

LESSON 6

Beach Mysteries

KEY CONCEPTS

Observations include what is seen, felt, smelled, heard or tasted. Inferences suggest explanations based on observations.

The observable, physical characteristics of a natural object from the beach can provide clues regarding its function.

OBJECTIVES

Students will record observations made on ten mystery items from Puget Sound.

Students will use the observations to make inferences to answer questions about each of the ten mystery items.

PROCESS SKILLS

observing classifying communicating inferring

KIT MATERIALS

one set of 10 different mystery beach objects and pictures

8 copies of Activity Sheet #6A - *Beach Mysteries*

picture set - "Revealing the Mystery", contains 3 photographs

The photographs used in this lesson were generously provided by the Seattle Aquarium and permission has been granted for their use.

NON KIT MATERIALS

clock

VOCABULARY

observation - involves using one or more of the five senses in a personal experience; what is seen, heard, felt, smelled and tasted

inference - a conclusion drawn from observations; an explanation for events which have occurred

Building on the library research in Lesson 5, this activity provides your students with a chance to draw observation based conclusions about some interesting objects from Puget Sound.

1. Divide students into working teams of four people. Explain that each team will receive a mystery object or picture from a Puget Sound beach. Explain that there are ten items to examine and that each team will receive all ten things (order is not important) as the items are rotated throughout the room.
2. Have each team select a recorder. Distribute one Activity Sheet #6A - *Beach Mysteries* to each team recorder. The position of recorder may rotate in the team with each new object examined. Select one object to demonstrate the recording procedure.
 - a. Locate the number of the object or picture on the sheet.For each object or picture:
 - b. Record **OBSERVATIONS** made by the members of the team.
 - c. Read the question aloud.
 - d. Record conclusions or **INFERENCES** which provide an answer to the question.
3. Consider a time limit (3-5 minutes) for team examination and discussion of each object. When time is up, the items should be rotated to another group.
4. As a class, review observations and inferences for each object and picture. Distribute the "Revealing the Mystery" pictures to help students "see" the "Beach Mystery".

2. It may be necessary to help students understand the difference between an observation and an inference. For example, if one were inspecting mystery object #5:

OBSERVATIONS might include: some large and small holes that tunnel through the wood; in some of the holes there is a thin layer of brittle, white material.

INFERENCES might include: an animal has tunneled into the wood; the animal lays down a thin layer of shell in the tunnel as it burrows, etc.

4. The "Beach Mysteries" **KEY** includes a description of the objects and pictures.

NOTE: Only three "Beach Mysteries" cards have a corresponding "Revealing the Mystery" picture card. Those that do are indicated with an asterisk (*) on the "Beach Mysteries" **KEY**.

BEACH MYSTERIES

1 a. OBSERVATIONS:

(For all 10 items, encourage students to record observable characteristics of the object).

1 b. What are the white marks on the rocks?

(For all 10 items, accept answers that logically follow from the observations).

INFERENCES:

(The "real life" answers are provided to satisfy curiosity and bring closure to the activity. During your discussion, it is important that students do not feel their logical inferences are wrong, even if they do not agree with the answers provided. Help them recognize that inferences provide the foundation for additional questions, research and experimentation. Scientists use this stepwise process to answer questions).

The white marks on the rock are scars left from the removal of barnacles from the rocks.

2 a. OBSERVATIONS:

2 b. What might have caused the hole in the clam shell?

INFERENCES:

The shell has probably been drilled by a whelk or moon snail.

3 a. OBSERVATIONS:

3 b. What could this be?

INFERENCES:

This is a barnacle "skeleton". The living animal is gone. Fixed shell plates make up the barnacle "skeleton". The smaller hole would hold moveable shell plates. The barnacles can open and close the missing moveable shell plates.

4 a. OBSERVATIONS:

4 b. From what animal did this come?

INFERENCES:

This is one of the 8 shell plates on the back of a chiton.

5 a. OBSERVATIONS:

5 b. What created the holes and tunnels in the wood?

INFERENCES:

These holes and tunnels were made by one of several species of shipworms. A shipworm is really a clam with two tiny shells near the front end. Its long, slender, worm-like body is encased in a tube manufactured by the animal. It bores the holes in the wood by opening and closing its shells and by rocking back and forth.

6 a. OBSERVATIONS:

6 b. What are the round "blobs" in the sand?

INFERENCES:

These soft blobs are sea anemones! This kind of sea anemone, called the Aggregate Anemone, lives on rocks on exposed beaches. Sand has washed over the rock these anemones are attached to so that the anemones appear to be nestled in the sand. They cover themselves with bits of gravel and shell pieces. When the tide is out, they contract, blending into the background.

7 a. OBSERVATIONS:

*

7 b. What is the round "collar" in the picture?

INFERENCES:

This snail, the Moon Snail, lays thousands of tiny eggs that are pressed together with particles of sand to form a collar-like ring around the snail's shell. The sand and eggs are cemented together by a sticky mucus that hardens to form a rubbery sand collar. The Moon Snail crawls away, leaving the collar. During a high tide, the egg case will crumble and release thousands of larval Moon Snails.

8 a. OBSERVATIONS:

*

8 b. If you actually found this crab, would you label it dead or alive?

INFERENCES:

This is really a crab skeleton, but the crab didn't die, it molted. When crabs grow, they must shed their shell to allow further growth. This is called "molting". To molt, the crab shrinks itself and backs out of its shell through a crack at the waistline. The new shell underneath takes about two days to harden. Before it hardens, the crab takes in water to expand the new shell. The crab is very vulnerable to attack until the shell hardens.

9 a. OBSERVATIONS:

9 b. What might have happened here?

INFERENCES:

The footprints in the sand were made by a gull such as this. Gulls use their bills to probe for crabs and worms. Apparently a gull uncovered this clam but left it behind. It is difficult for gulls to open up clams. Some gulls have learned to carry clams to an asphalt parking lot where they drop the clams from a great height to crack them open.

10 a. OBSERVATIONS:

*

10 b. What might be said about this hole in the sand?

INFERENCES:

It is likely the opening is to a Ghost shrimp burrow. They build elaborate burrows in mud and sand. The burrows have openings to the surface that are about the size a pencil would. When the Ghost shrimp digs, it flings mud and sand with its tail so that a volcano-looking mound is formed at the surface of the sand. Ghost shrimp feed on detritus (decayed matter).

* These mystery picture cards have a corresponding "Revealing the Mystery" picture card in the kit.

BEACH MYSTERIES

1 a. OBSERVATIONS:

1 b. What are the white marks on the rocks?

INFERENCES:

2 a. OBSERVATIONS:

2 b. What might have caused the hole in the clam shell?

INFERENCES:

3 a. OBSERVATIONS:

3 b. What could this be?

INFERENCES:

4 a. OBSERVATIONS:

4 b. From what animal did this come?

INFERENCES:

5 a. OBSERVATIONS:

5 b. What created the holes and tunnels in the wood?

INFERENCES:

Name _____

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Date _____

6 a. **OBSERVATIONS:**

6 b. What are the round "blobs" in the sand?

INFERENCES:

7 a. **OBSERVATIONS:**

7 b. What is the round "collar" in the picture?

INFERENCES:

8 a. **OBSERVATIONS:**

8 b. If you actually found this crab, would you label it dead or alive?

INFERENCES:

9 a. **OBSERVATIONS:**

9 b. What might have happened here?

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10 a. **OBSERVATIONS:**

10 b. What might be said about this hole in the sand?

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