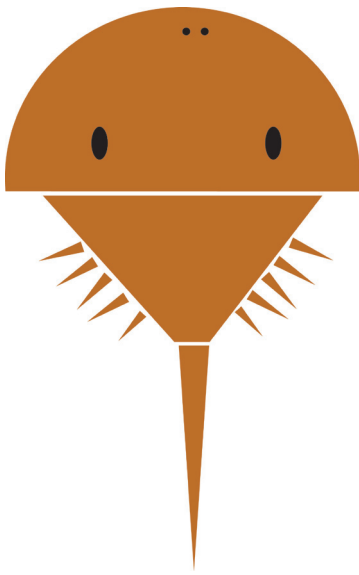
Topic Sentence:

Detail:

Detail:

Detail:

Concluding Sentence:



Lesson Two: The Geometry of a Horseshoe Crab: Math (Art, Science)

Objective: Students will create a horseshoe crab figure using only geometric shapes.

Elementary Students:

Materials Needed:

construction paper

scissors

glue

multiple, traceable, patterns made of oak tag poster board of the following shapes: a semi-circle, a trapezoid, an elongated isosceles triangle, an oval, a smaller circle, & a smaller triangle.

Believe it or not, although a horseshoe crab is an organic, living creature, it's body is extremely geometric in appearance. Students will create a work of art using geometric shapes to form a horseshoe crab. The teacher will make a few patterns of each shape for students to share and trace onto one or more colors of construction paper of their choice. Students will cut a semi-circle out of construction paper for the horseshoe crab's first section, a trapezoid for the middle, and an elongated isosceles triangle for the tail. To add detail, students will cut out two small ovals for compound eyes, two smaller circles for simple eyes, and about ten small triangles for movable spines. If desired, students can include a few line segments to add character and expression. Students will mount the body parts to form a complete horseshoe crab on a colored, background paper of their choice. The project will have a great look for a math/science bulletin board, with a connection to literature. This also could be used as a creative cover for a folder containing sea animal related projects.

Preschool Students:

Materials Needed:

