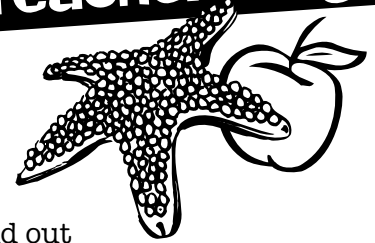


Scavenger Hunt



Thank you for choosing the Aquarium of the Pacific as your field trip destination. We are excited to share the wonders of the Pacific with you and your class.

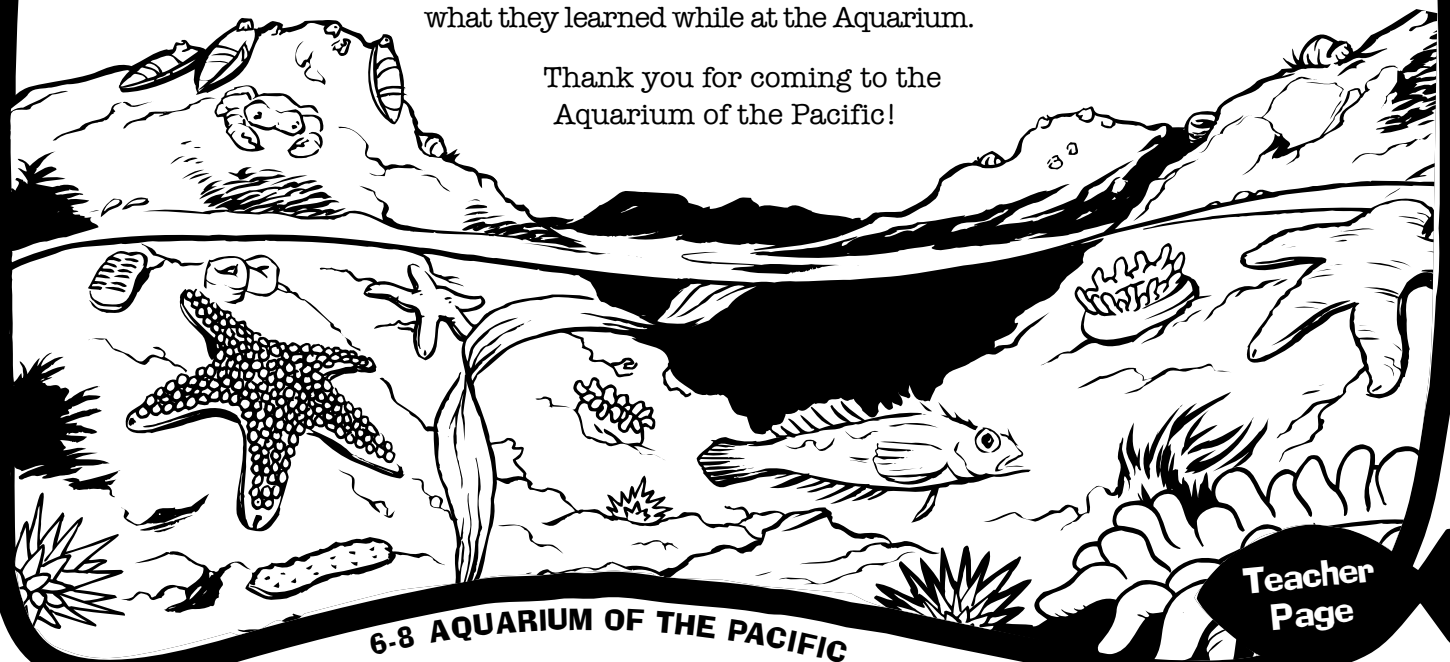
Teacher Page



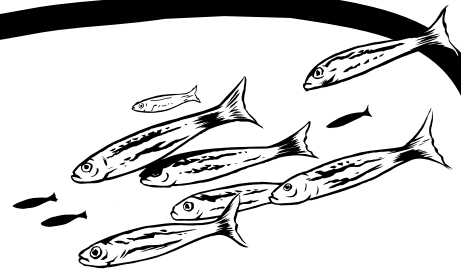
Use this scavenger hunt to make the most of your visit to the Aquarium. Inside this packet are vocabulary words, activities, and background information to make your field trip a fun and educational experience for your students. Simply make a photocopy of the following pages (double-sided please!) and hand out one copy to each student the day of your visit. All of the answers to the questions can be found in the galleries on signs, from our knowledgeable volunteers, or in our informative presentations. We also have a helpful answer key available on our website at www.aquariumofpacific.org. Here are a few hints to keep in mind before your visit.

