

ROCKY SHORE ZONES: THE MIDDLE INTERTIDAL ZONE

Topic

Zones, Adaptations

Duration

Two sessions

Vocabulary

adaptation
challenge
feature
middle intertidal zone
zone

STANDARDS

Practices

Analyzing and Interpreting
Data

Core Ideas

Adaptation

Crosscutting Concepts

Systems and System Models

OCEAN LITERACY PRINCIPLES

OLP 5

FOCUS QUESTION

What is the middle intertidal zone?

OVERVIEW

Students recall that the rocky shore has been divided into zones by marine biologists based on the average water and air exposure of each area. Students discuss what they learned about the splash zone and upper intertidal zone. Students record information about the middle intertidal zone's names, characteristics, common algae life and common animal life. Students continue to construct a bulletin board diagram or individual rocky shore zone diagram by creating the middle intertidal zone using art supplies.

OBJECTIVES

Students will be able to:

- ★ Indicate that the rocky shore can be divided into zones
- ★ Identify the middle intertidal zone and its features
- ★ Recognize the challenges living organisms encounter in the middle intertidal zone and the different adaptations of organisms living in the middle intertidal zone
- ★ Create a middle intertidal zone using art supplies

MATERIALS NEEDED

If doing bulletin diagram activity:

- ★ Rocky Shore Zones Table (one per student, "Rocky Shore Zones Table" on page 95)
- ★ Atlantic Ocean Rocky Shore Guide (one per student, pages 18–20)
- ★ Rocky Shore Zones Table Answer Key (for teacher reference, "Rocky Shore Zones Table" on page 96)
- ★ Life at the Rocky Shore Fact Sheet (for teacher reference, "life at the rocky shore" on page 13)
- ★ A large bulletin board or blank wall
- ★ White bulletin board art paper





Teacher Tips

- ★ Have students use the Atlantic Ocean Rocky Shore Guide as a reference while they draw their rocky shore organisms. Use book illustrations or other printed resources if you need more examples.
- ★ While instructing students about the middle intertidal zone using the Rocky Shore Zones Table, either project a copy of the table on the board or draw a table on a whiteboard to record information for all students to see.
- ★ Make copies of the Rocky Shore Zones Table Answer Key for students with special needs to use at their own desks to either copy or highlight.

MATERIALS NEEDED (CONTINUED)

- ★ White paper/index cards for each student
- ★ Coloring utensils for each student
- ★ Scissors for each student
- ★ Stapler (for teacher)

If doing individual diagram activity:

- ★ Rocky Shore Zones Table (one per student, “Rocky Shore Zones Table” on page 95)
- ★ Atlantic Ocean Rocky Shore Guide (one per student, pages 18–20)
- ★ My Rocky Shore Diagram (one per student, page 70)
- ★ Rocky Shore Zones Table Answer Key (for teacher reference, “Rocky Shore Zones Table” on page 96)
- ★ Life at the Rocky Shore Fact Sheet (for teacher reference, “life at the rocky shore” on page 13)
- ★ Coloring utensils for each student

BACKGROUND

The rocky shore ecosystem is naturally divided into zones by the tidal movement of the ocean. These zones are mainly defined by the amount of time they are exposed to water and air. Specific organisms can often be found inhabiting particular zones.

Although types of living organisms are often found in one specific zone, they can be located in different zones depending on their ability to survive in various regions of the rocky shore. Zones are not restrictive, and will vary tremendously by slope, exposure, size of loose rocks, etc. While using the term “zone” is common and helpful, it can also mislead if students think that barnacles can only exist in the “barnacle zone.”

Each rocky shore zone presents living organisms with challenges that risk their survival. These living organisms have adaptations that enable them to overcome these challenges and thrive in the rocky shore ecosystem conditions.

The rocky shore ecosystem is frequently divided into three zones: the upper intertidal zone, the middle intertidal zone and the lower intertidal zone. This ecosystem can be divided more precisely into five zones: the splash zone, the upper intertidal zone, the middle intertidal zone, the lower intertidal zone and the subtidal zone.