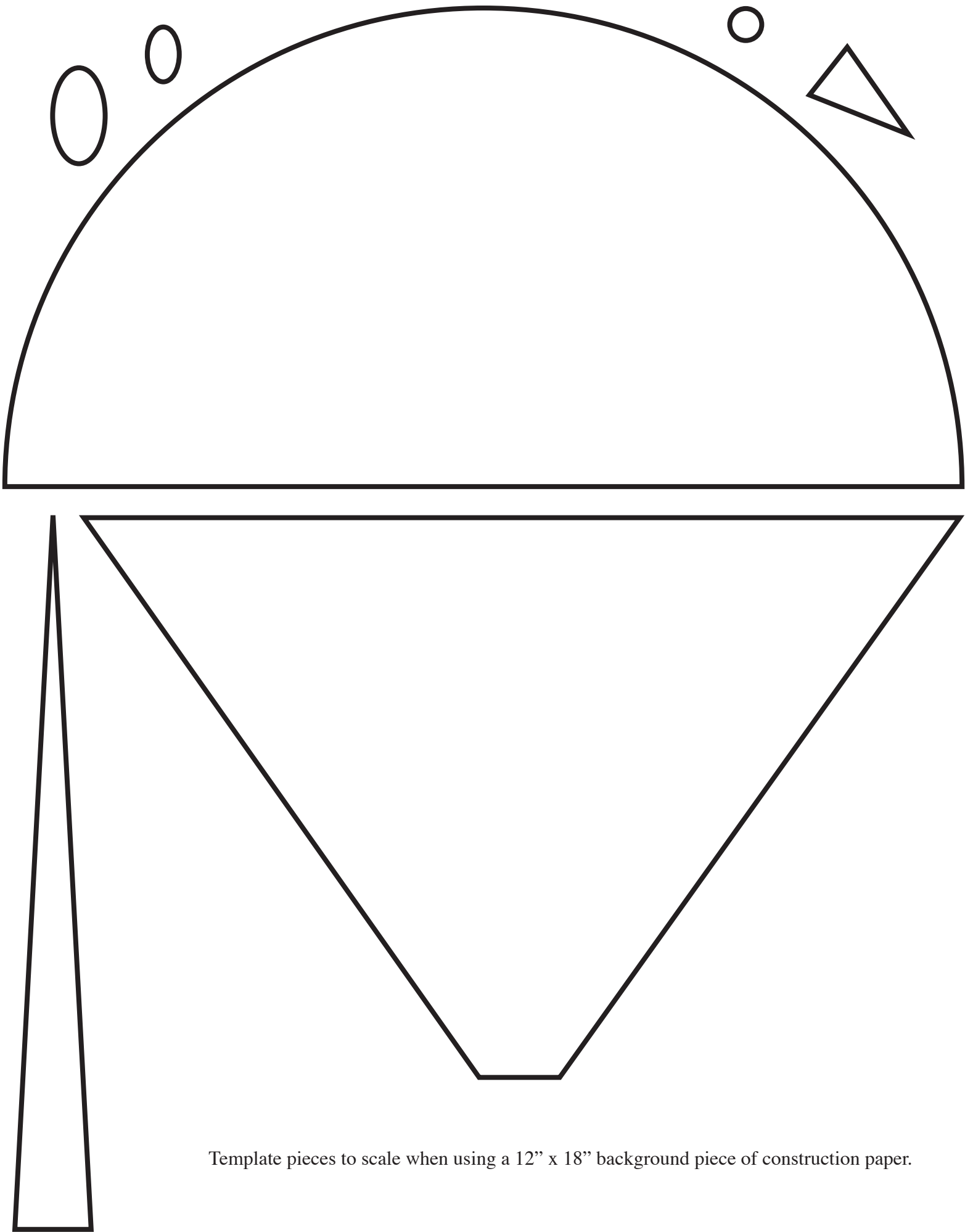
white construction paper

paint

sponges cut into different shapes including: a large trapezoid, a large semi-circle, an elongated triangle, a small oval, a small circle, a small triangle

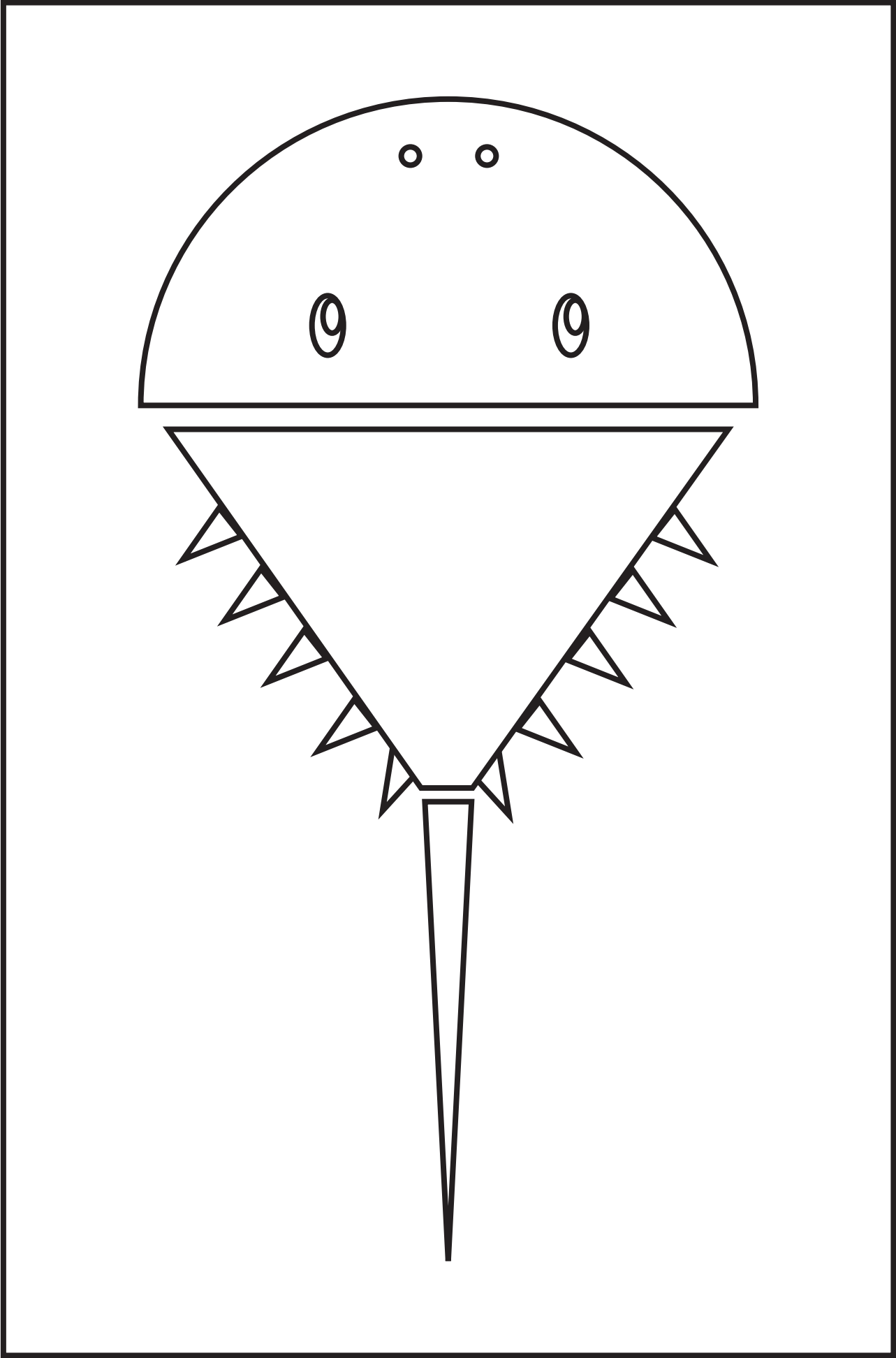
googly eyes (optional)

