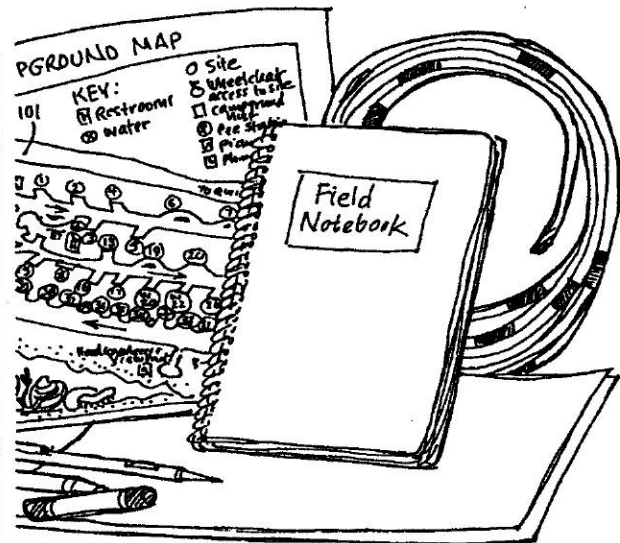


Upon Arrival...Getting Familiar With Seal Beach Campground

Key Concepts

1. Seal Rock Campground is a biologically rich area.
2. Three ecosystems (forest, intertidal beach and the open waters of Hood Canal) are found at Seal Rock Campground.
3. Observations of the biological and physical features of an ecosystem enable one to make inferences about its structure and dynamics.



Your students will bring their natural curiosity and desire to explore the unknown to your field trip to Seal Rock Campground. "Getting Familiar with Seal Beach Campground" provides a structured avenue for their discovery. A variety of activities are included to take your students from one end of the campground to the other and from its highest points to its lowest. Activities include:

Sign Language - using the beach interpretive signs as a guide, students become familiar with the site through activities which expand upon the topics covered in the following signs:

Rich with life in balance... - from each of the three ecosystems which comprise the Seal Rock Campground, students find a sign of life, then make a sketch or a rubbing of each of the signs.

If rocks could tell a story... - students find a glacier rounded rock and measure and record the distance from the sign to the rock, then locate plants and animals valued by Native Americans.

Hood Canal's special treasure - after locating an oyster or oyster shell with spat or a young oyster growing on it, students make a rubbing of the shell.

A circle of balance - using the data presented in the sign, students draw and label pictures of a salmon "circle of life" from egg to death after spawning

Life on the edge - students find and make a sketch of an animal "playing dead" on the beach, then find evidence that clams grow on Seal Rock beach.

Enjoy and explore Seal Rock Beach! - after listening to the sounds of the creatures on the beach, in the forest, and out on the open water, students write about what they've heard.

Cedar - A Gift from the Creator - following the Nature Trail, students read campground signage, do a rubbing, sketch the growth form of five cedar trees, and make hypotheses regarding how those five trees came to have the form they do.

Follow the Raindrop - students walk the campground site tracking and mapping the course they think a raindrop would follow from the upper campground to the waters of Hood Canal.

Checking it Out - first alone then with a partner, students walk the beach making observations of human activities which they record and analyze for their impact on the Seal Rock beach oyster population.

Materials

For each student:

- campsite map
- notebook with a firm back
- paper for rubbings
- pencil, crayon or oil pastel for rubbing
- 10 meter long cord (marked in 1 meter intervals with the first meter also marked in decimeter intervals)

Teaching Hints

Nine introductory activities provide students with an opportunity to explore and become acquainted with Seal Rock Campground.

The value your students derive from their trip to Seal Rock Campground will be greatly increased if you are familiar with the site. If at all possible, make time to do a "check out flight" of the trip. In addition to being able to answer the question of where the restrooms are located, you'll have a chance to more clearly think through the logistics of the day's activities.

