



Lesson Overview

Students will identify and learn about tidepool species while discovering the unique adaptations that help them live in the rocky intertidal.

Subjects:

Species Identification, Critical Thinking, Ecology

Preparation

- Photocopy pages 3–4, *Intertidal Clue Cards* #1 and #2, one per student or group.
- Make one color copy of pages 5-10, *Intertidal Photo Cards*; cut out each photo and display them randomly throughout the room.
- **Note:** Students will be best equipped to complete this activity if it is used in conjunction with some discussion and/or background information to intertidal species. It may be difficult for them to initially identify animals they have never heard of.

Materials

- Teacher Copy of page 2.
- Copies of pages 3–4, *Intertidal Clue Cards* #1 and #2, one per student or group.
- One color copy of pages 5-10, *Intertidal Photo Cards*.
- Tape or safety pins to display photos.

Time

30 - 45 minutes

State of Oregon - Education Standards

6.2 Interaction and Change

6.2L.2

6.3 Scientific Inquiry

6.3S.2

7.3 Scientific Inquiry

7.3S.2

8.2 Interaction and Change

8.1L.1

8.3 Scientific Inquiry

8.3S.3

Ocean Literacy

#5 - *The ocean supports a great diversity of life and ecosystems.*

Discovering the Intertidal

1. Hold a class discussion about student knowledge and experience of tide pools, leading into the biological and ecological traits of invertebrate species.
2. If not already done, display the color photos from pages 5-10, *Intertidal Photo Cards*, around the classroom.
3. Give each student or workgroup a copy of pages 3–4, *Intertidal Clue Cards* #1 and #2.
4. Use the Whelk Snail and corresponding clues to model the activity. Read the clues aloud, one clue at a time. Have students wait to guess until after all the clues are read.
5. Ask students to match the twelve clues with the respective photos while systematically rotating throughout the classroom. Have students write their findings on a separate piece of paper.
6. Once ample time is given, review the correct answers and/or collect student work.
7. Review the characteristics described on the clue cards of each intertidal species. Using this information discuss implications of evolution and natural selection.

Answer Key

A/3 - *Giant Green Anemone*

B/10 - *Aggregating Anemone*

C/7 - *Ochre Sea Star*

D/4 - *Sunflower Sea Star*

E/6 - *Sea Lemon*

F/9 - *Gumboot Chiton*

G/12 - *Purple Sea Urchin*

H/1 - *Acorn Barnacle*

I/5 - *Gooseneck Barnacle*

J/8 - *Hermit Crab*

K/11 - *California Mussel*

L/2 - *Black Turban Snail*

Extensions:

- ◆ Instead of giving students or workgroups all twelve clues, give individuals different cards and have them trade clue cards with another student to learn about another organism.
- ◆ Ask each student to research and report on an assigned species.
- ◆ Complement this activity with Intertidal Animal Scramble and Critter-cal Thinking lessons from Yaquina Head Outstanding Natural Area.

Whelk Snail

Nucella emarginata



1. I am related to land snails and slugs.
2. I am a carnivore, but sometimes I prefer to scavenge my meals.
3. Using my raspy tongue (radula), I can bore through the shells of my prey items and lick out the tasty insides.
4. It sometimes takes me 2 days bore through the shell of my prey and then to eat them.
5. I like to eat barnacles, hermit crabs, snails, and decaying matter.
6. There are many types of creatures just like me that carry my name, including channeled dogwinkles and boreal wentletraps.
7. My shell is spiral shaped and pointy.

- A**
1. I am related to sea jellies.
 2. I stick to the rocks, and won't move much over the course of my lifetime.
 3. I don't have any sort of shell at all to protect me.
 4. I eat whatever comes my way; mussels, barnacles, small fish, and crabs.
 5. I can only feed when the tide is in and I am submerged.
 6. I don't like being exposed to too much sun, so when the tide is out, you may see me coated in small rocks and bits of shell; I am using them as camouflage and sunscreen.
 7. I am a broadcast spawner.
 8. My tentacles have more sticky cells than stinging cells.
 9. My skin is green because of small, single-celled plant-like organisms that live in it. They soak up the sun and make extra energy for me to use, I offer them protection from predators.

- B**
1. I am related to sea jellies.
 2. I don't have a shell to protect my soft body.
 3. I grow in large colonies of genetically identical "brothers" or "sisters." When two different colonies meet, they will fight for territory.
 4. I can reproduce 2 ways; sexually and asexually.
 5. When I reproduce asexually, the process is called binary fission.
 6. I will eat most anything that comes my way, if it is small enough. I love to eat small crabs and fish, but will happily dine on micro invertebrates like zooplankton.
 7. My genetically identical relatives may be living in the same spot thousands of years from now; this leads scientists to wonder whether or not I should be considered an immortal life form.