- You may want to review the vocabulary page as homework before your Aquarium visit. This activity will be a fun way to introduce your students to the Aquarium and prepare them for all that they will experience.
- The tile rubbings pages are for the brass tiles that you will find in front of the preview exhibits in the Great Hall. Let the students choose a few of their favorites and make a rubbing with a crayon or pencil. Bring along a few old crayons without the wrappers to make the rubbings.
- The gallery pages will guide you to some of our key exhibits and give your students activities to make their visit more interactive and educational.
- The final page in this packet contains some pre-post activities for your students. These California Science standards based activities are a great way to prepare your students before they arrive at the Aquarium and to reinforce what they learned while at the Aquarium.

Thank you for coming to the
Aquarium of the Pacific!



Vocabulary



Unscramble the vocabulary words below into the following definitions. Once all the words are filled in, place the letters in the numbered slots into the phrase at the bottom of the page to read the secret message!

UOCOCBITINMULAA b₁ i₁₉ a c c u m u l a t i o n : absorption and accumulation of toxic chemicals up the food chain in living organisms

TIOOLLUNP p₁₂ o l l u t i o n : human caused changes that create an undesirable effect on living and non-living things

TOMSR RIDNA s₈ t o r m d r a i n : drainage canal where rain washes litter, soil, chemicals, and other pollutants into the drain, which carries pollutants into surface water

NIYTESD d₇ e n s i t y : the compactness of molecules in matter for a given organism

OAPOIVENTAR e₁₀ v a p o r a t i o n₂₁ : the process of a liquid becoming a gas, usually through application of heat

LNISTYAI s₆ a l i n i t y₁₁ : the ratio of salt to water

RAGLET CIA c₃ a r t i l a g e : a firm but flexible tissue; forms the skeletons of sharks and rays

DASLOR NIF d₂₃ o r s a l f i n₁₃ : a structure located on the top of a fish

RDLAME DILCENTES d e r m a l d e n t i c l e s₁₅ : tooth-like scales embedded in the skin of rays and sharks

GIALN a₁₆ l₁₇ g i n : a substance found in the cell walls of kelp that makes kelp flexible so that it can move with the ocean's currents; used as a stabilizer and thickener in products such as ice cream and toothpaste

DOOF NAHCI f₉ o o d c h a i n : typically the progression of smaller organisms being eaten by bigger organisms, which in turn are eaten by even bigger organisms

RKLIL k₂₂ r i l l : a tiny shrimp-like crustacean; the main food source of baleen whales

PIINEDNP p₂ i n n i p e d : a group of marine mammals that have fin-like feet, e.g., seals, sea lions, and walruses

SIRVUOPAO o₂₀ v₁₄ i p₄ a r o u s₁₈ : reproduction by laying eggs that hatch outside the female's body

VIIPRVOAUS v₅ i v i p a r o u s : producing living young that develop from eggs retained within the mother's body and nourished by her blood stream

Why are fish so smart?

B₁ e₂ c₃ a₄ u₅ s₆ e₇ t₈ h₉ e₁₀ y₁₁ l₁₂ i₁₃ v₁₄ e₁₅ i₁₆ n₁₇ s₁₈ c₁₉ h₉ o₂₀ o₂₁ l₂₂ s₂₃!

Blue Whale

Are you ready to test your knowledge of the blue whale? Circle the correct answer on the following ten questions then write the corresponding letter in the numbered spaces below to reveal the answer to the final question.

