



Lesson Overview:

Using multiple games, students will be able to identify species and understand their ecological importance after reviewing facts about each animal's habitat, lifestyle, and defining physical characteristics. Activities can be used as either pre or post-activities.

Subjects:

Science, Reading

Preparation:

1. Activity 1: Teacher copy of *Clue Cards* on pages 3-5.
2. Activity 2: Teacher copy of *Critter Cards* on pages 7-8.
3. Activity 3: Make photocopies of both Bingo sheets on pages 10 and 12 for your students and for yourself. Color copies will work best for page 10.

Time:

Can be used as a filler: 3-5 min.
 Activities: 15 - 20 min. each
 Entire Lesson: 50 - 60 min

State of Oregon - Education Standards

4.2L.1 Describe the interactions of organisms and the environment where they live.

5.2L.1 Explain the interdependence of plants, animals, and the environment, and how adaptation influences survival.

Ocean Literacy Principle

OL.5 The ocean supports a great diversity of life and ecosystems.

* Activities are used with permission from Joseph Cornell, author of *Sharing Nature with Children* and *Sharing the Joy of Nature*.

SEA-Crets: Yaquina Cards and Bingo

Teacher Background Information

Yaquina Head Outstanding Natural Area is home to many birds, mammals, and marine invertebrates. Populations of common murre, gray whales, and other migrating species use our shores seasonally during their travels, while other species such as sea stars and harbor seals inhabit the park year-round.

Since 1980, the Bureau of Land Management has been dedicated to preserving the natural terrain and history of the area. Protecting and monitoring these headlands are important for preserving natural ecosystems and wildlife populations, which contribute greatly to the legacy we leave for our youth.

At Cobble Beach, students can experience an ancient volcanic rock beach. At low tide, the ocean floor is exposed—revealing an up-close look at unique and diverse intertidal communities. Through gentle and guided exploration, visitors have the opportunity to interact with a variety of tidepool organisms.

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Activity 1

Species Clue Game

1. Refer to the clues for individual animals on Species Clue Cards on pages 3-5. Consider photocopying and laminating cards to make a teacher copy.
2. Explain to your students that you will be reading clues about a certain animal and they are to guess its name. They must listen to all clues before guessing.
3. Read one clue at a time.
4. When all the clues are read, have students say or write down their guess.



David S. Pitkin / USFWS

<p>Black Pine <i>Neorhodomela larix</i></p> <ol style="list-style-type: none"> 1. I get my energy from the sun. 2. My branches give me a thick, bushy appearance. 3. I live in dense mats that look like mini forests. 4. I can be up to one foot long. 5. I don't mind sand and waves, but don't step on me. 6. I grow quickly. 7. I make chemicals that keep many animals from eating me. 8. I am an alga. 	<p>Rockweed <i>Fucus gardneri</i></p> <ol style="list-style-type: none"> 1. I get my energy from the sun. 2. Snails, limpets, and isopods like to eat me. 3. I don't mind spending a lot of time out of the water. 4. I am flat with many branches in sets of two. 5. I am brownish-green. 6. I have bubbles at the tips that hold me upright when I'm underwater. 7. I can be up to two feet long. 8. I am an alga.
<p>Iridescent Algae <i>Mazzaella splendens</i></p> <ol style="list-style-type: none"> 1. I am solar-powered. 2. Snails like to eat me. 3. Don't step on me: I'm slippery! 4. Brown or green when dry, I look like a rainbow in sunny water. 5. I can be up to three feet long. 6. I can often be found lying flat against the rock. 7. I look and feel rubbery. 8. I am an alga. 	<p>Giant Green Anemone <i>Anthopleura xanthogrammica</i></p> <ol style="list-style-type: none"> 1. I am a loner and will fight my neighbors. 2. I'll eat anything I can grab with my tentacles. 3. I like to cover myself with pieces of shell. 4. My friend, the hermit crab, walks all over me. 5. I am green in bright sunlight. 6. I look like a donut when I am closed up. 7. I look like a flower when I am opened up. 8. I am a cnidarian.
<p>Coralline Algae <i>Calliarthron, Corallina, Bossiella, Lithothamnion sp.</i></p> <ol style="list-style-type: none"> 1. I get my energy from the sun. 2. I look like the animals that form coral reefs. 3. I come in many shapes and sizes but am always pink. 4. Sometimes I just look like a thin crust on rocks or shells. 5. Abalone, limpets, and chitons like to eat me. 6. My branches are very stiff. 7. I am an alga. 	<p>Aggregating Anemone <i>Anthopleura elegantissima</i></p> <ol style="list-style-type: none"> 1. I'm rarely found alone. 2. I'll eat whatever falls within grasp of my tentacles. 3. I like to hang out in cracks in the rocks. 4. I'm greenish on the outside but my tentacles are pink. 5. I use shell pieces as sunscreen. 6. I'm rarely more than 2 inches across. 7. I am round and squishy. 8. I am a cnidarian.
<p>Sea Lettuce <i>Ulva lactuca</i></p> <ol style="list-style-type: none"> 1. I am solar-powered. 2. I am very thin, only two cells thick. 3. People and many animals like to eat me. 4. It is easy for people to slip on me. 5. I am Shamrock-colored. 6. I can live on rocks or floating in calm waters. 7. In the water, I look like a vegetable. 8. I am an alga. 	<p>California Mussel <i>Mytilus californianus</i></p> <ol style="list-style-type: none"> 1. I live in giant beds with my friends and family. 2. Lots of critters like to eat me, including people, sea stars, and some birds. 3. I can filter 2-3 liters of ocean water an hour. 4. I eat tiny things called plankton. 5. My blue-black shell protects me. 6. I am orange and fleshy on the inside. 7. I hold on to rocks with threads that act like glue. 8. I am a mollusk.