- C**
1. I am a major intertidal predator.
 2. My "skin" is both spiny and spongy.
 3. I am a broadcast spawner.
 4. I am related to the sea urchin and the sand dollar.
 5. I come in many different colors, ranging from red to orange and purple.
 6. I love to eat mussels, and in the intertidal zone I keep their population in check.
 7. I can survive for more than a day out of the water, but I am happiest when I am submerged.
 8. I am not too fond of the sun and can often be found in cool, shady crevices in the rock.
 9. It may look like I have 5 legs, but I get around using my thousands of tiny tube feet.

- D**
1. I am related to sea urchins and sand dollars.
 2. My "skin" is velvety soft with hard little bumps imbedded in it.
 3. I can be purple, pink, red, blue, yellow, or brown. Sometimes I am many colors.
 4. I am a fierce intertidal predator; nothing can stand up to me.
 5. I can move more than a meter in a minute; I am one of the only intertidal animals that you can watch moving along the ocean floor.
 6. I love to eat sea urchins.
 7. I have 16-24 arms called rays.
 8. I can be up to one meter across, that's longer than the length of your arm.

- E**
1. I have no shell to protect my soft body.
 2. I am distantly related to octopuses, mussels, and snails.
 3. I love to dine on sea-sponges, like breadcrumb sponge and purple encrusting sponge.
 4. I get around by smelling my way, using the two smelling projections on my head.
 5. I have a soft little plume of gills that I breathe with that are attached to my back.
 6. When I lay eggs, they look like a thin yellowish ribbon curled into a rose shape.
 7. Some people think I smell fruity.
 8. I am yellow, about the size of your fist, and bumpy.

- F**
1. I am distantly related to snails, octopuses, and slugs.
 2. I have eight interlocking plates that form a type of protective skeleton within my back.
 3. I get around using a large muscular "foot" on the underside of my body, just like a slug does.
 4. I have a soft, brightly colored skin that covers my protective plates. This skin is called a mantle.
 5. I am an herbivore; my favorite food is encrusting algae.
 6. I am nocturnal and don't like the sun very much. Find me hiding under rocks or ledges during the day.
 7. I can be up to 14 inches long and weigh more than 4 pounds.
 8. Some people think I look like a flattened football, others think I look like a cow's tongue.

G

1. I am related to sand dollars and sea stars.
2. I can live up to 70 years.
3. I have tube feet that reach out through holes in my shell and help me to feed.
4. I am an herbivore, and I love to eat iridescent algae.
5. My "mouth" is on the underside of my body and has a funny name: Aristotle's lantern.
6. The shell that I leave behind when I die is called a test.
7. I am most common in areas with a lot of exposed rock, as that is where I make my home. I am not well adapted for the sand.
8. I may look sharp and spiny, but I won't pierce your skin with my spines, they are too dull on the ends. I use them for protection from predators.

H

1. I am related to dragonflies, crabs, and spiders, although you wouldn't know it by looking at me.
2. Once I am planted on a hard surface I will begin building my shell; it is shaped like a volcano.
3. After my larval stage, I become attached permanently to a hard surface; there I will spend the rest of my life.
4. I am a marine animal, but I am pretty comfortable spending time above the water. I usually live in the high tide zone.
5. I have a trap door in my shell that I can close to protect me from drying out in the sun.
6. I am a filter feeder; this means I dine by sweeping plankton out of the water when the tide is in.
7. I will spend most of my life with my head glued to a hard surface, and my feet pointing upward, out of my shell.

I

1. I am a filter feeder.
2. I am related to spiders, ants, butterflies, and scorpions, believe it or not.
3. I prefer to be wet, but I can last for a few days without much water. That's why I live in the high tide zone.
4. Sometimes I live in mussel beds.
5. I sweep the water with my "legs" to catch debris when the tide is in.
6. Once I settle from my larval stage, I'm stuck for the rest of my life.
7. We form dense colonies in crevices on rocky shores with strong waves.

J

1. I have 10 legs.
2. As an arthropod, I am related to barnacles and dragonflies.
3. I love to eat almost anything I can get my claws on, from algae to meat and fish. In captivity, I prefer fruit.
4. When I am scared, I can retract my body completely into "my" shell.
5. "My" shell is actually a borrowed shell left behind by a sea snail. I can only move in if the shell was left intact.
6. My soft abdomen is specially adapted to fit snugly into my new shell.
7. Throughout my life, I will slowly outgrow my home; when I do, I will go in search of a new one.