The introductory activities are presented as "task cards", half sheets with instructions and questions. Determine ahead of time whether you wish to have each student complete all of the activities. Each takes about 15 to 20 minutes to complete which means a 2 to 3 hour block to do the entire set. Consider allocating the morning to these activities then reconvening as a group for lunch and orientation for the afternoon activities.

Prior to arriving at the site, divide your class into smaller groups (The size of the group will be determined by the number of activities and the number of students in your class.) Recall that one intent of these activities is to allow students a chance to see the entirety of the site. As such, the groups will be dispersed throughout the campground. Decide whether you will need adult volunteers to accompany the groups or to help you manage the activity. As a way of monitoring the activities, you may choose to remain in a central location and have each group report to you as they move from one task card to another. Alternatively, you may choose to roam the campground, touching base with groups as you encounter them. Decide ahead of time the order of rotation of activities and the starting activity for

each group. As an aid, the activities are numbered (the numbers are arbitrary and one starting point is as good as another). Note that it is also possible, although more cumbersome, to have the entire class cycle through the activities together. Choose a strategy that will work well with your particular class.

For the day's activities each student will need a campsite map, notebook with a firm back (a clipboard may substitute for a firm back), paper for rubbings (can be pages of the notebook), pencil, crayon or oil pastel for rubbing (you may wish to have students practice a few leaf rubbings before the day of the field trip), a 10 meter long cord (marked in 1 meter intervals with the first meter also marked in decimeter intervals). For the afternoon activities, be sure to check the teacher background for each activity to see what additional materials are required.

At the site, review the make-up of the student groups and the management scheme you have selected. Alert students to the presence of poison oak through the picture at the campground bulletin board or "hands-away" pointing to an actual plant. Remind your students, "Leaves in three, let it be." Provide each student with a set of the task cards for the activities you choose to complete. Help students to orient themselves using their campground map as a guide. Point out the restrooms and, if you plan to remain in one location, where you are likely to be as they work on the activities. Synchronize watches (each group needs a time piece) and tell students when you expect them to reconvene and where. If you have adult volunteers helping, be sure they understand the strategy and are clear about their roles.

A list of common plants and animals found at Seal Rock Campground is included at the end of this Teacher Background section.

Reminder: Poison oak grows in several areas above the shore, along the interpretive trail, and near the beach. Remind your students, "Leaves in three, let it be." Stop at the campground bulletin board to show your students a drawing of the plant before you start. Be aware, though, that poison oak is deciduous, dropping its leaves in winter. The branches, although less virulent, can still cause a rash.

Essential Academic Learning Requirements in Science

1. The student understands and uses scientific concepts and principles. (1.3)
2. The student knows and applies the skills and processes of science and technology (2.1, 2.2)

Answer Key

Rich with life in balance...

1. The three ecosystems found at Seal Rock Campground are: the forest, intertidal beach, and salt water of Hood Canal.
2. The four factors necessary for life to survive are food, shelter, water, and living space.
3. Signs of life and rubbings from each of the three ecosystems will vary. Be sure the signs are labeled.

If rocks could tell a story...

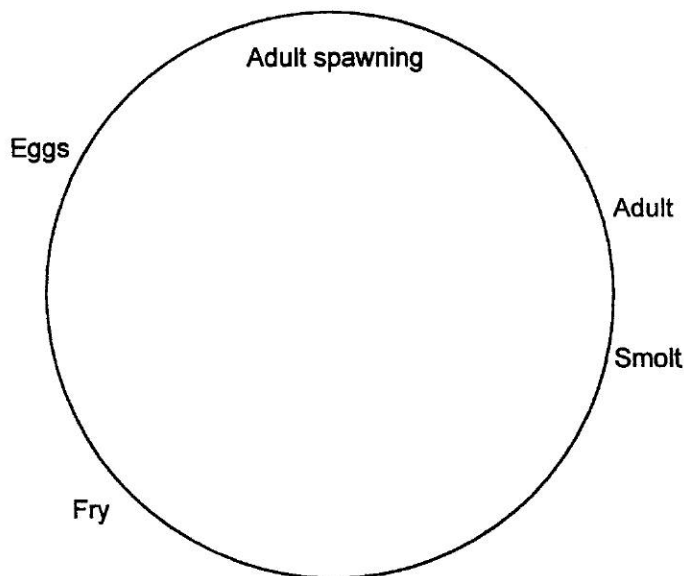
1. Hood Canal was formed by glaciers from the north which carried rocks that gouged and ground the fjord.
2. Answers will vary for the distance from the sign to the rock.
3. Oysters, salmon, cedar, salmonberry, and Pacific madrone are the plants and animals shown on this sign as particularly highly valued by Native Americans.
4. Distance from the rock to the one valued plant or animal will vary.

