

INTRODUCTION TO THE ROCKY SHORE

Topic

Rocky Shore Ecosystem Identification

Duration

One session

Vocabulary

adaptations
ecosystem
environment
habitat
intertidal
rocky shore

STANDARDS

Practices

Planning and Carrying Out Investigations

Core Ideas

Biodiversity and Humans

Crosscutting Concepts

Structure and Function

OCEAN LITERACY PRINCIPLES

OLP 5

FOCUS QUESTION

What is a rocky shore?

OVERVIEW

Students discuss their prior knowledge and experiences of the rocky shore. Students will examine photographs of the rocky shore and identify features of the rocky shore. Students will define the term “ecosystem.” Students will brainstorm the challenges life may face at the rocky shore.

OBJECTIVES

Students will be able to:

- ★ Identify the characteristics of a rocky shore
- ★ Define ecosystem
- ★ Make inferences on the challenges life faces at the rocky shore

MATERIALS NEEDED

- ★ Print outs of four rocky shore photographs (pages 33–36)
- ★ Scientist notebooks (if used in class)
- ★ Poster paper/paper for groups to record their observations

TEACHER PREPARATION

1. Print out the four rocky shore photographs (pages 33–36), preferably in color.
2. Plan on designating specific work spaces for groups.
3. Teachers will need easy access to a whiteboard or interactive whiteboard to record student input.

BACKGROUND

A rocky shore is an intertidal area that is made up of rocks, pools of water, and many plants and animals. Each species of plant life and animal life have adaptations that enable them to survive their harsh environments. These species and their habitats interact with one another to form the rocky shore ecosystem.





Teacher Tips

- ★ If following this curriculum or a different curriculum, reviewing previous lessons at the beginning of each lesson is good practice.
- ★ Consider preserving student input and questions from each lesson on your computer or chart paper.
- ★ Print out the rocky shore photographs in color, paste them to cardstock or a firm paper product, and laminate them for future use.



Extension Suggestions

- ★ Read the “Rocky Shore Tale” (pages 37–40). Afterward, have students identify the potential dangers of living at the rocky shore and what adaptations rocky shore creatures might have to help them stay alive.
- ★ Find a website or multiple websites with live cameras observing rocky shore locations for students to observe, such as Monterey Bay Aquarium’s Live Web Cam.

PROCEDURE

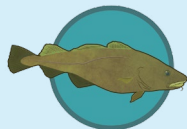
1. Ask students what they can recall from the first two lessons (Toss the Blue Planet and Build Your Own Watershed). Review facts about the ocean, watersheds, and conservation. Refer back to student responses from previous lessons.
2. Inform students that now they have reviewed the importance of our oceans and how we can impact them, they are going to be spending a lot of time discovering facts about a specific, amazing area of the ocean—the rocky shore.
3. Ask students what they think a rocky shore is, and to provide as many specifics as possible. Allow for students to discuss experiences they have had, and record relevant student input.
4. Explain to students that you will be dividing them up into four groups and that each group will have their own photograph of a rocky shore. Tell them to write down as many characteristics of the rocky shore their group observes in their photograph. The group or the teacher needs to designate a recorder for this activity.
5. Divide students into four groups and give each group a photograph (pages 33–36).
6. Allow students 5–10 minutes to examine the photographs and record their findings.
7. Once students have investigated their photos, have each group share what characteristics they found and record their input for everyone to see. Students can write their answers in their science notebooks (if applicable).
8. Lead students in a discussion of what they have found, and highlight common themes:
 - a. What similar things did groups find?
 - b. What things did some groups find but others did not?
 - c. If each group is looking at a photograph of a rocky shore, why are they observing different things?
9. Explain to students that an ecosystem is a community of interacting organisms and their environment. Consider integrating the first extension suggestion here.
10. Explain to students that the rocky shore is an ecosystem which has many characteristics because of the coming and going of the tides. Teachers and students can briefly discuss tides at this time, and students can be informed that they will be learning more about tides in future lessons.





Books

- ★ *Clam-I-Am!: All About the Beach* by Tish Rabe
- ★ *Kermit the Hermit* by Bill Peet



Websites

- ★ Watch a rocky shore on a live camera at the Monterey Bay Aquarium website.
- ★ Check out videos from the rocky shore in New Hampshire on the Seacoast Science Center's Youtube Channel.



Scientist Notebook

- ★ Students can record the definitions of rocky shore and ecosystem, their observations of the rocky shore photograph, and their inferences of life's challenges at the rocky shore.

PROCEDURE (CONTINUED)

- II. Ask students to make inferences as to what challenges life on the rocky shore may have and record their input to refer to at a later time. Students can write their answers in their science notebooks (if applicable).

