

UC Santa Barbara

Educational Materials

Title

Coal Oil Point Reserve Beach Hopper Lesson

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Coal Oil Point Reserve: Beach Hopper Research

Next Generation Science Standards

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

Lesson Plan: Beach Hopper Research

Cognitive Learning Objectives:

Students will learn through hands-on activity the basic steps of the scientific method and simple experimentation. Students will also discover beach micro-habitats and their functions in the coastal ecosystem.

Affective learning objectives:

Students will feel connected to the local environment and motivated to learn more. Students will feel a sense of responsibility for their environment, and be motivated to protect important habitats.

Materials: Pencils, KIN Journal(37-58), Shovel, Containers (to hold sand samples), Metal stakes and KIN group cards(for labeling piles), tape measure

Location: Coal Oil Point Reserve

Preparation: Before students arrive, identify and label five piles of seaweed on the beach. The piles should be distinctly different in moisture content ranging from fresh, wilted, slightly dry, dry, to very dry. It should be apparent that the wetter piles contain more Beach Hoppers (*Orchestoidea californiana*) than the dry piles. (note: at COPR this activity is best during a low tide but may not always be possible)

Engage: Gather the students around as you move a pile of the seaweed to the side to show all the beach hoppers running around underneath it. Ask if the students know what they are. Then, roll out the tape measure on the beach and ask students to see how far they can jump. Let them know that beach hoppers are able to jump sixty times their length. Ask them to figure out how far that would be for a human, by multiplying their height in centimeters by sixty. Explain that being able to jump so far is a survival adaptation that beach hoppers have developed. Give students a little bit more background on beach hoppers. Beach hoppers are **amphipods**, a type of small crustacean. They like to **forage** in the **intertidal zone** among the **beach wrack**.

Explore: Ask students: If you were a hungry Beach Hopper, where might you look for food? *Beach hoppers feed on seaweed washed up on the beach. Why might Beach Hoppers burrow themselves in the sand and come out in the evening? What animals might make a quick snack out of a Beach Hopper? Beach Hoppers bury themselves in the sand to stay cool and to avoid becoming prey for shorebirds. They come out in the evening and feed on freshly washed-up seaweed at night.*

Explain: Familiarize students with the basic steps of the scientific method. Let them know that you are all going to do an experiment together to find the answer to the question of where beach hoppers like to feed. Divide into groups of three to four. Ask each group to create a **hypothesis** about which seaweed piles will have the most beach hoppers.

Elaborate: Within the groups, assign each student a task, eg., one student lifts the pile up, another shovels a pile of sand from underneath and another student holds the container. Divide the groups among the seaweed piles. Instruct the students to quickly and carefully count the Beach Hoppers present in one shovel full of sand, letting them go gently as they are counted. Instruct the students to record their findings in the appropriate boxes in the table and record their data on the graph on page 39 of their KIN Journals. If time allows, move the group to another pile and repeat the experiment. (note: there may not be many, if any, to count in the very dry piles while the wet piles may be very populated.) Ask students to communicate the conclusion of their experiment.

Evaluate: After returning to the classroom the student's teacher will help them to share their data with the rest of the class to complete the graph and discuss the outcome of their experiment. The students should have counted significantly more Beach Hoppers in the fresher seaweed piles.