

Beach Hopper Bonanza

Grade Level: Second Grade

Developers: Jan Ward, Merry Lojkovic, Kara Davidson, Ashley Binter Trainer (teachers), Alix Laferriere (fellow)

Learning Goals: Students will:

- Observe the characteristics, behavior, and anatomy of beach hoppers.
- Examine the relationships between the beach hopper and its sandy environment.
- Use scientific inquiry to form questions and hypotheses, design an investigation, collect and present data, and interpret results.

Oregon State Science Standards addressed in the field section:

Benchmark 1/Life Science:

- * Recognize characteristics that are similar and different between organisms
- * Describe the basic needs of living things
- * Describe how related plants and animals have similar characteristics
- * Describe a habitat and the organisms that live there
- * Identify how some animals gather and store food, defend themselves and find shelter

Benchmark 1/ Scientific Inquiry:

- * Make observations. Based on these observations ask questions or form hypothesis which can be explored through simple investigation
- * Plan a simple investigation
- * Collect data from an investigation
- * Use the data collected from the investigation to explain the results

Materials for the unit:

For each field group:

- plastic peanut butter jar (transparent)
- 1-2 buckets
- sieves
- shovel
- small plastic container with lid to hold beach hoppers
- flora and fauna guide (one page, laminated)

For each child:

- 3 pre-labeled zip-lock bags
- field journal (zonation tally page, relocation map page)
- writing tool

Time needed for unit:

Pre: one to five sessions

Field day: four hours

Post: one to five sessions

Time needed for field trip: minimum of four hours

Best location for the field trip: Sunset Beach

Summary of the unit:

Pre-lessons:

- Twenty Questions – Students ask yes or no questions to discover the organism they will be studying (beach hopper).

- KWHL -- The teacher leads the students in an anticipatory activity to create an information chart and to discover and share student background knowledge and questions. The KWHL chart has four columns labeled: what we know, what we want to know, how we can learn, and what we learned. Mini-experiments can be designed and implemented based on student questions. (The chart can be displayed in the classroom for reinforcement of concepts and learning goals.)

- Anatomy Observation – Students are given a dead or frozen beach hopper to observe, sketch and label.

- Jumping and Measuring Experiments with beach hoppers – The students create a bull's eye poster with circles labeled every five inches. Students measure the beach hopper and then measure the beach hopper's first jump from the center.

- Question, hypothesize and design an investigation -- Class discussion to stimulate questions, make hypotheses and plan out procedures for the field.

- Keep beach hoppers as class pets – Students set up an aquarium in the classroom and take responsibility of caring for the beach hoppers.

- Sieve building -- Students build sieves for field experiments. Recommended materials are flexible screen, sturdy container with bottom cut out, and duct tape.

Field Experience

Zone Sieving Survey

- Divide groups into four or five children with an adult leader.
- Assign groups a cross-section of beach (can measure or pre-set experiment areas with flags or cones).
- Students sample or scoop sand from each of the high, medium and low zones:
 - each child scoops two peanut butter jars full of sand in specified spots into a bucket

- the bucket gets poured into sieves and the students sieve the sand and put beach hoppers into a small container
 - count and record the number of beach hoppers found
 - record other items found in sieve
 - make observations
 - record data
- Discuss how many hoppers and other items were found in high, medium and low zones.

Zone Survey Extension

The students examine the beach hoppers' distribution. They develop their own mini-surveys. Ideas for mini surveys in most populated zone include counts to compare hoppers found near algae versus not near algae, shaded versus exposed sites, ridge versus non-ridge sand formations, etc.

Catch and Release Relocation Experiment

- Students catch twenty to thirty beach hoppers and place in a container.
- Students release, observe, and record behaviors of hoppers in high, middle, and low zones.
- Information is recorded on relocation map page in field journal. (Example: students use arrows to record the direction of the hoppers movement; use letter "D" to record a digging hopper; use squiggle lines to show plant life (shelter).
- Student groups reconvene to discuss observations and results.

Sand Sample Collection

Students use their zip-lock bags to collect sand samples from high, medium and low zones to be analyzed in the classroom at a later date.

Post-Lessons:

- Sand Sample Analysis: Students compare sand from high, medium, and low sections of the beach. Use scopes in accordance with the MARE "Sand on Stage Curriculum".
- Zonation Poster: Students work individually to create a poster portraying their results and experience in the field. This tool can be used as an assessment of knowledge gained in the field experience.
- Graph Survey Results: Students create a bar graph to depict distribution of beach hoppers per zone. Students work in their field trip groups to graph their group's data and then the class data is pooled and graphed.
- Jumping Comparison Activity: Building on the jumping pre-lesson; students measure themselves and their jumping distance and compare to a beach hopper's body size and jumping distance.

- Day in the Life of a Beach Hopper: Students work individually to write and illustrate a short story about being a beach hopper.

How does the unit address active inquiry learning?

- Ask a question about objects, organisms, and events in the environment.
- Plan and conduct a simple investigation.
- Employ simple equipment and tools to gather data and extend the senses.
- Use data to construct a reasonable explanation.
- Communicate investigations and explanations.

What are the work samples the students will produce?

- Field journal
- Poster
- Bar Graph
- Short story

How can the unit be integrated into the existing curriculum and into other disciplines?

Math: graphing, comparison, measuring, recording

Literacy/Communication: note taking skills, creative-writing, reading for information

Geography: mapping

Art: drawing

P.E.: beach walk