1. What does a blue whale eat?

- (A) krill (C) squid (B) sharks
 (D) small items found in the mud

2. Which of the following whales does NOT have the same feeding structure as a blue whale?

- (E) killer whale (G) humpback whale
 (F) right whale (H) gray whale

3. The blue whale is the largest living mammal. What is the largest living LAND mammal?

- (M) giraffe (O) hippopotamus
 (N) African elephant (P) grizzly bear

4. What are the lines on the underside of a blue whale's chin called?

- (A) dimples (C) accordion pleats
 (B) chin pleats (D) throat grooves

5. Your heart is the size of your fist. How big is the heart of a blue whale? The size of...

- (E) a grapefruit (G) a Honda Civic
 (F) a beach ball (H) a school bus

6. How heavy is the tongue of a blue whale? The weight of...

- (M) a school bus (O) our tongue
 (N) an African elephant (P) a person

7. Blue whales eat some of the smallest creatures in the ocean called plankton. What feeding structures do they use?

- (Q) sharp teeth (S) gills
 (R) baleen (T) flat teeth

8. Which of the following features do marine mammals NOT have?

- (A) breathes air
 (B) has hair (C) produces milk
 (D) lays eggs

9. How many fins does the blue whale have? (Don't forget the dorsal fin!)

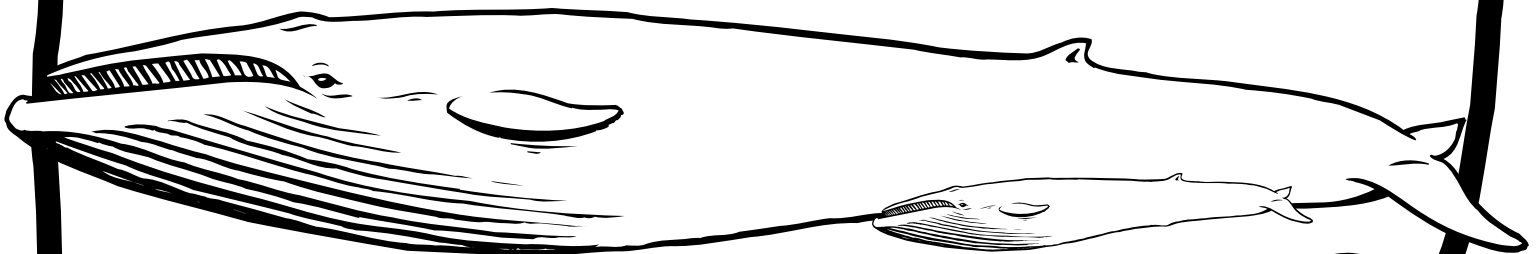
- (E) four (G) eight
 (F) two (H) one

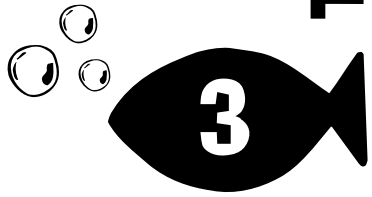
10. How long is this model of a blue whale? (Hint: the baby is 22 feet long)

- (E) 88 feet (G) 33 feet
 (F) 300 feet (H) 10 feet

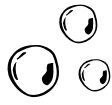
Which list is the blue whale currently on in the United States?

E	N	D	A	N	G	E	R	E	D
10	3	4	1	6	5	9	7	2	8



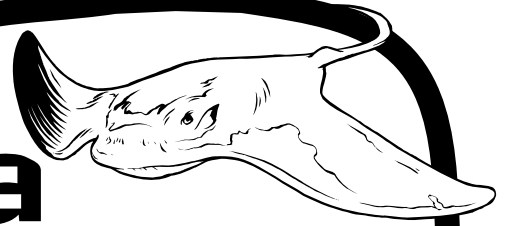


Tile Rubbing Page



Tile Rubbing Page

Southern California Baja



You may know it as seaweed, but kelp is not a weed. Kelp forms forests that provide food and shelter to many animals. Humans also use kelp on a daily basis!



Using the clues below, determine the products you may use everyday that contain kelp.

1. You use this gel-like substance two times each day, once in the morning and once at night, hopefully!!
2. This milk has chocolate syrup in it!
3. After you shampoo, you will need this to make your hair really smooth!
4. Women wear this on their lips to make them look pretty.
5. Our salads would be boring without this poured on!
6. Cake is lonely without this freezing cold treat by its side.