Hood Canal's special treasure

1. Native Americans were eating Olympia oysters at Seal Rock when Captain Vancouver sailed the waters of Hood Canal.
2. Pacific oysters are found at Seal Rock beach today.
3. Answers will vary depending upon background knowledge. Scientists think that water quality changes due to pulp mills and sedimentation were primary reasons for the change.
4. Rubbings of oyster or oyster shell with spat or a young oyster growing on it will vary.

A circle of balance

5. The death of salmon is important for the life of the forest because the decay of the dead salmon gives nutrients gained from the sea back to the forest.
6. The marbled murrelet depends on the forest (in particular, moss-covered branches of large old trees) and open saltwater for its life in the Seal Rock area.
7. Drawings of the salmon "circle of life" from egg to death after spawning will vary but should include the stages shown below:



Life on the edge

1. In this sign, "life on the edge" means "living in a place where your house floods and dries out twice a day", the intertidal area.
2. Sketches of animals "playing dead" will vary.
3. Evidence that clams grow on Seal Rock beach will vary but may include: shells, shell fragments, siphons, holes, or entire animals.
4. I important to turn rocks back over and to leave the beach as you found it to minimize the trauma to beach residents. This question is included to remind students of proper beach etiquette.

Enjoy and explore Seal Rock Beach!

1. The forest, the beach and the salt water of Hood Canal are the three ecosystems that connect to give life and resources to every living organism at Seal Rock Campground.
2. Descriptions of the sounds of the creatures on the beach will vary.
3. Descriptions of the sounds of the creatures in the forest will vary.
4. Descriptions of the sounds of the creatures out on the open water will vary.

Cedar - A Gift from the Creator

Western red cedar was important to Native American peoples who lived at Seal Rock as the source of raw materials for housing, canoes, clothing, ropes, tools, and masks and other ceremonial objects.

Students should label their rubbing with date, location and species.

Sketched and hypotheses regarding cedar growth forms will vary depending on the trees selected. Variations in exposure to sunlight, crowding, injury, weight of dead limbs, etc., can help explain the differences in growth forms. The object of this question is to encourage students to look closely at a present situation and to think about what past factors may have caused what they see.

Follow that Drop

Student maps will vary but should show where the water leaves the forest ecosystem and enters the shoreline, the waters of Hood Canal, surface types (e.g., pavement, gravel, forest litter, dirt, rocks, sand, etc.), and any drains or pipes through which the raindrop passed.

Answers will vary regarding how substances from road surfaces at Seal Rock Campground can be prevented from entering Hood Canal but may include catchment basins, oil traps, improved vehicle maintenance, and road closure, among others.