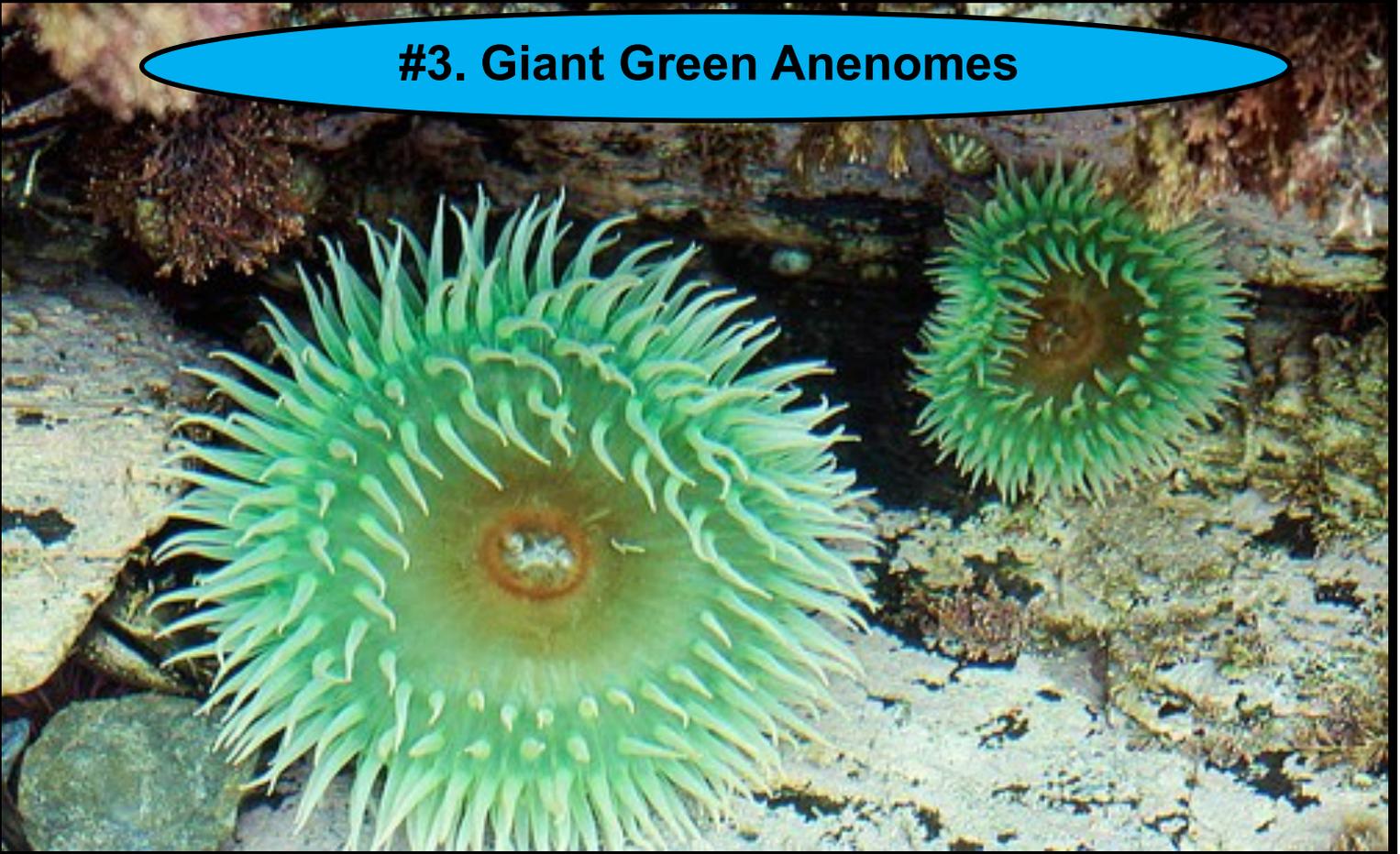
K

1. I am related to clams and cockles.
2. I live in large colonies called beds.
3. I am what is known as a bivalve.
4. I support the intertidal community by providing food and habitat for many different creatures.
5. Other organisms often live in my beds, including acorn barnacles, gooseneck barnacles, many species of algae, and aggregating anemone.
6. My shell can be up to 10 cm in length.
7. Gulls, sea stars, oystercatchers, and surf scoters love to eat me.
8. Ochre sea stars keep my population in check within the tide pool community.