Toothpaste

Chocolate Milk

Conditioner

Lipstick

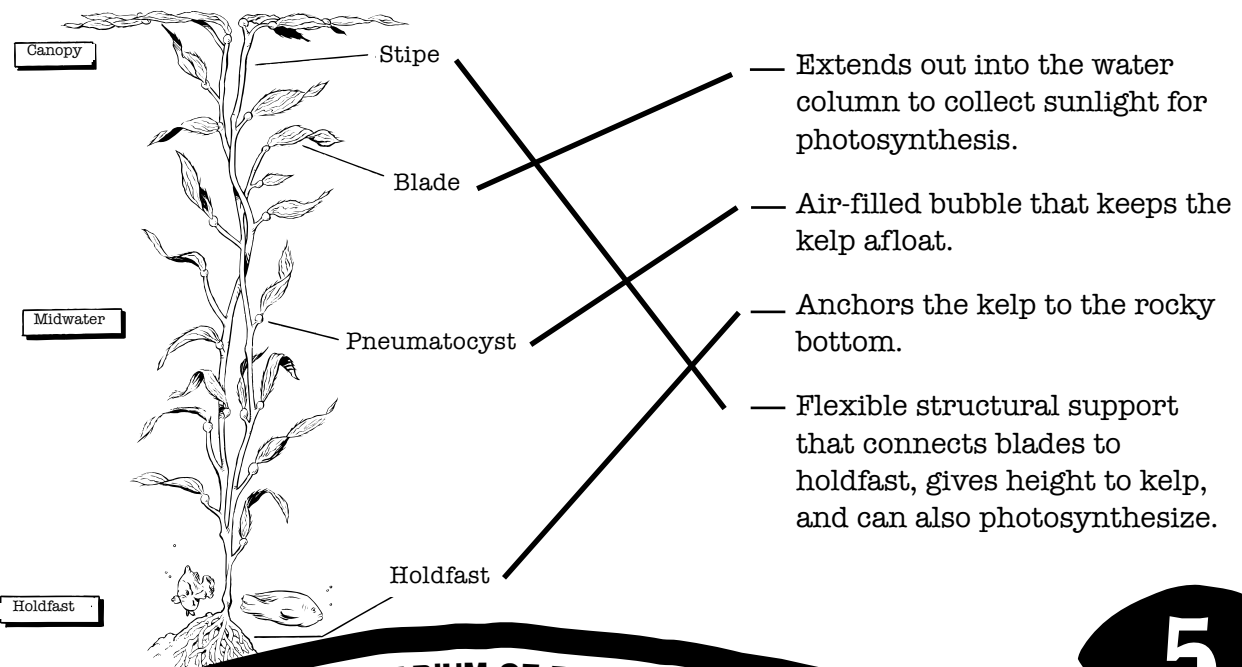
Salad dressing

Ice cream



All of these products are similar. They are all a gel-like substance that have several ingredients mixed together. The substance in kelp that is used, algin, is what helps keep all of those ingredients together in a creamy texture.

Connect the parts of the kelp from the right to their functions on the left.



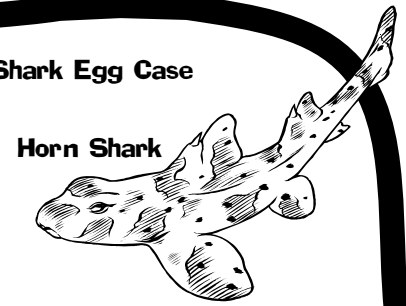
Southern California Baja



Swell Shark Egg Case



Horn Shark Egg Case



Horn Shark

Shark Babies

Sharks reproduce in one of two ways. The first is called Vivipary or live birth, where the baby grows inside of the mother and is born a functioning, smaller version of the mother. The second is called ovipary, where the mother lays egg pouches outside her body and the baby is connected to a yolk for nutrients.

Are horn sharks and swell sharks oviporous or viviporous? Oviparous

Answer the questions below with (T) for true or (F) for false. Fill in the T or F from each question in the appropriate space to complete the saying below.