WRAP-UP

- ★ Ask students what main characteristics make up a rocky shore.
- ★ Ask students to define the term ecosystem.
- ★ Remind students that the characteristics they discovered have given them clues as to the challenges life on the rocky shore faces each day.
- ★ Inform students that they will be learning about one of these challenges in their next lesson.



ROCKY SHORE, IMAGE 1



ROCKY SHORE, IMAGE 2



ROCKY SHORE, IMAGE 3



ROCKY SHORE, IMAGE 4



ROCKY SHORE TALE

by Thom R. Smith

Note: This is not scientifically-based. This story is meant to provide an engaging context for exploring the rocky shore and adaptations.

One morning you walked into your classroom and your teacher was standing by a large device with flashing lights and three large buttons. She explained to you that she had invented an ecosystem machine. If the green button is pushed, the ecosystem you live in changes into a different ecosystem. If the red button is pushed, your ecosystem changes back to what it was from the start. If the blue button is pushed . . . well, she said to never to touch that button.

Most students wanted to see if the machine worked so your teacher called on one of your classmates to push the green button. As your classmate pressed the green button, for a split second everything turned black. When everything became light again it appeared as if nothing had changed. All of the students were discouraged and your teacher apologized, not understanding why her invention had not worked.

As math class began something strange happened. Water splashed up against the windows of the school—but it hadn't rained for days and it was sunny outside. As the teacher tried to get everyone to pay attention water hit the windows again, and some of the water leaked through the open classroom windows. Everyone peered out to see what was going on when they noticed the entire schoolyard had turned into a gigantic puddle, and the puddle was rising! The principal's voice came out of the intercom, informing everyone to stay inside the building until they figured out what was going on, and to remain calm.

Your teacher shut the classroom windows as more and more water splashed against the building. She noticed that some of the water was knocking some bricks loose and cracking some windows, so she pulled down the window shades so you and your classmates wouldn't get scared. Trying to get your classmates' minds off of the flooding, she decided all of you should play a game instead. As students formed groups some began to complain that they were getting colder. The teacher apologized and explained that she can't change the temperature but encouraged all of you to put on whatever sweatshirts and coats you'd brought to school.

Your class got back together into groups to play a game to prepare for your upcoming math test. Suddenly the entire classroom shook. Then it shook again. Thinking an earthquake might be happening your teacher instructed you and your classmates to get underneath your desks immediately. She quickly took a peek outside and was astonished by what she saw. The entire school was underwater! Accidentally letting go of the window shade, the teacher allowed the window shade to go all the way up, revealing to your entire class that you were underwater! The motion of the underwater currents shook the school back and forth, making it hard for everyone to stand still. Your principal came back on the intercom, advising everyone to remain calm, and that as long as they stayed in their classrooms, all students would be safe.



ROCKY SHORE TALE *continued . . .*

Just as soon as the principal stopped talking an enormous whale swam by your classroom window! Your teacher exclaimed that she now understood what was going on. Her invention had worked! Your school had been changed from being located in a forest ecosystem to being located in a rocky shore ecosystem. What swam by the school was not a whale, but an Atlantic cod! She pressed the red button to change your ecosystem back around but nothing happened. The machine was broken! One of your classmates suggested that she press the blue button but your teacher got upset and exclaimed “Absolutely not!”

As your class watched the cod swim around your teachers’ cars, the gigantic fish started to swim toward your classroom’s window. Before anyone could react, the fish, mouth wide open, slammed into your classroom’s window causing a large crack to form and water to start leaking into the classroom. Your teacher asked some of your classmates to help her cover the leak with duct tape, and while they did you and some of your classmates asked your teacher what would happen if the cod came back? After all, wasn’t it trying to eat you all? The teacher remarked how that was a good question, and asked you what you thought your class should do.

You knew that your class couldn’t leave the school building, but you knew that somehow everyone needed to hide. You suggested to your teacher that your class needed to hide the school building.

“How are we going to do that?” your teacher asked.

You suggested that everyone color seaweed designs on the window shades that faced the outdoors so that when fish see the school building they’ll think nothing is there to eat.

Your teacher thought it was a great idea and informed the principal through the intercom of your idea. The principal’s voice came over the intercom again telling all classrooms to color drawings of seaweed on their window shades. Your idea seemed to work as schools of fish swim by, but they did not bother your school building anymore.

While your teacher tried to fix her ecosystem machine she requested that your class pair up and read to each other in partners. Your classmates started to decide who they were going to read with when someone noticed that the water was not leaking through the window anymore, and appeared to be going down. Everyone ran to the window and was happy to see that the water was indeed going down. Once it completely disappeared, the principal came over the intercom and informed the school that everyone was safe and could continue to participate in their regular school activities.