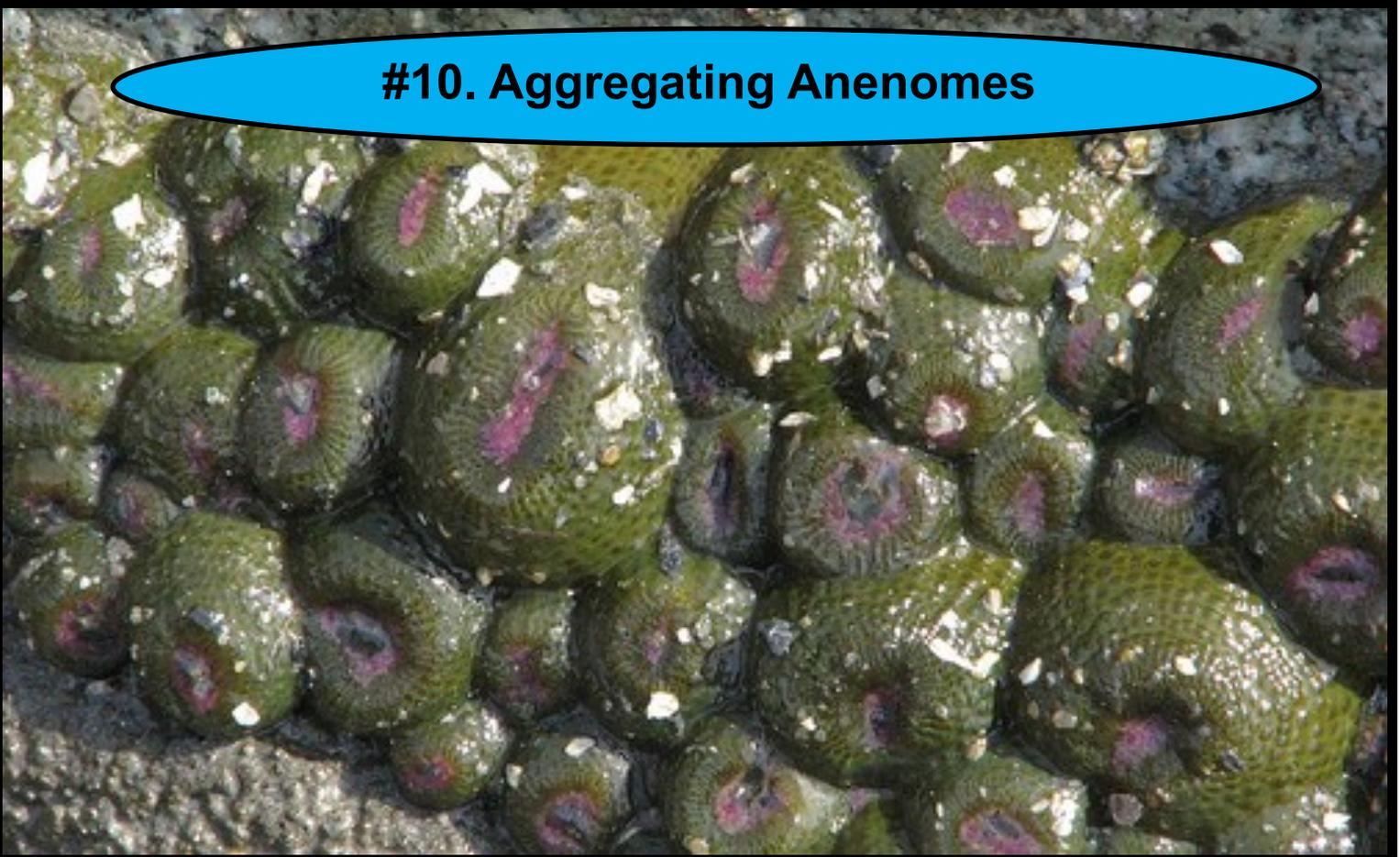
L

1. I am related to land snails and slugs.
2. I love to eat seaweed and algae that I find in the pools.
3. My favorite are called soft algae such as sea lettuce and laver.
4. Carnivorous snails like whelks will sometimes prey upon me.
5. I am a tide pool and mid-tide animal.
6. My shell is the perfect hideout for a hermit crab.
7. I can live up to 100 years. This is why my "black" shell is commonly blue, purple, or white; it has been washed away by the years I have spent in the tide pools.
8. My curly, round shell reminds some people of a hat called a turban.

#3. Giant Green Anenomes



#10. Aggregating Anenomes



7. Ochre Star



#4. Sunflower Star



#6. Sea Lemon Nudibranch



#9. Giant Pacific Chiton



#12. Purple Sea Urchin



#1. Acorn Barnacles



#5. Gooseneck Barnacles



#2. Turban Snails



#8. Hermit Crab



#11. California Mussels