The teacher will need to cut sponges into different shapes: a semi-circle for its first section, a trapezoid for the middle, an elongated isosceles triangle for the tail, a small oval for the two compound eyes, a smaller circle for the two simple eyes, and a small triangle for the movable spines. Students will dip their sponges into colored paints and stamp them onto a piece of white construction paper to create the three sections of a horseshoe crab and moveable spines. Let dry. Then students dip sponges into a different paint color than before to create eyes, or glue googly eyes to add a little fun to the project. When completed, you have a great math, science and art lesson, all wrapped into one.



Template pieces to scale when using a 12" x 18" background piece of construction paper.

Finished example using a 12" x18" piece of construction paper. (Scaled down to fit on this 8.5" x 11" paper.



Lesson Three: A Horseshoe Crab's Habitat: Science (Reading, Writing, Language Arts, Art)



Objective: Students will identify the characteristics of a tidal flat habitat and choose four sea animals that can be found living there.

Elementary Students:

Students will need:

poster board

markers, colored pencils, pencil, or paint

4 photos, pictures, or printed illustrations of sea life

glue

On a large piece of poster board, students will draw a tidal flat scene, either from a photo from the internet (or this website), or if possible, from a visit to a tidal flat. Students may use colored pencils, markers, or paints to add life to their background habitat. Then, students will choose four sea creatures that live in the same tidal flat habitat as the horseshoe crab, using the horseshoe crab as one of their four sea creatures. Students can find examples of other marine life in the “scientifically speaking” section of *The Bumpy, Lumpy Horseshoe Crab* portion of this website. (Some examples: hermit crabs, jonah crabs, sea gulls, moon snails, clams, sand dollars, periwinkles, sea stars, razor clams, oysters.)

Students will draw, use a photograph, or print out an illustration of each of the four sea creatures, and glue each one to a different quadrant of their habitat. Beside or below each example of sea life, students will glue a small, paper rectangle that has a paragraph written or typed that tells about the sea creature pictured in the illustration.



Preschool Students:

Materials Needed:

magnetic dry erase board

magnets (ones sent in the mail from advertisers are perfect to recycle.)

photos, pictures, or printed illustrations of sea life, as well as woodland and/or farm animals (mounted on the magnets)

glue

markers

Using a magnetic dry erase board, teachers will roughly draw some sea grass in the foreground, a brown dotted area for sand in the middle area, and blue waves for water in the background to represent a tidal flat habitat. After *The Bumpy, Lumpy Horseshoe Crab* is read at circle time, students will take turns coming up to choose a magnet depicting a sea animal that belongs on a tidal flat. After a quick discussion about the chosen sea animal, the student will stick it to the dry erase board. (Some examples: hermit crabs, jonah crabs, sea gulls, moon snails, clams, sand dollars, periwinkles, sea stars, razor clams, oysters.)