You and your classmates requested to go outside and have some recess since you had been inside for so long. Your teacher thought that was a great idea to get some fresh air, and besides, she had had a difficult time fixing the ecosystem machine.

“It might be good for everyone to have a break,” she said.

While your class played on the wet playground, some students noticed that parts of the ground were filled with rainbow-colored puddles.

“How pretty!” some classmates exclaimed.

“Why do these puddles look like rainbows?” others asked your teacher.

“The puddles look like rainbows because they are polluted,” replied your teacher. “When the water came



ROCKY SHORE TALE *continued . . .*

and rose like tides some of it must have had some oil or gasoline in it.”

Just then one of your classmates shouted from near the swings, calling your teacher to come quick. When everyone ran over they saw a huge sea star lying on the ground. It was as big as you and some of your classmates!

“Why isn’t it moving?” one of your classmates asked.

“I’m afraid it is not alive,” responded your teacher. “It has some of that rainbow-colored water on it. I’m guessing it died from being poisoned by the polluted water.”

Everyone in your class frowned and did not feel like playing anymore.

As you and your classmates started walking back to the school to go inside a tremendously large shadow passed overhead. Everyone put their hands over their eyes to see what large plane or cloud was above them. The shadow passed by again, except quicker than any shadow any of your classmates had ever seen.

“Ouch!” yelled one of your classmates.

Everyone turned around and saw that a gigantic white feather had fallen on top of one of your friends! As you ran over to help your friend, your teacher shouted, telling everyone to run under the trees as fast as possible. Some students started to ask why when everyone realized—a gigantic bird was making its way toward the class with its beak wide open! Your class ran faster than it ever had before, and before you could make it to the trees everyone had to dive underneath different pieces of playground equipment —tire tunnels, the merry-go-round and more.

Your teacher shouted for everyone to stay where

they were until the coast was clear of all gulls. One student admitted they had sneaked a bag of chips out onto the playground, and asked the teacher if that might distract the gull that was chasing them. Your teacher expressed that although she was unhappy that your classmate broke the rules by bringing food onto the playground, she thought that it was a great idea. Your classmate tossed his chips out into an open space, and as soon as the enormous gull started to gobble up the ranch-flavored chips your teacher and all of your classmates ran back inside the school.

Safe inside the school, your teacher began to continue to fix her ecosystem machine while the rest of the class had a snack and talked excitedly about their day. As your class finished snack and started to clean up a tremendous crash was heard. Everyone turned expecting to see their teacher and a broken machine but instead saw a terrifying sight! A crab the size of a small car had broken through the classroom window with its claw and was trying to squeeze inside. Your class tried to escape into the hall but the door was stuck . . . there was no way out! The crab pushed by the broken glass and clattered onto your classroom floor, knocking over a few desks.

“What do we do?” your class asked your teacher.

“I’m going to push the blue button everyone . . . hold on tight!” she yelled.

Your teacher raced over to her machine, past the snapping claw of the crab and slammed down the blue button. For a split second everything went black again, but when everyone could see they saw that the crab was still there. The blue button did not work . . . or did it? Everyone ran to try to hide from the crab when they



ROCKY SHORE TALE *continued . . .*

noticed they couldn't. They were stuck to the ground! Their body had become surrounded by a hard shell.

"The blue button changes humans into organisms from the ecosystem they are currently living in!" shouted your teacher. "Since we are currently living in the rocky shore ecosystem, the blue button has changed us into barnacles. Your hard shell should protect you from the crab . . . you also have an operculum on your shell which you can shut like a door to keep the crab from getting to your body. You shut your operculum and stay inside your shell until I can get my machine fixed!"

You and your classmates all shut your operculums and could not see a thing while you heard the crab scuttling around the classroom. Once in a while you could hear your teacher shouting at the crab to stay away, and you could also hear your teacher dropping her tools onto the floor—instead of arms she only had feathery feet

to use to try and fix her machine. You then heard your teacher shout "Woo hoo!" and everything went black.

When you opened your eyes you could see your classroom, your classmates, and your teacher and her machine. However, the crab was gone, the floor was dry, and everything seemed to be back to normal. Your teacher apologized for putting you and your classmates in such danger, and commented that she will never use the ecosystem machine ever again unless she knows for certain that the red button is working. Your day had been full of threats—waves, tides, changing temperatures, predators, pollution, and more. You were thankful that you could visit the rocky shore ecosystem without needing to be a member of it! You will also remember to ask to go to the nurse if you ever see one of your teacher's inventions inside your classroom again. ★