Enrichment

- Vary Activity 1 by having a student select an animal but not say which one they have picked. Have the rest of the class ask questions. The person who picked the animal can only answer Yes, No, Maybe, or Sometimes. Ask students raise their hand when they guess the animal; if they don't shout out the name, more students in the class can participate.
- Assign students to write their own Species Clue Cards for other animals.

Black Pine

Neorhodomela larix

1. I get my energy from the sun.
2. My branches give me a thick, bushy appearance.
3. I live in dense mats that look like mini forests.
4. I can be up to one foot long.
5. I don't mind sand and waves, but don't step on me.
6. I grow quickly.
7. I make chemicals that keep many animals from eating me.
8. I am an alga.

Rockweed

Fucus gardneri

1. I get my energy from the sun.
2. Snails, limpets, and isopods like to eat me.
3. I don't mind spending a lot of time out of the water.
4. I am flat with many branches in sets of two.
5. I brownish-green.
6. I have bubbles at the tips that hold me upright when I'm underwater.
7. I can be up to two feet long.
8. I am an alga.

Iridescent Algae

Mazzaella splendens

1. I am solar-powered
2. Snails like to eat me.
3. Don't step on me: I'm slippery!
4. Brown or green when dry, I look like a rainbow in sunny water.
5. I can be up to three feet long.
6. I can often be found lying flat against the rock.
7. I look and feel rubbery.
8. I am an alga.

Giant Green Anemone

Anthopleura xanthogrammica

1. I am a loner and will fight my neighbors.
2. I'll eat anything I can grab with my tentacles.
3. I like to cover myself with pieces of shell.
4. My friend, the hermit crab, walks all over me.
5. I am green in bright sunlight.
6. I look like a donut when I am closed up.
7. I look like a flower when I am opened up.
8. I am a cnidarian.

Coralline Algae

Calliarthron, Corallina, Bossiella, Lithothamnion sp.

1. I get my energy from the sun.
2. I look like the animals that form coral reefs.
3. I come in many shapes and sizes but am always pink.
4. Sometimes I just look like a thin crust on rocks or shells.
5. Abalone, limpets, and chitons like to eat me.
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Aggregating Anemone

Anthopleura elegantissima

1. I'm rarely found alone.
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7. I am round and squishy.
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Sea Lettuce

Ulva lactuca

1. I am solar-powered.
2. I am very thin, only two cells thick.
3. People and many animals like to eat me.
4. It is easy for people to slip on me.
5. I am Shamrock-colored.
6. I can live on rocks or floating in calm waters.
7. In the water, I look like a vegetable.
8. I am an alga.

