ROCKY SHORE ZONES: THE UPPER INTERTIDAL ZONE

Topic
Zones, Adaptations

Duration
Two sessions

Vocabulary
adaptation
challenge
feature
upper 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 upper 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. Students record information about the upper 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 upper intertidal zone using art supplies.

Objectives

Students will be able to:

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

Materials Needed

If doing bulletin diagram activity:

- Rocky Shore Zones Table (one per student, page 81)
- Atlantic Ocean Rocky Shore Guide (one per student, pages 18–20)
- Rocky Shore Zones Table Answer Key (for teacher reference, page 82)
- Life at the Rocky Shore Fact Sheet (for teacher reference, page 12)
- A large bulletin board or blank wall
- White bulletin board art paper
- White paper/index cards for each student
- Coloring utensils for each student

Teacher Tips

- Have students use the Atlantic Ocean Rocky Shore Guide as a reference as they draw their rocky shore organisms. Use book illustrations or other printed resources if you need more examples.
- While instructing students about the upper 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)

- Scissors for each student
- Stapler (for teacher)

If doing individual diagram activity:

- Rocky Shore Zones Table (one per student, page 81)
- 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, page 82)
- Life at the Rocky Shore Fact Sheet (for teacher reference, page 12)
- Coloring utensils for each student

Teacher Preparation

For the large classroom diagram:

1. Make sure all students have copies of the Rocky Shore Zones Table and Atlantic Ocean Rocky Shore Guide.
2. Thoroughly review the Rocky Shore Zones Table Answer Key and Life at the Rocky Shore Fact Sheet.
3. Prep scissors, drawing utensils, and white paper/index cards for each student.

For the individual student diagram:

1. Make sure all students have copies of My Rocky Shore Diagram, Rocky Shore Zones Table and Atlantic Ocean Rocky Shore Guide.
2. Thoroughly review the Rocky Shore Zones Table Answer Key and Life at the Rocky Shore Fact Sheet.
3. Prep drawing 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."

Extension Suggestions

★ Have students participate in a classroom "Rocky Shore Reading Challenge!" Each student is given a Rocky Shore Challenge Reading List (page 85) to fill out as they read either at home or at school (or both) and a My Rocky Shore Creatures template (page 86). This template can be attached to the students' desks or a location of choice. Each ten chapters (or books) a student reads, the student receives one rocky shore creature to paste to their My Rocky Shore Creatures template. Teachers can cut these images out of the Rocky Shore Reading Challenge Images sheet (pages 83–84). Once students read 100 chapters (or 100 books) they have completed the Rocky Shore Reading Challenge.

Background (continued)

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

Part One

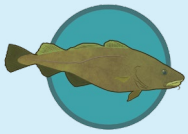
1. Ask students if they can recall how the rocky shore is divided into zones.
2. Inform students that a zone can be an area of land that has particular features. Each zone of the rocky shore has particular features, including specific amounts of time they are exposed to air and water, specific living organisms, and specific challenges to an organism's survival.
3. Have students discuss what they have learned about the splash zone by referring to their Rocky Shore Zones Table.
4. Inform students that they are going to be learning about the upper intertidal zone.
5. Instruct students on the names, features, algae, and animal life of the upper 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 upper 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 upper intertidal zone.
    d. When finished, have students cut out their organisms, and the teacher will attach them to the bulletin board or wall diagram.

Books

- ★ *Happy Hermit Crab, A Tale of Shell Seekers* by Suzanne Tate
- ★ *A House for Hermit Crab* by Eric Carle



Websites

- ★ Watch PBS Digital Studios Under H_2O video titled "The Intertidal" on YouTube.
- ★ Watch the Delaware Sea Grant YouTube Channel and their video titled "Barnacles."
- ★ Watch the Seacoast Science Center YouTube Channel and their video titled "Northern Rock Barnacle Feeding."

Scientist Notebook

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

Procedure (continued)

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 upper intertidal zone onto their My Rocky Shore Diagram.