“A Horseshoe Crab’s Habitat” Lesson Assignment: (sample finished project)



Moon Snail: Students will identify the animal and tell a little about it, and glue the description here.

Tidal Flat Habitat

Students will draw an illustration of a tidal flat habitat that takes up all of the space on a poster. Then they will write briefly about the tidal flat and its features and glue it here.



Sand Dollar: Students will identify the animal and tell a little about it, and glue the description here.

Hermit Crab: Students will identify the animal and tell a little about it, and glue the description here.



Then students will identify four sea animals who make their home in a tidal flat, either by drawing a picture, finding an image online and printing it, or taking a photo. One picture is glued to each quadrant of the poster.

Horseshoe Crab:

Students will identify the animal and tell a little about it, and glue the description here.



Lesson Four: The History of Horseshoe Crabs and their Relationship to People

Project: Make a “Just Flip ‘em” Poster : History (Listening, Reading, Writing, Art)

Objective: Students will learn about the contributions that horseshoe crabs have made throughout history, and continue to make today. Then, students will create a “Just Flip ‘em” poster to help ensure the horseshoe crab population doesn’t become extinct.

Elementary Students:

Students will need:
poster board or construction paper
markers
creativity and a clever slogan

Teachers will tell students the information below about how horseshoe crabs have helped people, adjusting the information to the grade level taught. Following this lesson, teachers tell students that there’s something we can do to help the horseshoe crab. The Ecological Research & Development Group, Inc. launched a campaign in 1998 to help horseshoe crabs called, “Just Flip ‘em.” The program is designed to let people know that if they see a horseshoe crab stranded on its back with its legs in the air, they should gently take it by its shell and flip it over so it can swim away. Stranded horseshoe crabs can fall prey to shorebirds, or become overheated and dry in the hot, summer sun. If everyone does his or her part, the horseshoe crab population will no longer be at risk, and will rebound quickly.

Project: Help the horseshoe crab population, one horseshoe crab at a time, by making a “Just Flip ‘em” poster! Each student will use poster board or construction paper and markers to create a “Just Flip ‘em” poster to hang in the school hall, to help educate students and teachers about the importance of giving horseshoe crabs a helping hand to turn over.

The Horseshoe Crab in History: Horseshoe crabs have helped human beings throughout history. When we think of Thanksgiving, most people think of turkey. But back when this country was first settled, Native Americans used horseshoe crabs as a food source. Most of the meat in a horseshoe crab can be found in the opisthosoma, or middle section of the horseshoe crab. They also may have eaten a few of the organs in the first section of the horseshoe crab, or prosoma. But Native Americans are noted for not wasting a bit of an animal that provides them with food. This was the case with the horseshoe crab. The shell of the horseshoe crab was used to bail out their boats. The telson, or tail of the horseshoe crab, was attached to Native American spears to give them a sharp point. Then Native Americans would grind the shell of the horseshoe crab, which is rich in nitrogen, to use as fertilizer to grow crops.

Native Americans taught the new settlers how to use horseshoe crab shells as fertilizer, and the fertilizer industry used ground up horseshoe crab shells until the 1950’s. This practice was discontinued partially because chemical fertilizer became more popular and partially because from the 1920’s on, there was a decline in the horseshoe crab population.

Horseshoe crabs also have been fed to chickens and pigs as an inexpensive food source in the past. Today, horseshoe crabs are used as bait to catch eel and conch, which raises new concerns about an alarming decline in the horseshoe crab population. As an invaluable resource to the biomedical field, where the horseshoe crab’s copper-based, blue blood is used to keep people safe from infections, horseshoe crabs are also an important natural food source for loggerhead turtles and shorebirds. It’s even more important than ever to find ways to protect the horseshoe crab population.

Horseshoe Crabs Throughout History