California Mussel

Mytilus californianus

1. I live in giant beds with my friends and family.
2. Lots of critters like to eat me, including people, sea stars, and some birds.
3. I can filter 2-3 liters of ocean water an hour
4. I eat tiny things called plankton.
5. My blue-black shell protects me.
6. I am orange and fleshy on the inside.
7. I hold on to rocks with threads that act like glue.
8. I am a mollusk.

Sea Lemon Nudibranch

Anisodoris nobilis

1. I am soft and squishy.
2. I don't like to be out of the water.
3. My antennae-like rhinophores help me know where I'm going.
3. Sponges are my favorite food.
4. My gills look like feathers.
5. My bright color warns off predators.
6. Some people think I look like a certain sour fruit.
7. I am a mollusk.

Whelk

Nucella sp.

1. I like to eat other snails, mussels, and barnacles.
2. I can drill through shells.
3. My shell has ridges and a pointy tip.
4. I cling to the rocks with my single foot.
5. I move slowly.
6. I can appear striped or spiraled in appearance.
7. I can be up to 3 inches long.
8. I am a mollusk.

Gumboot Chiton

Cryptochiton stelleri

1. My favorite food is red algae.
2. I look like a red rock or a wandering meatloaf.
3. I can be as big as a clown shoe.
4. My skin feels leathery.
5. I move slowly.
6. I have a red mantle on top and yellow foot on bottom.
7. I have 8 butterfly-shaped shell plates hidden beneath my skin.
8. I am a mollusk.

Mossy Chiton

Mopalia muscosa

1. Algae are my favorite food.
2. I hide during the day and eat at night.
3. When attacked, I roll up like an armadillo.
4. I'm often found attached to rocks.
5. Sea stars like to eat me.
6. Sometimes I wear algae or animals on my back.
7. I am protected by 8 plates of armor.
8. I am a mollusk.

Black Turban Snail

Tegula funebris

1. I like to eat algae.
2. Some of my cousins live on land, but I prefer the shore.
3. My shell is round and black with a white tip.
4. Some birds, sea stars and people like to eat me.
5. I am famous for being slow.
6. After I die, a hermit crab might live in my shell.
7. Though rarely larger than two inches, I can be very old.
8. I am a mollusk.

Thatched Barnacle

Balanus cariosus

1. I look like a little white volcano.
2. I eat microscopic plankton.
3. I can live on rocks, whales, boats, and shells.
4. My head is glued to the surface I live on.
5. I eat with my feet.
6. Sea stars are my main predators.
7. My "shell" is amazingly strong and sharp.
8. I am an arthropod.

Limpet

Lottia sp.

1. You might find me clinging to a rock.
2. Algae is my favorite meal.
3. My shell is shaped like a shield or a cone.
4. I have one foot that's as long as my body.
5. Sea stars like to eat me.
6. I move very slowly.
7. Sometimes I have stripes or spots.
8. I am a mollusk.

Purple Shore Crab

Hemigrapsus nudus

1. I hide among the rocks.
2. I move sideways.
3. I like to eat algae, but I also do a lot of scavenging.
4. I usually sleep during the day.
5. I have ten arms and legs.
6. I discard my hard outer layer so I can grow.
7. Don't let the birds find me, or I'll be dinner!
8. I am an arthropod.

Gooseneck Barnacle

Pollicipes polymerus

1. I like to eat microscopic plankton.
2. I don't mind being pounded by waves.
3. My "shell" looks like a white mosaic.
4. My stalk looks like the neck of a certain bird.
5. Gulls and some people like to eat me.
6. I like having mussels as neighbors.
7. I eat with my feet.
8. I am an arthropod.