- T 1. Both the horn and swell shark have five gills slits on each side of their bodies.
- F 2. Horn and swell sharks like to eat people.
- T 3. Swell sharks are named for their ability to swell with water and wedge between rocks.
- F 4. Swell sharks have a spine on each of their dorsal fins for defense.
- F 5. Both horn and swell sharks have large, sharp teeth to help them eat fish.
- T 6. Horn and swell sharks do not need to move constantly to breathe.

Sharks Tend To be Tricksters when Finding Funny Fish to eat.



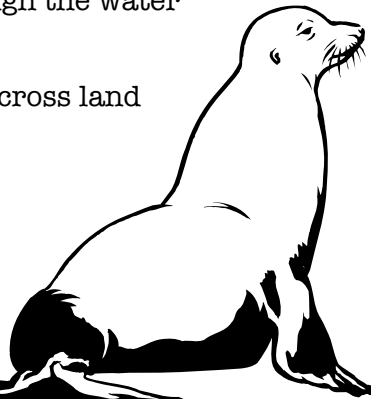
Seal

Pinnipeds

Seals and sea lions look very similar. They both have streamlined bodies, flippers, and whiskers. But there are several differences.

Can you tell them apart? Circle the correct answer for each statement.

- | | | | |
|---|---------------------------------------|---|---------------------------------------|
| 1. Uses hind flippers to propel itself through the water | <input checked="" type="radio"/> seal | sea lion | <input type="radio"/> both |
| 2. Has external ear flaps | seal | <input checked="" type="radio"/> sea lion | <input type="radio"/> both |
| 3. Is a pinniped | seal | sea lion | <input checked="" type="radio"/> both |
| 4. Uses front flippers to propel itself through the water | seal | <input checked="" type="radio"/> sea lion | <input type="radio"/> both |
| 5. Young are called pups | seal | sea lion | <input checked="" type="radio"/> both |
| 6. Uses front and hind flippers to "walk" across land | seal | <input checked="" type="radio"/> sea lion | <input type="radio"/> both |
| 7. Has a long neck | seal | <input checked="" type="radio"/> sea lion | <input type="radio"/> both |
| 8. Has a layer of blubber to keep warm | seal | sea lion | <input checked="" type="radio"/> both |
| 9. Crawls on belly while on land | <input checked="" type="radio"/> seal | sea lion | <input type="radio"/> both |
| 10. Diet is made up mainly of fish | seal | sea lion | <input checked="" type="radio"/> both |



Sea Lion

Northern Pacific

Eat like an Otter!

Sea otters LOVE to eat! They eat 25- 30% of their body weights each day! This means that a 60 pound sea otter would need to eat 15 pounds of food each day.

If you were a sea otter, how much would you eat?

Sample:
100 lbs

X 0.25

25 lbs

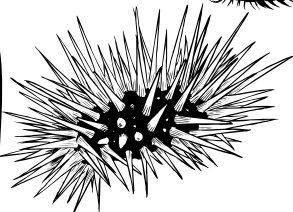
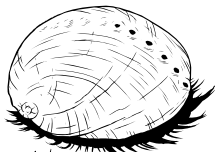
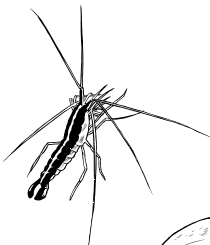
Your body weight

Pounds of food/day
(Don't forget to move the decimal!)

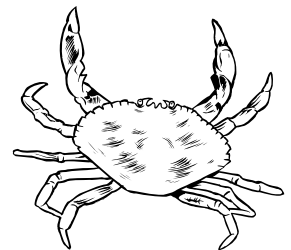


Sea Otter Menu

Most of the animals that sea otters eat have a hard external skeleton so the otters have to use a rock to crack them open. However, some of their food is soft, squishy, and ready to eat! Find nine animals in the word search below that sea otters eat (Hint: the pictures below might give you a clue!). The words may be diagonal or backwards. **Fill in the name of the animal without a hard shell in the blank spaces below to learn a fun fact about it!**