Wrap-up

- ★ Have students store their Rocky Shore Zones Table, Atlantic Ocean Rocky Shore Guide, and My Rocky Shore Diagram (if applicable) in a secure place to refer to in upcoming lessons.
- ★ Have students recall the features of the upper intertidal zone and its living organisms.
- ★ Have students recall the specific adaptations of the upper intertidal zone organisms.

ROCKY SHORE ZONES TABLE

Name: _____

Date: _____

Name of Rocky Shore Zone: _____

Zone Name	
Zone Features	
Zone Algae	
Zone Animals	

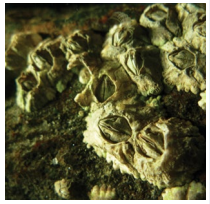
ROCKY SHORE ZONES TABLE

Answer Key

Name of Rocky Shore Zone: Upper intertidal zone

Zone Name	Upper intertidal zone
Zone Features	This zone is mainly exposed to air except for at extreme high tides. Tide pools start to appear in the upper intertidal zone (pools of saltwater left behind when the tide goes out; many living organisims can be found in tide pools).
Zone Algae	Cyanobacteria
Zone Animals	Scud, Common Periwinkle, Rock Barnacle, New England Dog Whelk, Northern Hermit Crab

ROCKY SHORE CHALLENGE!

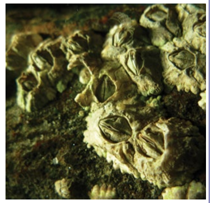
								
Periwinkle	**Dog Whelk**	**Blue Mussel**	**Barnacle**	**Limpet**	**Green Sea Urchin**	**Sea Star**	**Green Crab**	**Lobster**
10 Chapters	20 Chapters	30 Chapters	40 Chapters	50 Chapters	60 Chapters	70 Chapters	80 Chapters	100 Chapters

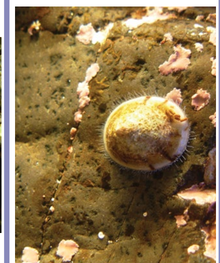
ROCKY SHORE CHALLENGE IMAGES


Periwinkle


Dog Whelk


Blue Mussel


Barnacle


Limpet


Green Sea Urchin


Sea Star

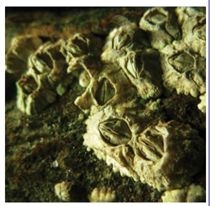

Green Crab

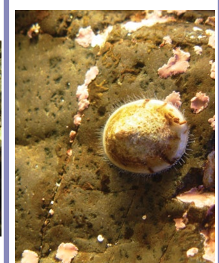

Lobster


Periwinkle


Dog Whelk


Blue Mussel


Barnacle


Limpet


Green Sea Urchin


Sea Star


Green Crab

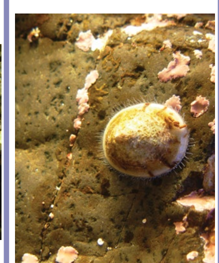

Lobster

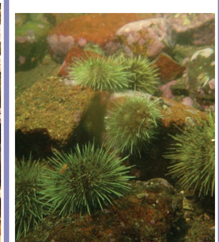

Periwinkle

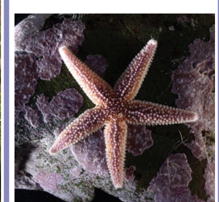

Dog Whelk


Blue Mussel


Barnacle


Limpet


Green Sea Urchin


Sea Star


Green Crab


Lobster

ROCKY SHORE CHALLENGE READING LIST

Name:

Book	Chapter	Date
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

You have earned: _____!

ROCKY SHORE CHALLENGE READING LIST

Name:

Book	Chapter	Date
1. _____		
2. _____		
3. _____		
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

You have earned: _____!

MY ROCKY SHORE CREATURES

Name: _____

Periwinkle	Dog Whelk	Blue Mussel	Barnacle	Limpet	Green Sea Urchin	Sea Star	Green Crab	Lobster