Sculpin

Oligocottus maculosus

1. I do not like to be out of the water
2. I can push off of the sea floor with my big side fins for a quick burst of speed.
3. I use my gills to breathe.
4. I often stay very still, waiting to ambush my prey.
5. I like to eat small animals: worms, isopods, snails, and baby crabs.
6. Don't let the kelp greenling find me- it wants to eat me.
7. I can change my color to blend in with the rocks around me.
8. I am a vertebrate.

Hermit Crab

Pagurus sp.

1. You might mistake me for a snail, but I move faster.
2. Black turban snail shells are my favorite homes.
3. I have antennae to help me find my food.
4. I am a scavenger.
5. Some people keep me as a pet.
6. As I grow, I have I have to find new, bigger homes.
7. Sometimes I hide in anemones from my predators: fish and octopi.
8. I am an arthropod.

Western Gull

Pycnospodia helianthoides

1. I'll eat just about anything I can find.
2. I have orange feet.
3. I am very common on the coast.
4. I am scared of eagles.
5. I can fly.
6. I raise my young on cliffs and rock islands.
7. My feathers are white and gray.
8. I am a vertebrate.

Purple Sea Urchin

Strongylocentrotus purpuratus

1. My favorite food is algae.
2. I move very slowly.
3. I don't have any major predators.
4. I can destroy a kelp bed.
5. I breathe through my tube feet.
6. I cover myself with shells and rocks.
7. I live in a hole that I carved out of the rock.
8. I look spiky, but will hug your finger if you gently touch me.

Common Murre

Uria aalge

1. I make noises that sound like my name.
2. I live on the open ocean, except when nesting.
3. My daddy teaches me to swim and fly.
4. My eggs are blue with black spots and pear-shaped.
5. I make my nests on rocky islands with thousands of other birds like me.
6. I have to watch out for hungry Bald Eagles.
7. I am black and white.
8. People say I look like a penguin.

Ochre Star

Pisaster ochraceus

1. I have thousands of tube feet but only 5 arms.
2. I can take my stomach out.
3. Mussels are my favorite food.
4. I have hard skin to keep the moisture in.
5. I have a sensor spot that tells me where I am
6. I come in several pretty colors: orange, red, or purple.
7. I look like a star.
8. I am an echinoderm.

Harbor Seal

Phoca vitulina

1. My favorite meal is fish and octopus.
2. Killer whales and sharks like to eat me.
3. My blubber keeps me warm.
4. I haul out on rocks to rest during low tide.
5. I can weigh up to 300 lbs.
6. I have ears, but you can't see them.
7. I am graceful in the water but awkward on land.
8. I am a vertebrate.

How to use the cards

Yaquina Head Critter Cards, on pages 7-8, and Species Clue Cards, on pages 3-5, consist of a variety of pictures and descriptive information on birds, marine invertebrates, and marine mammals commonly found at Yaquina Head Outstanding Natural Area and Oregon's rocky shores.

These cards may be used in a variety of different ways to enhance student knowledge and appreciation of local wildlife. The activities suggest various ways in which you can use the cards, but please don't be limited by these suggestions. We encourage you to develop your own activities as well.

Activity 2

What Animal Am I?

1. Review information on Yaquina Head Critter Cards on pages 7-8.
2. Explain to the students that you have secretly selected an animal species from the Yaquina Head Critter Cards and they must ask a question to which you will only answer *Yes, No, Maybe, or Sometimes*. For example: Are you as big as a toaster? Are you a mammal? Do you eat meat? etc. Model and discuss questions with the students.
3. Choose one species from the attached cards without letting your students know your selection.
4. Encourage and coach students to ask appropriate questions about the species selected. The students have to ask at least five questions before they can begin guessing.
5. Repeat the activity with other animals allowing students to take your place.



Common Murre

Markings: Head is brownish black, and body is brownish black with a white belly. They have a long, slender, and pointed bill. In the winter, birds have extensive white on the face, with a dark line behind the eye. Common Murres are often mistaken for penguins.

Behavior: This bird uses its wings for swimming and diving underwater to capture its prey, appearing to fly through the water.