N S K R W S C E F A P D E C U
 N X U M Z V N O X W A U B R F
 C R P P L Z I A W E H D P A V
 B Z X P O Y W O I S R S U B O
 T R B C U T T W E L E C P N V
 M W L R O R C A A E V E E A X
 M A U S Q G U O Y Z D F N P S
 M F X Y V R A T S A E S O S B
 E L C O C L U H U W Z R L V I
 V P Y H E M E N T A E Y A I Y
 T T I S G I L Q Z C P Y B E L
 V N S O P N V F S G T J A Q R
 P U S H R I M P G B N Y Z B
 M W R H B T Q C X R S W Y V W
 U L S A A U B I I I C K Z G Z

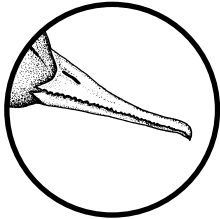


Fun Fact: The Octopus is an animal that uses its suction cups to taste its food!

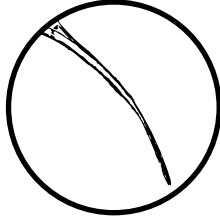
Northern Pacific

Beaks and Feet

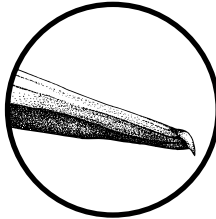
You can tell a lot about a bird just by looking at its beak. Its beak tells you how it eats. **Using the clues under each beak below, connect it to the food that the bird would eat. Circle the beak below that represents the beak of the horned puffin in this exhibit.**



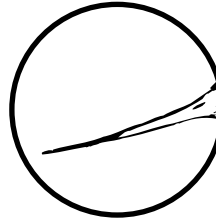
Clue: This sharp-edged beak helps grab and hold large slippery creatures.



Clue: This long, skinny beak goes into holes in the mud to find these tube-dwelling invertebrates.



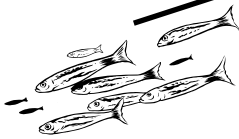
Clue: This long, strong beak is good for collecting many animals at once.



Clue: This long, skinny beak digs into the mud and lifts up to expose these hard shelled invertebrates.



Clue: This small, chunky beak grabs small, slippery creatures.



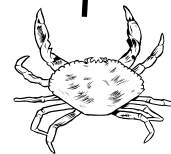
School of fish



Large fish



Small fish



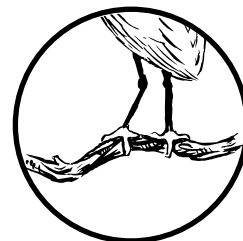
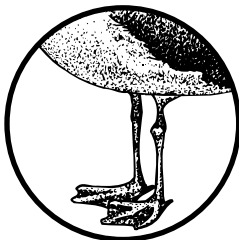
Crabs or other crustaceans



Worm

You can also tell a lot about a bird by looking at its feet. Eagles have huge claws that allow them to swoop in and grab their prey. Shorebirds have long legs that allow them to wade in the water. What do puffin feet look like? What are they adapted to do?

Puffin feet are webbed. Their feet are adapted to swim at the waters surface.

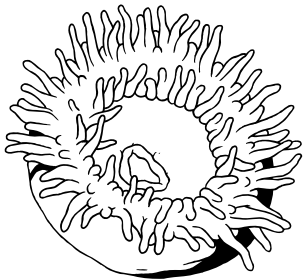


Tropical Pacific

Symbiosis Stories

Symbiosis literally means “living together” and refers to several types of animal relationships. Review the following types of symbiotic relationships, then read each story below and decide which type of relationship each has.

- A **commensalistic** relationship is one in which only one organism benefits and the other organism is not harmed.
- A **mutualistic** relationship is one in which both organisms benefit.
- A **parasitic** relationship is one in which one organism benefits and the other one is harmed.

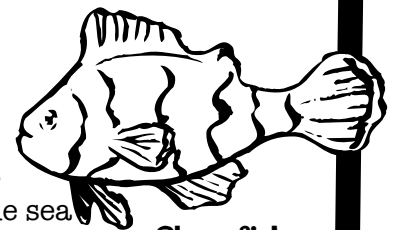


Sea Anemone

Story #1

Clownfish have a mucous coat covering their bodies that protect them from the sting of the anemone. The sea anemone provides protection for the clownfish and in return the clownfish defends the anemone from anemone-eating fish.