Seal Rock Campground Species

Producers

Forest, Shoreline Producers

Evergreen huckleberry - *Vaccinium ovatum*
Salal- *Gaultheria shallon*
Poison oak- *Rhus diversiloba*
Salmonberry- *Rubus spectabilis*
Western hemlock - *Tsuga heterophylla*
Western red cedar - *Thuja plicata*
Douglas fir - *Pseudotsuga menziesii*
Pacific madrone - *Arbutus menziesii*
Snowberry - *Symphoricarpos albus*
Oceanspray - *Holodiscus discolor*

Intertidal producers

Rockweed- *Fucus distichus*
Sea lettuce- *Ulva sp.*

Consumers

Larger forest mammals, some visitors

Elk- *Cervus canadensis*
Deer- *Odocoileus hemionus*
Black bear- *Ursus americanus*
Raccoon- *Procyon lotor*
Beaver- *Castor canadensis*

Common interior birds

Raven - *Corvus corax*
Blue grouse- *Dendragapus obscurus*
Winter wren- *Troglodytes troglodytes*

Shoreline birds

Kingfisher - *Megaceryle alcyon*
Great blue heron- *Ardea herodias*
Ducks - *Anas sp.*

Surfscoter- *Melanita perspicillata*
Hooded merganser- *Lophodytes cucullatus*
Harlequin duck- *Histrionicus histrionicus*
Geese - *Branta sp.*
Marbled murrelet- *Brachyramphus marmoratus*
Common loon- *Gavia immer*
Western grebe- *Aechmophorus occidentalis*
Western sandpiper- *Calidris mauri*
Glaucous-winged gull- *Larus glaucescens*

Marine mammals

Harbor seal- *Phoca vitulina*
River Otter- *Lutra canadensis*
Harbor porpoise - *Phocoena phocoena*
Dall Porpoise - *Phocoenoides dalli*

Fish

Salmon - *Oncorhynchus sp.*
Dogfish - *Squalus acanthias*
Lingcod - *Ophiodon elongatus*
Herring - *Clupea harengus*
Rockfish - *Sebastes sp.*
Sea perch - *Embiotocidae sp.*
Sculpin - *Cottidae sp.*
Tidepool sculpin- *Oligocottus maculosus*
Crescent gunnel- *Pholis laeta*

Intertidal invertebrates

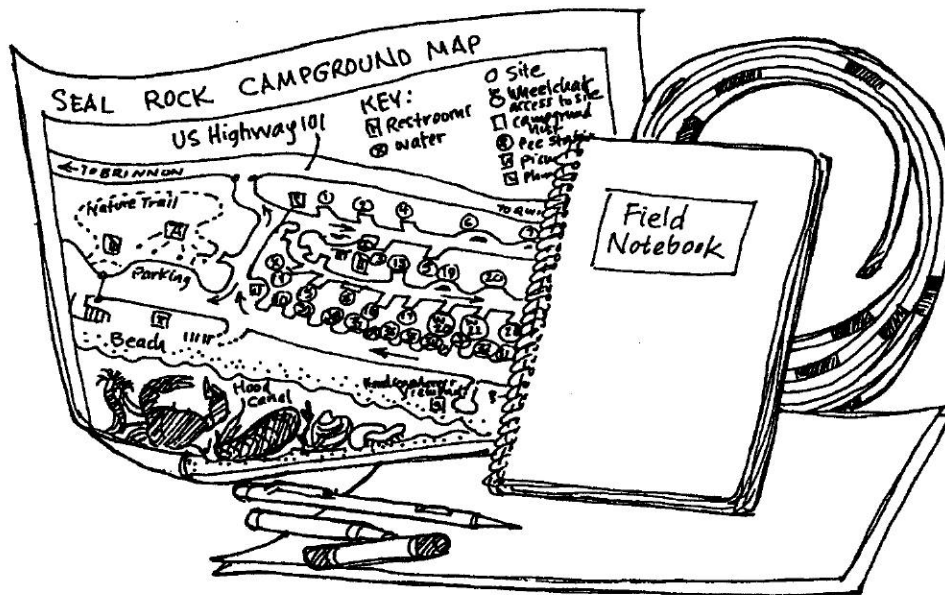
Purple or ochre sea star- *Pisaster ochraceus*
Red rock crab- *Cancer productus*
Acorn barnacles- *Balanus glandula*
Purple shore crab- *Hemigrapsus nudus*
Sea anemone- *Anthopleura elegantissima*