PROCEDURE





Extension Suggestions

- ★ Have students participate in a daily leveled reading activity called “Ocean Partners.” Create partner book packets using mailing envelopes and developmentally appropriate books on ocean topics. On the front of the packet paste a picture of the book to be read, along with a list of teacher expectations (i.e. write one fact from each page or draw a picture of your favorite animal and write three facts about it). If desired, label the envelope with a color according to reading level. Laminate the envelope so it can be used repeatedly. The book packet should contain two books and any materials your students may need for book activities. Have student partners take turns reading the book aloud for fluency development

Part One

1. Ask students if they can recall how the rocky shore is divided into zones.

PROCEDURE (CONTINUED)

2. Inform students that a zone can be an area of land that has particular features. Each zone of the rocky shore has particular features, including specific amounts of time they are exposed to air and water, specific living organisms, and specific challenges to an organism’s survival.
3. Have students discuss what they have learned about the splash zone and upper intertidal zone by referring to their Rocky Shore Zones Table.
4. Inform students that they are going to be learning about the middle intertidal zone.
5. Instruct students on the names, features, algae, and animal life of the middle intertidal zone, having each student record facts you provide them with in their Rocky Shore Zones Table.
6. Emphasize the challenges to life in the middle intertidal zone, specifically citing the organisms’ adaptations that allow them to survive these challenges.

Part Two

7. Inform students that they are going to continue to work on their rocky shore diagram, either as a class or individually.
8. *If as a class:*
 - a. Have students access their Atlantic Ocean Rocky Shore Guide.
 - b. Provide each student with white paper or index cards, scissors and drawing utensils.
 - c. Divide students into groups and designate each group specific organisms to draw and color for the middle intertidal zone.
 - d. When finished, have students cut out their organisms, and the teacher will attach them to the bulletin board or wall diagram.

If individually:

- a. Have students access their Atlantic Ocean Rocky Shore Guide and My Rocky Shore Diagram.
- b. Inform students that they are going to draw the specific organisms of the middle intertidal zone onto their My Rocky Shore Diagram.

WRAP-UP

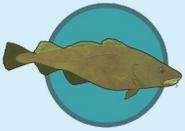
- ★ Have students store their Rocky Shore Zones Table, Atlantic Ocean Rocky





Books

- ★ *Spiny Sea Star: A Tale of Seeing Stars* by Suzanne Tate
- ★ *Crabby and Nabby: A Tale of Two Blue Crabs* by Suzanne Tate



Websites

- ★ Watch the Delaware Sea Grant YouTube Channel and their video titled “Blue Mussels.”
- ★ Watch the Seacoast Science Center’s YouTube Channel Episode titled “OceanRunnerNH Crackly Crabs.”
- ★ Watch the Vimeo video titled “Echinoderms: Sea Star Time-lapse: Eating Mussel.”



Scientist Notebook

- ★ Students can record the challenges and adaptations of organisms found at the middle intertidal zone.

Shore Guide and My Rocky Shore Diagram (if applicable) in a secure place to refer to in upcoming lessons.

WRAP-UP (CONTINUED)

- ★ Have students recall the features of the middle intertidal zone and its living organisms.
- ★ Have students recall the specific adaptations of the middle intertidal zone organisms.



ROCKY SHORE ZONES TABLE

Name: _____

Date: _____

Name of Rocky Shore Zone: _____

| | |
|---------------|--|
| Zone Name | |
| Zone Features | |
| Zone Algae | |
| Zone Animals | |



ROCKY SHORE ZONES TABLE

Answer Key

Name of Rocky Shore Zone: Middle intertidal zone

| | |
|---------------|---|
| Zone Name | |
| | Middle intertidal zone |
| | |
| | |
| Zone Features | |
| | This zone is exposed to air and water approximately equal amounts of time. |
| | |
| | |
| Zone Algae | |
| | Rockweed, Knotted Wrack |
| | |
| | |
| Zone Animals | |
| | Blue Mussel, Green Crab, Green Sea Urchin, Tortoiseshell Limpet, Asian Shore Crab |
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