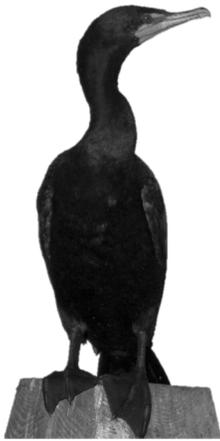
Habitat: The ocean and rocky coasts

Diet: Fish, squid and other marine invertebrates

Adaptations: Murres are known for having heavier bones than most birds which helps them when diving.

Enrichment

- Vary the activity by having the class select an animal. The teacher or a designated student ask questions with the class answering *Yes, No, Maybe, or Sometimes*.
- Use the Yaquina Head Critter Cards to teach species identification. Compare and contrast the animals represented by finding similarities and differences in their physical characteristics.
- Assign each student to write a report or create a new card on a specific animal.



Oyster Catcher

Markings: Stout black body with pale pink legs and a long, skinny, bright orange-red bill.

Behavior: This bird forages in pairs or alone along rocky Sea coasts. When in flight they will sometimes call with a high pitched *peep-peep-peep-peep*.

Habitat: Rocky shoreline

Diet: Mussels and other intertidal marine invertebrates

Adaptations: This bird has long legs and toes to give it stability on the rocky shore line. They also have a highly specialized long beak which is good for rapidly poking up and down in the water until it feels something to eat, and for prying mussels off rocks.

Bald Eagle

Markings: Brown body with a white “bald” head and a wing span of up to eight feet

Behavior: This bird of prey will scavenge when the opportunity arises. Eagles have been known to steal the prey of smaller birds.

Habitat: Lakes, rivers, marshes and the sea shore

Diet: Smaller birds, fish, rodents, dead animals

Adaptations: The Bald Eagle has good eyesight, about six times better than a human; ideal for catching its meal. Its curved beak helps shred its meal. It has razor sharp talons that can easily grab and kill prey.

Common Murre

Markings: Head is brownish black, and body is brownish black with a white belly. They have a long, slender, pointed bill. In the winter, birds have extensive white on the face, with a dark line behind the eye. Common Murres are often mistaken for penguins.

Behavior: This bird uses its wings for swimming and diving underwater to capture its prey, appearing to fly through the water.

Habitat: The ocean and rocky coasts

Diet: Fish, squid and other marine invertebrates

Adaptations: Murres are known for having heavier bones than most birds which helps them when diving.

Brandt’s Cormorants

Markings: Long slender black body, webbed feet for swimming and slight hook at the tip of the bill.

Behavior: This bird gathers in flocks of several hundred and flies to feeding grounds in long lines. They dive from the surface of the water and chase their prey underwater.

Habitat: Coastal or offshore rocks and waters near shore

Diet: Fish and some squid

Adaptations: Cormorants have webbed feet which they use for foot-propelled diving while fishing. They also have a large wing span making them heavier when wet which aids them in staying under water longer.

Harbor Seal

Markings: A spotted coat, chunky body with short front flippers, large eyes, and no external ear flaps.

Behavior: They spend half of their time in the water and the other half resting out on rocks. They move by wiggling or “galumping.” They are very curious about humans, but do not like them coming too close.

Habitat: Monterey Bay to the Arctic, on sand bars, rocky places, and open ocean

Diet: Fish, squid, and octopus

Adaptations: Seals can sleep on land or in the water. They are able to collapse their lungs when they dive. Their blubber keeps them warm.

Brown Pelican

Markings: A very large, stocky bird with a dark brown body and a long flat bill. It has webbed feet and a short tail.

Behavior: They fly low over the water in single file. After sighting prey, the bird will dive into the water, then drain water from their beak before swallowing the fish.

Habitat: Sandy coastal beaches and lagoons, waterfronts and pilings, and rocky cliffs

Diet: Fish and some marine invertebrates

Adaptations: Pelicans have pouches used as fishing nets. After catching their food, the excess water drains out the sides before they eat their prey. They also have special glands between their bill and eyes which secrete excess salt.

California Sea Lion

Markings: Brown fur coat, ear flaps present, large front flippers to walk on. Males develop a bump on their head called a crest.

Behavior: They bark loudly and sound like dogs. They like to gather in groups and lay out on rocks or docks.