Mutualistic



Clownfish

Story #2

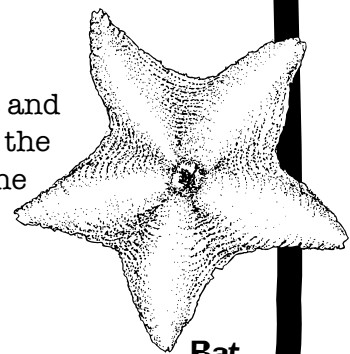
In the tropics there is a species of anemone that attaches to the stem of a fan coral. The anemones continue to reproduce, eventually covering the entire fan coral making it impossible for the fan coral to feed. Fan corals live in areas that have currents rushing by so the anemones are able to collect a lot of food.

Parasitic

Story #3

Bat stars are scavengers. They feed on algae and dead or decaying plant and animal matter. A small worm lives on the underside of the star and eats the same food as the bat star. The worm gets a free ride to its food without the sea star even knowing it has a hitch-hiker.

Commensalistic

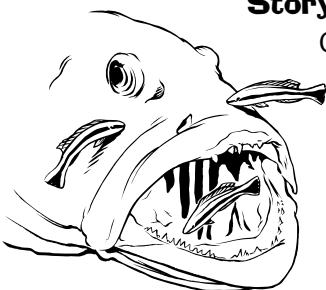


Bat Star

Story #4

Cleaner wrasses are small fish that pick the parasites, loose scales, and other matter off larger fish. This provides food for the wrasses and keeps the other fish nice and clean! It may even feel like a nice massage to the fish being cleaned.

Mutualistic

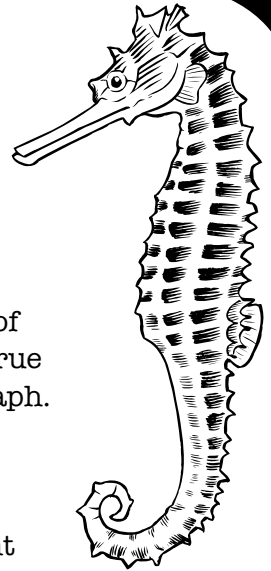


Grouper and Cleaner Wrasse



Tropical Pacific

Liar, Liar



Below you will find a story told by a seahorse and a sea dragon. Most of their story is true, **except for one sentence!** Find the sentence that is **not** true and circle it. Make the sentence true and re-write it below the paragraph.

Seahorse

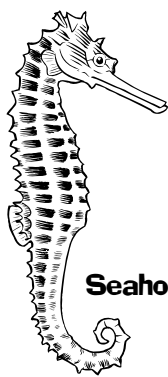
Believe it or not, I am a type of bony fish just like a halibut or a barracuda. However, I have several adaptations that allow me to be different from these and most other fish in the ocean. Since I live in water with a strong current that brings me my dinner, I have a curly tail like a monkey to wrap around seaweed so I don't float away. Even tiny baby seahorses that the females give birth to have these monkey-like tails to help them stay put.

Even the tiny babies, that the males give birth to, have these monkey-like tails to help them stay put.

Leafy Sea Dragon

I am a bony fish too, just like my relative the seahorse. I have leaves all over my body to camouflage me in my sea grass home off the coast of southern Australia. I find these leaves on the ocean floor and place them on my body, much like decorator crabs do. I camouflage in the seagrass to hide from predators and to be able to sneak up on my prey. I have a very large appetite and eat hundreds of mysid shrimp every single day!