Shellfish, molluscs

Olympia oyster- *Ostrea lurida*
Pacific oyster- *Crassostrea gigas*

Butter clam - *Saxidomus giganteus*
Geoduck clam- *Panopea abrupta*
Japanese littleneck clam- *Tapes japonica*
Native littleneck clam- or steamer clam - *Protothaca staminea*
Sitka periwinkle- *Litorina sitkana*
Basket cockle - *Clinocardium nuttalli*
Blue mussel - *Mytilus edulis*
Limpets - *Acamea* sp.
High shore limpet- *Notoacmea persona*
Dogwhinkles - *Thias* sp.
Moon snail - *Polinices lewisi*

Getting Familiar With Seal Beach Campground



Rich with life in balance...

Which three ecosystems are found at Seal Rock Campground?

What four factors are necessary for life to survive?

Find a sign of life from each of the three ecosystems. Make a sketch or a rubbing of each of the signs. Be sure to label the sign and where you found it.

If rocks could tell a story...

Look out to see Hood Canal. How was this deep fjord formed?

Glaciers carry rocks as they slowly move. The rocks act just like the sand on sandpaper, they wear away the material against which they rub. They also become rounded and smooth as they grind. Look around you until you find a glacier rounded rock. Use your meter string to measure the distance from this sign to the rock. Record that distance in the space below:

What plants and animals shown on this sign were of particularly high value to Native Americans?

Choose one of these valued plants or animals and use your meter string to measure the distance from it to the rock. Record that distance in the space below:

Hood Canal's special treasure

What kind of oysters were Native Americans eating at Seal Rock when Captain Vancouver sailed the waters of Hood Canal?

What kind of oysters are found at Seal Rock beach today?

What do you think caused the change?

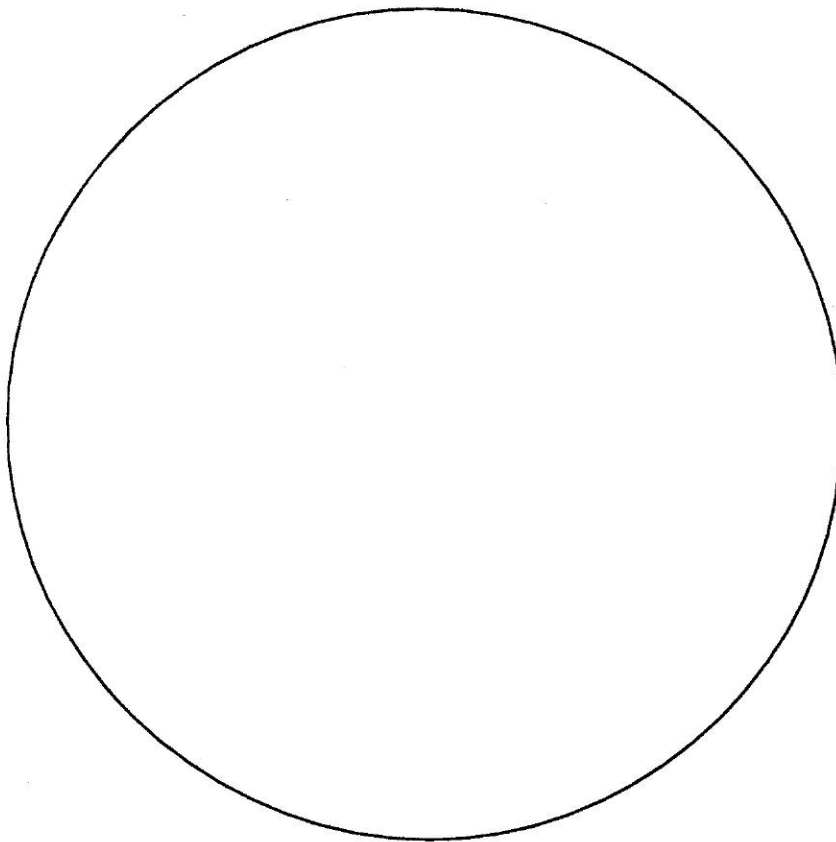
Find an oyster or oyster shell with spat or a young oyster growing on it. Make a rubbing of it in the space below.

