



## KIDS ENVIRONMENTAL LESSON PLANS

This lesson developed by:

SEA Semester<sup>®</sup>



# Drying Out on the Rocky Shore

### Overview:

Learn how marine creatures have adapted to survive the extreme conditions between the tide marks on the rocky shoreline.

### Ocean Literacy Principles:

5. The ocean supports a great diversity of life and ecosystems
7. The ocean is largely unexplored

### Key Concepts:

- Intertidal zone (area between high and low tides) is a harsh and unforgiving habitat, being exposed to the rigors of both the sea and the land
- Intertidal species have developed adaptations to survive the extreme changes in salt concentrations, drying out, sun exposure and other varying conditions

### Materials:

- one cup of fresh water
- one cup of salt water (one tablespoon of salt in one cup of water)
- several sheets of paper towels
- 2 or 3 sandwich-size plastic bags
- crayon or pencil

### Duration:

1 to 1.5 hours over the course of a day



# Drying Out on the Rocky Shore (cont.)

## Physical Activity:

Moderate

## Background:

Life is challenging between the tide marks on the rocky shore. Crashing waves, drying sun, varying salt concentrations and changing tides set the conditions for life along the shores; here, as on the wharf pilings, plants and animals aren't randomly distributed but occur in bands or zones.

The high-tide zone is more land than sea; only a few specially adapted plants and animals can survive. The plants and animals that live here receive most of their moisture through wave splash. To avoid drying out, barnacles close their shells and limpets go out only at night.

In the mid-tide zone lives a diverse group of animals and plants, including seaweeds, mussels and sea stars. Community members must find ways to stay moist when the tide is out, avoid predators when the tide is in and compete with each other for space.

The low-tide zone is exposed to air only during the lowest tides. As they're usually covered by water, the sessile (attached) organisms are subject to predation by sea stars, fishes and seabirds that use shallow waters.

## Activity:

Describe the goal of having students model adaptations used by intertidal organisms to keep from drying out. After showing them the materials, ask students to design a way to model and test rates of drying in different conditions.

1. If you want to give more guidance, have students follow these steps. Students may work individually or in pairs. Ideally, this should be approached as an inquiry activity, with students proposing models for intertidal organisms and outlining testing procedures.
2. Tear each sheet of paper towel into four pieces.
3. Using crayon or pencil, give each piece a different number or letter.
4. Experiment with folding the pieces into different sizes and dipping them in the fresh or salt water. Wad up some pieces into tight balls, fold some a few times and fold some not at all. Dip some in the fresh water and some in the salt water. Place some in the plastic bags and leave some exposed to the air. Leave some in a sunny spot and some in the shade.
5. Ask student to predict:
  - What do you think will happen?
  - Which ones will dry out the fastest?
  - Which will dry the slowest?
6. Make a chart to record your experiments. Going down the left side of your paper, list what you did to the paper towel. Across the top, make two columns: your guess and what actually happens.
7. Now leave your pieces for one hour, six hours and one day. Compare the different pieces to the shapes of tide pool animals.



# Drying Out on the Rocky Shore (cont.)

## Discussion:

- Are any of your pieces similar to the way an animal finds cover at the seashore?
- Which of your towels pieces is like a seaweed?
- Which one is like a barnacle, a sea star, a mussel?
- How do these animals keep from drying out during low tide?



# Drying Out on the Rocky Shore (cont.)

<b>What did you do to the paper towel?</b>	<b>Guess</b>	<b>Actual</b>