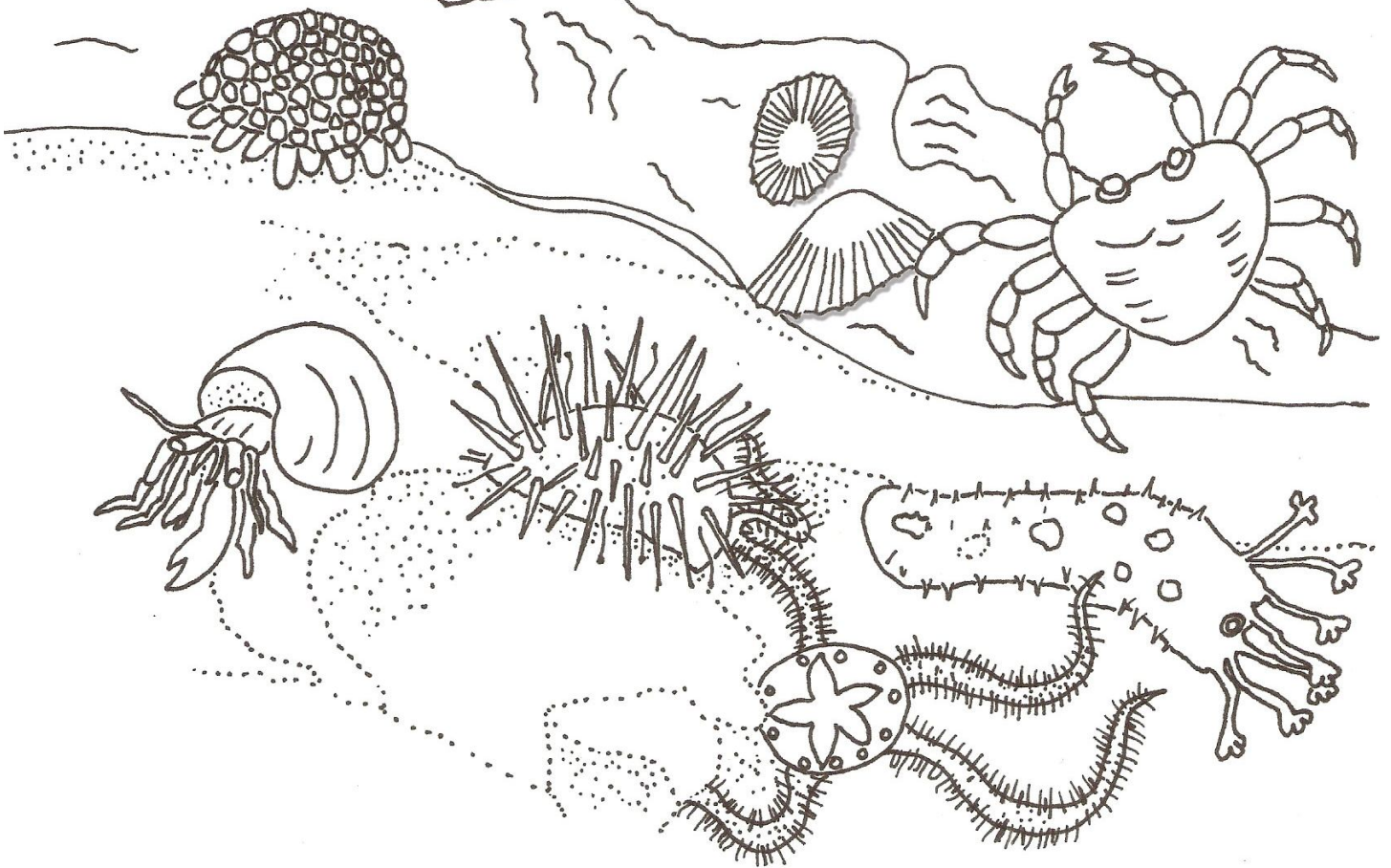


by  
Jackie Gaudioso  
bobby Hsu  
Diana Belmudes  
Kathleen Johnson &  
Mary Zuiderveen

# Hawaii's Rocky Shore





## Hawaii's Rocky Shore

**Developed by:**

**Jackie Gaudioso, Bobby Hsu, Diana Belmudes, Kathleen Johnson, and Mary Zuiderveen**

**Grade Level:** First Grade

**Purpose:** This unit is designed to demonstrate:

- I. How the intertidal zones of Hawaii are physically and biologically structured.
- II. How we use science to study the animals of the intertidal zones habitat and the relationship between them.
- III. How the rocky shore is culturally important for Hawaii.

