



Science Unit: *Discovering Life in Local Habitats*

Lesson 6: *Beach Life: Spanish Banks field trip*

School Year: 2009/2010

Developed for: Weir Elementary School, Vancouver School District

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Grade level: Presented to grades 1 and 2; appropriate for grades K – 7 with age appropriate modifications

Duration of lesson: Two lessons within a field trip, the first 1.5 hours long, the second 30 minutes long

Objectives

1. Discover that in the familiar shells found at beaches, there are or were living animals.
2. Learn a few animal and plant species commonly found at local beaches.
3. Learn about the needs and life cycle of selected beach life (barnacles, mussels, seaweed and whelk).

Background Information

This is the final lesson of 6 exploring local habitats for life. Following a dissection of a clam in class the day before, we visit the beach to see clams in their natural habitat, along with other beach life.

Vocabulary

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| <u>clam:</u> | a kind of a mollusc, an animal with two flat shells found in sand at the beach |
| <u>mussel:</u> | a kind of a mollusc, an animal with two long shells found on rocks at the beach |
| <u>foot:</u> | the part of a mollusc that enables it to move and burrow |
| <u>mantle:</u> | the part of a mollusc that makes the shell |
| <u>siphon:</u> | the part of a mollusc that sucks that water and food into the shell |
| <u>gill:</u> | the part of a mollusc that collects oxygen from the water |
| <u>barnacle:</u> | a kind of a crustacean, an animal with a shell found on rocks at the beach |
| <u>filter feeder:</u> | an animal that feeds by filtering, or sieving, small food particles out of the water |
| <u>predator:</u> | an animal that eats other animals |

Materials

- science notebook and lunch in backpack for each student
- live mussel, recently opened
- image of mussel anatomy
- image of a feeding barnacle
- scissors
- whelk egg case (or other baby marine animals)
- box magnifiers for each student
- tape



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- bucket of rockweed in seawater
- kitchen sieves
- tray for floating cut seaweed pieces
- bingo cards with beach life images

At the beach

For the first half of the day, the students are split into three groups and rotate around three activities, each 30 minutes long. If additional scientists or teachers are available to help, these lessons benefit from additional adults stationed at each of these activities.

- Barnacles and mussels: observe live mussels and barnacles on rocks; compare the anatomy of mussels and clams.
- Seaweed: experimenting to discover the function of different parts of rockweed.
- Baby shells: observe baby marine snails in an egg case; hunt for other shells of different sizes.

For the second half of the day, the students are split into two groups and rotate around two activities, each 15 minutes long, followed by free play.

- Beach Life Bingo: bingo game with beach life, both living and washed up.
- What is sand made of: close observation of sand to discover it's components, and learn how it got there.

Students will focus on these processes of science: observation, recording, exploration and curiosity, predicting and concluding.

Safety guidelines: stay within areas designated by scientist and teachers.

Science Activities

(1) Activity Title: Barnacles and mussels

Purpose of Activity: To find animals living on rocks and compare with those previously studied.

Methods and Instructions:

Set-up prior to experiment: Activity title glued on the top of a blank page in student's notebooks. Students work individually.

1. Remind the students of the clam dissection previously done in class. Show them a large, opened mussel, and the same parts as a clam inside (foot, mantle, siphon, gill). Discuss how mussels feed in the same way as a clam (refs 1, 2).
2. Students hunt for mussels on the rocks (ref 3).
3. Students are asked to find other shelled animals living on the rocks (ref 3). Point out the young and old barnacles, and the scar where a barnacle used to be. Students draw one of the barnacles.
4. Review what the shells of all these animals are for, and ask how predators might open the shells.
5. Review how clams and mussels feed. Compare with how barnacles feed: show a picture of a barnacle eating (ref 4). Summarize that all these animals are filter feeders (ref 5).
6. Students can explore further by touching barnacles to make them close up.



(2) Activity Title: Seaweed

Purpose of Activity: To learn the parts of rockweed and the functions of the parts.

Methods and Instructions:

Set-up prior to experiment: Activity title glued on the top of a blank page in student's notebooks; rockweed cut into pieces that each include bladders and stems and ideally holdfasts; a tray of water.

Students work individually.

1. Students each hold a piece of rockweed. Discuss what it is, where it grows, and that it is an alga (not a plant). (ref 6.)
2. Students look closely at the parts of the rockweed, and draw it in their notebooks. The holdfast and the bladders are labeled. Prediction of what the parts of the seaweed might be for.
3. Led by the teacher, the group discusses and tests the function of the parts of the seaweed: a piece of rockweed is cut into pieces, each piece containing part of the stem or a bladder. Each piece is tested to see if it floats in a tray of water. Students help to conclude the function of the bladders: they keep the tips of the seaweed floating up in the water, to maximally expose all parts of the seaweed to sunlight. Discussion on the function of the holdfast: it keeps the seaweed anchored to a rock, so that it is not washed ashore.
4. Students hunt for living seaweed on rocks and washed up seaweed at the tide line. Beach hoppers live under dried seaweed, and can be used for further discussion if there is time (ref 7).