A circle of balance

How is the death of salmon important for the life of the forest?

Upon which two ecosystems does the marbled murrelet depend for its life in the Seal Rock area?

Use the circle below to draw pictures of the salmon "circle of life" from egg to death after spawning. Be sure to label each stage.



Life on the edge

In this sign, what is meant by the term "life on the edge"?

Find an animal that is "playing dead" on the beach. Make a sketch of it and write its name below your sketch.

Find evidence that clams grow on Seal Rock beach. What evidence did you find?

Why is it important to turn rocks back over and to leave the beach as you found it? Did you?

Enjoy and explore Seal Rock Beach!

Which three ecosystems connect to give life and resources to every living organism at Seal Rock Campground?

Listen to the sounds of the creatures on the beach? Sounds? Try it! Write about what you hear in the space below.

Now, listen to the sounds of the creatures in the forest. Write about what you hear in the space below.

"Hear's" the hardest. Listen to the sounds of the creatures out on the open water. Sounds? Try it! Write about what you hear in the space below.

Cedar - A Gift from the Creator

Find the Nature Trail. Read the sign "Cedar - A Gift from the Creator".

How was Western red cedar important to Native American peoples who lived at Seal Rock?

Find the cedar closest to the sign and carefully make a rubbing of a section of needles. Have a partner help you. Do not remove the section from the tree. Label your rubbing.

Western red cedar can grow to be very tall and very old. Sometimes life is hard on them and they don't grow straight and tall. Walk the Nature Trail and find five cedar trees whose growth forms aren't perfectly straight. Sketch each of the five.

(Need help getting started? Walk up the trail to the bridge. Next to the bridge you'll find an 18 inch diameter cedar with an unusual growth form.)

Now, next to your sketch create an hypothesis which states how you think the tree came to have its particular shape.

Follow that Drop

Where does a raindrop go after it lands on the ground? To find out where all the water is going that's not soaking into the ground, follow a raindrop. Here's what to do:

Go to a quiet spot near campsites 4 to 7. Picture a raindrop landing somewhere on the pavement. Where will it go next? Downhill, of course! Follow the course you think it would travel, wherever it leads (watching out for traffic and people's campsites).

If it goes into a drain or pipe, don't give up. There are clues inside the drain or pipe that will tell you where the underground pipes are leading. Look at the direction in which the pipe carries the water. Walk in that direction, looking for an outflow.

Follow the drop until you reach the waters of Hood Canal.

Make a map of the area you walked. On your map show where the water leaves the forest ecosystem and enters the shoreline. Show the waters of Hood Canal, too. Label the surface types (e.g., pavement, gravel, forest litter, dirt, rocks, sand, etc.) your raindrop encounters on its travel to the canal. Be sure to show any drains or pipes through which your raindrop passed.

Water which drains from road surfaces at Seal Rock Campground picks up numerous substances along the way, especially petroleum products from cars. How can these substances be prevented from entering Hood Canal?

Checking It Out...

Puget Sound and Seal Rock beach have been influenced by human activity. If you look carefully when you walk the beach, you can observe many ways in which human activity has influenced the natural world. How many can you find?

By Yourself...

Walk the beach from the southern beach access (near the "Overflow Parking and Picnic Area") to the northern beach access (near the handicap viewpoint below campsites 29 and 28). On your way look for signs of human activity apparent at Seal Rock beach. Record them as you find them.

Some of these human activities have a negative impact on the oyster populations at Seal Rock beach. Next to each activity you've listed, briefly describe if and how the activity could impact oysters.

With a Partner...

Walk back on the same stretch of beach but this time with a partner. As you walk, compare your lists and record additional signs of human activity and their influence on oysters.