**Hawai'i Content and Performance Standards (HCPSIII) Addressed:**

Standard 1: The Scientific Process: **SCIENTIFIC INVESTIGATION:** Discover, invent, and investigate using the skills necessary to engage in the scientific process.

Benchmarks:

SC.1.1.1 Collect, record, and organize data using simple tools, equipment, and techniques safely.

SC.1.1.2 Explain the results of an investigation to an audience using simple data organizers (e.g., charts, graphs, pictures).

Standard 2: The Scientific Process: **NATURE OF SCIENCE:** Understand that science, technology, and society are interrelated.

Benchmarks:

SC.1.2.1 Explain why people create technological devices.

SC.1.2.2 Describe a variety of changes that occur in nature.

Standard 3: Life and Environmental Sciences: **ORGANISMS AND THE ENVIRONMENT:** Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment.

Benchmarks:

SC.1.3.1 Identify the requirements of plants and animals to survive (e.g., food, air, light, water).

Standard 4: Life and Environmental Sciences: **STRUCTURE AND FUNCTION IN**



**ORGANISMS:** Understand the structures and functions of living organisms and how organisms can be compared scientifically.

**Benchmarks:**

SC.1.4.1 Describe how living things have structures that help them to survive.

**Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION:** Understand genetics and biological evolution and their impact on the unity and diversity of organisms.

**Benchmarks:**

SC.1.5.2 Describe the physical characteristics of living things that enable them to live in their environment.

**Standard 6: Physical, Earth and Space Science: NATURE OF MATTER AND ENERGY:** Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe.

**Benchmarks:**

SC.1.6.1 Identify solids, liquids, and gases and their basic properties.

**Topics and Driving Question:**

What is unique about the rocky intertidal habitat, what lives there, and how is it culturally important for Hawaii?

**Rationale:**

In this unit, we introduce students to the rocky intertidal zones, as an important coastal resource for Hawaii, both biologically and culturally. Through hands-on activities, live-specimen observations, and discussion sessions, students learn the physical properties, an overview of the flora-fauna, and the cultural uses of rocky intertidal zones. By studying this ecosystem in detail through the inquiry process, students will be encouraged to construct questions and solutions that promote conservation goals of the rocky shore.

**Concept Map:** See attached sheet.

**Formative Assessment:**

Throughout the unit, students' learning is re-enforced and assessed through worksheets, data collection, and class discussions.

**Summative Assessment:**



Students will work cooperatively to express their knowledge of the rocky shore habitat and the flora-fauna found there by performing a drama of the rocky intertidal zones. Each student will be assigned a plant or animal found in the rocky intertidal zones and will make a 3D realistic costume of the organism. Each student will present his or her organism and answer questions about its behavior and where it belongs within the habitat. Students will use critical thinking, creativity, and communication skills to express what they know about rocky intertidal zones. They will also describe where in the rocky shore food web this animal belongs, and what animals it depends on as well as what animals depend on it.

**Overview of Lessons:** See attached sheets.

**Sources:**

MARE Rocky Seashores

PRISM

[www.coast-nopp.org](http://www.coast-nopp.org)

[www.enchantedlearning.com](http://www.enchantedlearning.com)