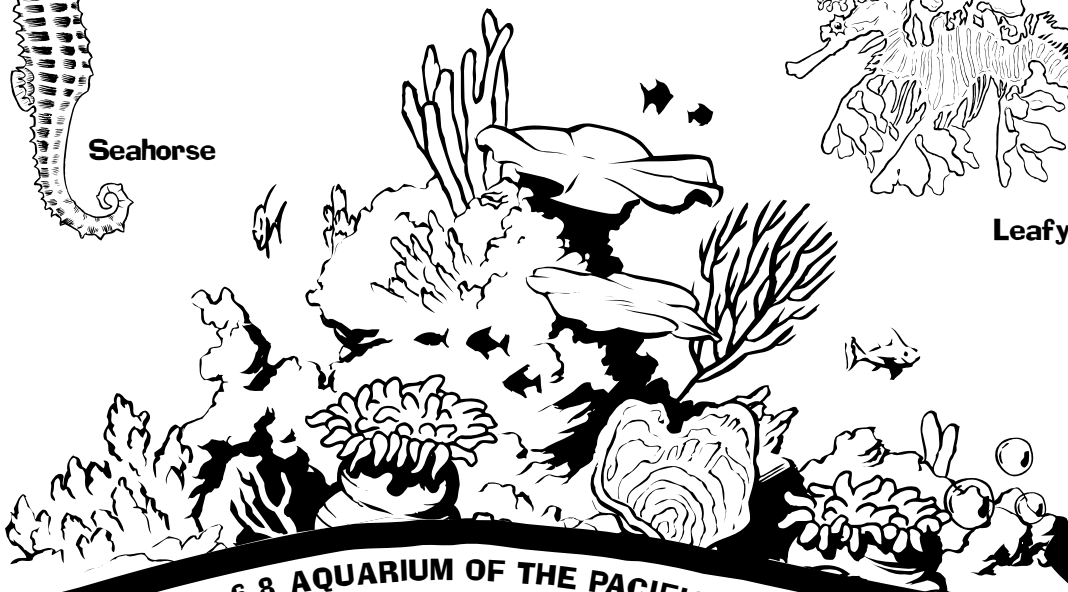
These leaf-like structures grow naturally on my body.



Seahorse



Leafy Sea Dragon



Pre-Post Activities

What's in a Wave?

Materials:

- Aluminum baking pan
- Water
- Handful of cheese puffs



Procedure:

1. Divide students into small groups. Distribute an aluminum baking pan and a few cheese puffs to each group.
2. Fill each of the pans with water and have students place cheese puffs on the water.
3. Have one person in each group blow gently across the surface of the water, but not directly on the cheese puffs. Explain that their wind should be making waves in the pan.
4. Ask the students to observe and describe in drawings and in writings what happens to a cheese puff as a wave passes it.
5. Review how waves are formed. Reinforce the idea that waves are created by energy moving through the water and that the water stays in the same place, only the energy moves.

Learning Extension:

For a class demonstration on wave behavior, place a glass baking pan on an overhead projector and fill with a small amount of water. Turn on the projector. Make waves in the pan by gently tapping it. Place a ruler in the pan to represent an obstruction such as a wharf or a jetty. Observe that the waves seem to move around the ruler and change direction after striking it, producing a calm area in the water's surface. This change in direction is called diffraction. Next, observe the waves that hit the ruler broadside and bounce back toward their origin. This process is called deflection.

Tangled up in Trash

Stretch a rubberband across the back of each student's hand from the thumb to the pinky. Twist the rubberband to make it fit a little tighter. Once each student is "entangled," explain that all the students are marine animals that have just been tangled up in trash. Since they are adapted for the marine environment, they have no hands available to pull the trash off their body. The students must free themselves of the rubberbands without the aid of their other hand, their mouth, or any other part of their body. Wait until some have succeeded and some have given up. Is it easy for marine animals to pull trash off their bodies? What will happen to the animals that are unsuccessful in removing the trash? How did this trash get to the ocean? What can we do to solve this problem?



Filter Feed Like a Whale

Blue Whales, the largest animals on the planet, feed on some of the smallest animals, zooplankton, known as krill. The whales fill their gigantic mouths with water and then use their tongues to force the water out through their baleen, two rows of fringed plates hanging from the upper roof of their mouth. The water gets out but the krill does not.

To demonstrate this filter feeding, take the students outside and have each student fill his/her mouth with a mixture of water and crispy rice cereal. Instruct the students use their tongues to force the water, but not the cereal, out through their teeth. As they eat the cereal left in their mouths, explain the filter feeding habits of a blue whale.