(3) Activity Title: Baby shells

Purpose of Activity: To observe the size differences between young and old shelled animals.

Methods and Instructions:

Set-up prior to experiment: Activity title glued on the top of a blank page in student's notebooks.

Students work individually.

1. Students are shown a marine snail egg case (e.g. knobbed whelk egg case containing tiny shells), found washed up on a beach (ref 8).
2. An adult cuts baby shells out of the egg case. One shell is put in each student's box magnifier.
3. Discussion of the shell shape: spiral, unlike the clams (and mussels) we have looked at before.
4. Students draw the spiral shell, filling a page of their notebook, to be as large as an adult shell. Tape the baby shell next to the adult, to compare the enormous size difference between baby and adult shells of this type.

After a break for lunch, students split into two groups for the final two activities.

(4) Activity Title: What is sand made of?

Purpose of Activity: To observe sand closely and learn what it is made of.

Methods and Instructions:

Set-up prior to experiment: Activity title glued on the top of a blank page in student's notebooks.

Students work individually.

1. Students look closely at sand and find the colours in it. They tape a sample in their notebook and list the colours that they find.



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2. Discussion that sand is made from rocks broken up by the waves.
3. Students look for larger rocks of the same colour on the beach, that may have been broken into sand.
4. Students look for other debris in sand, especially parts of shells.
5. Discussion that the shells of the animals become sand as they are broken up by the waves.
6. Students can sieve sand to find more broken shell pieces, and tape them in their notebook.

(5) Activity Title: Beach Life Bingo

Purpose of Activity: To find and recognize common beach life.

Methods and Instructions:

Set-up prior to experiment: Beach Life Bingo boards glued into students notebooks.

Students work individually.

1. Students are instructed to search for the items on their bingo card (see Beach Life Bingo file) within a designated area. (Each card has six of these 10 items: rockweed, green rope seaweed, mussel, barnacle, clam shell, crab shell, beach grass, tree cone (washed up), speckled rock, driftwood).
2. Students call Bingo! when they have found all 6 items on their sheet.

References

1. <http://iweb.tntech.edu/mcaprio/whole_no_mantle_L.jpg> Clam anatomy image. Web site hosted by Tennessee Technological University. Accessed May 17, 2010.
2. <<http://faculty.orangecoastcollege.edu/mperkins/zoo-review/clam-mussel/clam-mussel2.html>> Mussel anatomy image. Web site hosted by Orange Coast College, CA. Accessed May 17, 2010.
3. Harbo, Rick. 2009. A Field Guide to Seashells and Shellfish of the Pacific Northwest. Harbour Publishing. Laminated pamphlet.
4. <<http://www.flickr.com/photos/beachcomberco/3085231848/>> Image of a barnacle feeding, from Flickr. Accessed May 17, 2010. Many other barnacle feeding images found with a google image search.
5. <<http://nathistoc.bio.uci.edu/Filter%20feeders.htm>> Information on filter feeders, including mussels, clams and barnacles. Website hosted by University of California at Irvine. Accessed May 17, 2010.
6. Harbo, Rick. 1999. Whelks to Whales. Coastal Marine Life of the Pacific Northwest. Harbour Publishing.
7. <<http://www.marinebio.net/marinescience/03ecology/sblife.htm>> Information on beach hoppers (from 6th image down). Website affiliated with Santa Barbara City College and Santa Barbara Museum of Natural History. Accessed May 17, 2010.
8. <http://en.wikipedia.org/wiki/Knobbed_whelk> Information on knobbed whelk egg case. Wikipedia website. Accessed May 17, 2010.

Beach Life Bingo



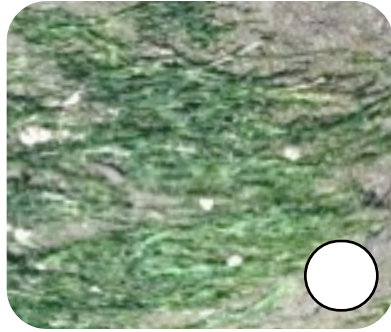
Beach grass



Barnacle



Rockweed



Green rope



Clam Shell

Beach Life Bingo



Driftwood



Crab shell



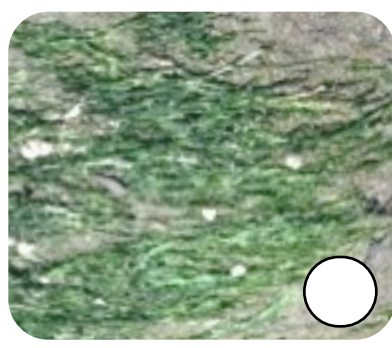
Rockweed



Mussel



Speckled rock



Green rope



Tree cone