Habitat: Baja California to British Columbia, in bays or harbors, rocks, and open ocean, not found at Yaquina Head Outstanding Natural Area

Diet: Fish, squid, and octopus

Adaptations: Sea Lions have eyes adapted for night vision, seeing underwater, and seeing on land. Their flippers are jointed allowing them to walk, climb, and clap, while their long necks allow them to make sharp turns to escape from predators.

Gray Whale

Markings: Light to dark gray baleen whales, can reach up to 50 feet long. They sometimes look speckled due to barnacles and parasites that attach themselves to the whales’ bodies.

Behavior: Gray Whales migrate from Baja California to the Bering Sea and back again (about 14,000 miles). They give birth to their young in the warm waters of Baja California and go North in the spring and summer to look for better food.

Habitat: Baja California to the Bering Sea

Diet: Small crustaceans, and sometimes fish

Adaptations: They are bottom feeders that turn on their side to scoop the ocean floor into their mouth. They strain their food with the baleen and spit the mud back out.

Activity 3

Yaquina Head Bingo

1. Make photocopies of the Tidepool Bingo Sheet with images on page 10 and the blank Bingo sheet on page 12. Print one for yourself and each student. Images will be clearest when page 10 is printed in color.
2. Cut apart the Tidepool Bingo Sheet (page 10) for the teacher portion and place in a hat or something else that you can pull from.
3. Have students cut out the individual species squares on the Tidepool Bingo sheet and glue them at random onto the blank Bingo sheet on page 12, creating their individualized Bingo cards.
4. When ready to play, select a species card from your hat (see step 2) and either show them the picture or call out the animal name. Discuss the characteristics of the chosen species as each new species is selected.
5. Instruct students to place a marker onto the corresponding square on their individual bingo board.
6. Continue playing until someone calls out "bingo."



Tidepool Bingo Sheet

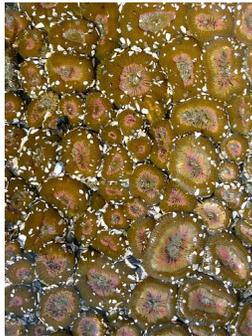
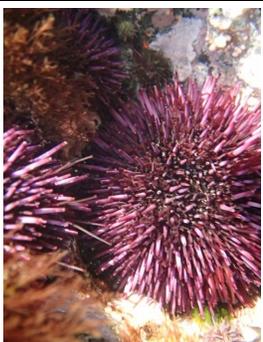


Tidepool Bingo, Master Organism List

1. Thatched Barnacle	13. Aggregating Anemone
2. Black Pine	14. Sea Lemon Nudi-branch
3. Giant Green Anemone	15. Limpet
4. Sculpin	16. Purple Sea Urchin
5. Coralline Algae	17. Sea Lettuce
6. Ochre Star	18. Gooseneck Barnacle
7. Mossy Chiton	19. Common Murre
8. Whelk	20. California Mussel
9. Hermit Crab	21. Harbor Seal
10. Western Gull	22. Gumboot Chiton
11. Iridescent Algae	23. Black Turban Snail
12. Purple Shore Crab	24. Rockweed

Enrichment

- Give each student a blank Bingo sheet (page 12). Review and list the names of the animals from the Species Clue Cards on pages 3-5 on the blackboard. Ask each student to copy the names of each species randomly in the squares until the card is full. When ready, select pictures of each animal and, without verbally identifying the species, have each student match the name while placing markers on their Bingo card.
- Teacher reads clues aloud while students find the corresponding animal on their Bingo cards.

<p>5.</p> 	<p>10.</p> 	<p>14.</p> 	<p>19.</p> 	<p>24.</p> 	
<p>4.</p> 	<p>9.</p> 	<p>13.</p> 	<p>18.</p> 	<p>23.</p> 	
<p>3.</p> 	<p>8.</p> 	<p>Tidepool Bingo</p>		<p>17.</p> 	<p>22.</p> 
<p>2.</p> 	<p>7.</p> 	<p>12.</p> 	<p>16.</p> 	<p>21.</p> 	
<p>1.</p> 	<p>6.</p> 	<p>11.</p> 	<p>15.</p> 	<p>20.</p> 	

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		Free Space		

Teacher Resources

More in-depth information about specific animals you might discover in the tidepools for your use as an educator.