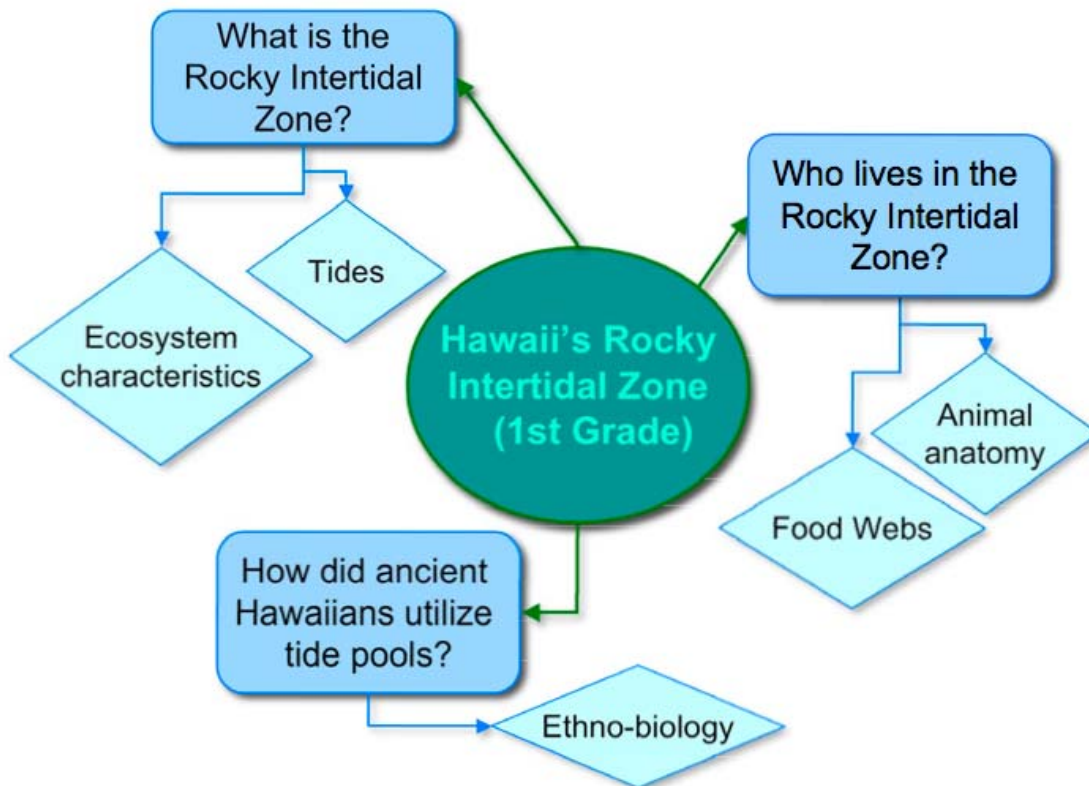
Titcomb, Margaret. 1979. Native Use of Marine Invertebrates in Old Hawaii. *Pacific Science* 32: 325-377.

Photos:

- [Arkive.org](http://arkive.org)
- <http://www.malawicichlidhomepage.com/aquainfo/marinetank53.html>
- <http://www.nma.gov.au/cook/artefact.php?id=110>



## Concept Map





## HAWAII'S ROCKY SHORES GLOSSARY

What is the Rocky Shoreline? (Lesson 1):

*Desiccation*: the process of drying out

*Habitat*: The home to a particular organism where the species will attempt to be as adaptive as possible to that particular environment.

*Living (Biotic)*: alive

*Non-living (Abiotic)*: not alive

*Salinity*: the saltiness or dissolved salt content of a body of water.

*Shoreline*: the region where the land meets the ocean

*Tidepool*: an intertidal pool of seawater that occurs regularly along the rocky shoreline

*Tides*: daily fluctuation in seawater levels due to the gravitational pull of the moon on the earth's oceans.

Intertidal Zones (Lesson 2):

*High tide zone*: the intertidal zone only covered with water during the highest tide

*Low tide zone*: the intertidal zone usually submerged and only exposed during the lowest tide

*Middle tide zone*: the intertidal zone that is regularly exposed and submerged

*Spray zone*: the intertidal zone that only receives water from the splash or spray from crashing waves when they hit the shoreline.

Hidden Animals (Lesson 3):

*Burrows*: to hide by digging under a substrate

*Crustacean*: an aquatic arthropod; i.e. crabs, lobsters, shrimp, crayfish, etc.

*Environment*: all living and non-living things that occur naturally in one specific region

*Mollusk*: a soft-bodied invertebrate. Groups of mollusks include gastropods (snails), cephalopods (octopus, squid), and bivalves (clams).

*Predator*: an organism that eats animals as prey

*Shelter*: a safe place of refuge

*Substrate*: material

*Wave shock*: intense movements of water

Create a Tako Lure (Lesson 4):

*Fiber*: a material with continuous filaments

*Husk*: fibrous part of plant material, i.e. coconut husk

*Leho*: Hawaiian name for cowry shells

*Lure*: a decoy

*Resource*: an entity that is vital for survival

*Tako*: Hawaiian name for octopus



Critters in the Classroom (Lesson 5):

*Adapted:* to adjust or change the behavior, physiology, and structure of an organism to become more suited to an environment.

*Anatomy:* the study of body parts and their function

*Data:* numerical form of the results of a scientific experiment

*Foraging:* to gather food methodically

*Observation:* statements determined by using the senses

Rocky Shore Food Web (Lesson 6 and 7):

*Community:* An ecological unit composed of a group of organisms or a population of different species occupying a particular area, usually interacting with each other and their environment.

*Food chain:* a framework that describes the feeding relationships between species within an ecosystem.

*Grazer:* an organism that feeds on vegetation by browsing

*Producer:* vegetation that produces its own energy through intrinsic processes (photosynthesis)

*Scavenger:* an organism that feeds on dead meat that they did not kill themselves, thereby contributing to decomposition.

Name \_\_\_\_\_

Hawaii's Rocky Shore Pre-assessment

**Draw a tidepool and what lives there.**

Name \_\_\_\_\_

Hawaii's Rocky Shore Pre-assessment

**Draw a tidepool and what lives there.**



<b>Lesson</b>	<b>Topic</b>	<b>Concepts</b>	<b>Student Objectives</b>	<b>Activity description</b>	<b>Assessment</b>
<i>Lesson 1</i> 45minutes	Pre-assessment and What is the Rocky Shore?	Students will be introduced to the rocky shore habitat, its physical properties and an overview of its flora-fauna. They will inquire with one another about what they know and would like to know about the unique rocky shore habitat.	Students will discuss what they already know about the rocky shore. They will form questions about what they want to know about the rocky shore. They will be introduced to some organisms that live on the rocky shore. They will learn how the changing tide makes the rocky shore a habitat that is always in flux.	Students will talk about what they already know and want to learn about the rocky shore from their collective experiences. They will then be introduced to the rocky shore environment through new vocabulary and images.	Pre-assessments completed Group discussion
<i>Lesson 2</i> 45minutes	Intertidal zones	Tides and cyclic environmental flux.	Students will explore some of the causes that form intertidal zones in different areas.	Students will experiment with model of sea shore in the classroom and learn the variation in tidal range caused by tide and slope angle of the shore.	Presentation of tidal zone adaptation worksheet and completion of the worksheet.
<i>Lesson 3</i> 1 hour	Hidden animals	Organisms are adapted to the environment in which they live.	Students will make predictions on which substrate provides the most protection based on its property. They will test their predictions through experimentation. They will learn basic data collection using data sheets and data management by creation of simple pie charts.	Students will observe the effects of wave shock on animals living in three different seashore substrates: sand, gravel, and rocks. They will predict which substrate is safest for the hidden animals. Students will collect and record data from this experiment. In the extended activity, they will make pie charts and interpret their results.	Worksheet completed
<i>Lesson 4</i> 1 hour	Create a Tako Lure from Old Hawaii	Hawaiian culture Rocky shore as a natural resource	Students will learn how Hawaiians use the rocky shore as a natural resource. They will experience the making of traditional octopus lures by making models of the traditional lure.	Students will listen to a story about making of the octopus lures using materials from the rocky shore in old Hawaii. After the story, students will design their own octopus lure using sea shells and recycling materials.	Making a model of the octopus lure Completing the work sheet



<b>Lesson</b>	<b>Topic</b>	<b>Concepts</b>	<b>Student Objectives</b>	<b>Activity description</b>	<b>Assessment</b>
<p><i>Lesson 5</i></p> <p><i>45minutes</i></p>	<p>Rocky Shore Critters in the Classroom</p>	<p>Students will be introduced to animals that live on the rocky shore. They will be able to make live observations about these animals and learn how to study organisms in detail, as scientists do.</p>	<p>Students will learn which animals live on the rocky shore.</p> <p>Students will form questions and make observations about these animals.</p> <p>Students will compare and contrast the parts of each organism.</p> <p>Students will discuss how the anatomy of each animal is adapted for living on the rocky shore.</p>	<p>Students will observe live animals from the rocky shore in the classroom. Students will make drawings of each organism and write one sentence describing the animal at each station. The class will end with a group discussion and sharing what they learned and observed about these animals.</p>	<p>Worksheets completed</p> <p>Group discussion</p>
<p><i>Lesson 6 &amp; 7</i></p> <p><i>2 hours</i></p>	<p>Rocky Shore Food Web and Post Assessment</p>	<p>The food web concept will demonstrate how animals depend upon one another and plants for food in the rocky shore ecosystem. Students will understand that each level is crucial to the balance of the system.</p>	<p>Students will be able to demonstrate the relationships between members in a rocky seashore food chain.</p>	<p>Over two consecutive lessons, students learn the relationship between animals and plants of rocky seashores. During the first lesson, each student will make a costume of a rocky shore organism. On a poster board with a rocky shore community drawing, students will learn the roles of their specific organism and where they live on the rocky shore.</p> <p>During the second lesson, students will use their costumes to act out the interactions and relationships between each level of the rocky shore food chain. At the end of the lesson, students will discuss questions that are designed to extend their understanding from the rocky shore community drama.</p>	<p>Rocky shore community drama and discussion.</p>