Black Pine

Neorhodomela larix

Classification: alga

Nutrition: sunlight (photosynthesizer)

Main Predators: avoided by many animals since it produces chemicals for defense

Appearance: in dense clusters, black to dark brown, many small branches of equal size

Behavior: attaches to rock, moves with water

Rockweed

Fucus gardneri

Classification: alga

Nutrition: sunlight (photosynthesizer)

Main Predators: snails, limpets, isopods

Appearance: brownish-green, overall flat but with inflated branch tips, branching in pairs

Behavior: attaches to rock, moves with water

Iridescent Algae

Mazzaella splendens

Classification: alga

Nutrition: sunlight (photosynthesizer)

Main Predators: snails

Appearance: flat, rubbery sheets, greenish-brown out of water but iridescent in sunlight underwater

Behavior: attaches to rock, moves with water

Giant Green Anemone

Anthopleura xanthogrammica

Classification: cnidarian

Nutrition: various animals including fish, crabs, and mollusks

Main Predators: nudibranchs

Appearance: bright green and flower-like when open with tentacles out, donut-like and darker green when closed, usually greater than 1.5" across

Behavior: covers exterior with shell fragments to protect itself from the sun, generally does not harm hermit crabs, uses tentacles to grab and stun prey

Coralline Algae

Calliarthron, Corallina Bossiella, Lithothamnion sp.

Classification: alga

Nutrition: sunlight (photosynthesizer)

Main Predators: abalone, limpets, chitons

Appearance: pink, hard calcium carbonate cell wall, branching and coral like or forming a crust on rocks

Behavior: incapable of movement

Aggregating Anemone

Anthopleura elegantissima

Classification: cnidarian

Nutrition: various animals including fish, crabs, and mollusks

Main Predators: nudibranchs

Appearance: pinkish-green and flower-like when open with tentacles out, donut-like and dark-green when closed, usually less than 1.5" across

Behavior: lives in groups of clones, covers exterior with shell fragments for protection, uses tentacles to grab and stun prey

Sea Lettuce

Ulva lactuca

Classification: alga

Nutrition: sunlight (photosynthesizer)

Main Predators: many animals, edible to people

Appearance: bright green, very thin (only ~2 cells thick)

Behavior: incapable of movement

California Mussel

Mytilus californianus

Classification: mollusk

Nutrition: plankton (filter-feeder)

Main Predators: sea stars, oystercatchers, people

Appearance: two blue-black shells, orange flesh, attaches to rock with byssal threads

Behavior: live in dense beds for protection against waves, shells close when out of water but open underwater to allow it to eat

Sea Lemon Nudibranch

Anisodoris nobilis

Classification: mollusk

Nutrition: sponge

Main Predators: few

Appearance: yellow, two antennae-like rhinophores at front end, feathery gills at rear end

Behavior: uses rhinophores to detect prey and predators, cannot breathe out of water

Whelk

Nucella sp.

Classification: mollusk

Nutrition: snails, barnacles, mussels

Main Predators: sea stars, other whelks

Appearance: various colors according to species, pointy-tipped shell has spiraling ridges, single strong foot

Behavior: uses radula to drill holes in the shells of its prey

Gumboot Chiton

Cryptochiton stelleri

Classification: mollusk

Nutrition: red algae

Main Predators: parasitic worms and snails, sometimes eaten by people

Appearance: red to brown leathery skin, yellow-orange foot, up to 13" long, shell plates not visible when alive

Behavior: slow-moving

Mossy Chiton

Mopalia muscosa

Classification: mollusk

Nutrition: algae

Main Predators: sea stars, whelks

Appearance: brownish-green, eight visible shell plates are surrounded by girdle that resembles moss

Behavior: feeds at night, hides in cracks and under algae during the day, sometimes has algae or small animals growing on back

Black Turban Snail

Tegula funebris

Classification: mollusk

Nutrition: algae

Main Predators: sea stars, some birds, people

Appearance: round shell is black but often has white tip, single foot

Behavior: slow-moving, can live over 100 years, often covered in crust of coralline algae

Thatched Barnacle

Balanus cariosus

Classification: arthropod

Nutrition: plankton (filter-feeder)

Main Predators: sea stars, whelks, birds

Appearance: whitish volcano-shaped "shell" attached to rock with two plates inside, feet resemble eyelashes when open

Behavior: attaches head to substrate for life; can live on whales, rocks, or boats

Limpet

Lottia sp.

Classification: mollusk

Nutrition: algae

Main Predators: sea stars, whelks

Appearance: shield- or cone-shaped shell, coloring varies according to species, may be striped or spotted, single foot as long as body

Behavior: usually found clinging to rocks, slow moving

Purple Shore Crab

Hemigrapsus nudus

Classification: arthropod

Nutrition: algae, dead animals (scavenger)

Main Predators: birds

Appearance: purple to reddish-brown, ten legs with two large claws

Behavior: walks sideways, hides under rocks during the day, feeds at night

Gooseneck Barnacle

Pollicipes polymerus

Classification: arthropod

Nutrition: plankton (filter-feeder)

Main Predators: sea stars, whelks, birds, people

Appearance: mosaic of whitish plates that opens along central line, grey stalk resembles a goose's neck

Behavior: found in dense clusters in wave-wracked areas, attached to hard surfaces, feeds with feet that resemble eye-lashes

Sculpin

Oligocottus maculosus

Classification: vertebrate

Nutrition: worms, small snails, small crustaceans such as isopods and young crabs

Main Predators: kelp greenling

Appearance: tan to black with white markings, relatively large side fins, gills

Behavior: ambushes its prey, pushes off the seafloor with large front fins for an extra burst of speed

Hermit Crab

Pagurus sp.

Classification: arthropod

Nutrition: algae, dead animals (scavenger)

Main Predators: fish, octopi

Appearance: ten legs but often only six are visible, long antennae, most of body hidden in snail shell

Behavior: lives in the shells of dead snails or whelks, must find a larger shell as it grows

Western Sea Gull

Larus occidentalis

Classification: vertebrate

Nutrition: eggs, fish, squid, mollusks, dead animals (omnivore)

Main Predators: eagles, falcons

Appearance: white with grey wings and back, orange legs and beak

Behavior: nests on cliffs and rock islands, sometimes drops hard-shelled food like snails and crabs from great heights in order to crack them open

Purple Sea Urchin

Strongylocentrotus purpuratus

Classification: echinoderm

Nutrition: algae

Main Predators: sea otters, sheep-head fish, lobsters

Appearance: purple, round, covered in spines, purple tube feet are thin and spaghetti-like

Behavior: bores holes in the rock for protection from waves, often holds driftwood or shell on top of itself to hide, spines inject predators with poison but are harmless to people

Common Murre

Uria aalge

Classification: vertebrate

Nutrition: fish, squid and other marine invertebrates

Main Predators: eagles, falcons

Appearance: brownish black body with a white belly, bill is long and slender, penguin-like appearance

Behavior: uses its wings for swimming and diving underwater to capture its prey, appears to fly underwater

Ochre Star

Pisaster ochraceus

Classification: echinoderm

Nutrition: mollusks (especially mussels) and barnacles

Main Predators: sunflower sea stars, gulls, sea otters

Appearance: purple to orange or red, five "legs" in star shape, hard spiny skin, hundreds of spaghetti-like tube feet on bottom side

Behavior: uses tube feet to walk and to open the shells of its prey, eats by inserting its stomach into the shell of prey

Harbor Seal

Phoca vitulina

Classification: vertebrate

Nutrition: fish, crabs, squid, octopus, occasionally mollusks

Main Predators: killer whales, sharks

Appearance: white to grey or brown, spotted, so blubbery as to resemble sausages from afar

Behavior: rests on rock islands or shore during low tide, feeds during high tide, clumsily "galumphs" on land but graceful swimmer, can swim from birth