

Bizarre and Beautiful

Objective:

1. Students will identify and explain the structure and movement of specific marine creatures.
2. Students will be able to differentiate between vertebrates and invertebrates within the specific marine life being studied.
3. Students will be able to give a general explanation of the importance of conserving clean oceans.

Performance Objectives:

Grade 1: Strand 4: Concept 1 – PO 1-3
NGSS: 1-LS1-2-B

Grade 2: Strand 4: Concept 1 – PO 1-3
NGSS: 2-LS4-1

Grade 1 – 2

Key Vocabulary:

- Cephalopod
- Vertebrate
- Invertebrate
- Camouflage

Related Literature:

What Lives in a Shell?
Kathleen Weidner
Zoehfeld

Ocean Life from A-Z
Cynthia Stierle

Secret Seahorse
Stella Blackstone

Wow! Ocean
Robert Neubecker

Background Information:

The ocean is filled with **bizarre**-looking creatures that have found a way to survive in the ocean environment. These creatures have changed in special ways, to be able to live in the ocean or what is called their **habitat**. Their body shape and way their body works have changed over time so they can live in the ocean water.

The seahorse is an interesting and unusual creature. Seahorses are one of the smallest species of **vertebrates**, this means they have a bony skeleton just like humans. These tiny creatures can range in size from 0.9 inch, about as small as your pinky finger, to 12 inches, which is the same length as a ruler. They live their

lives in warm tropical waters around the world and can be found in reef areas where they can find food.

Seahorses have a very special type of skin that allows them to change colors to match the plants around them. This is called **camouflage** does anyone know another animal that can camouflage? The seahorse can blend in to the color of a piece of sea grass to stay protected from **predators**. Both tiny and difficult to see, the seahorse can live up to 6 years in its ocean habitat.

A seahorse is also known for the shape of the head. The long nose, which looks like that of a horse, is used to suck up food. Seahorses eat brine shrimp, plankton, and algae. Their eyes can move in all different directions at the same time to help them watch for predators while they enjoy a fresh meal. The long tail of a seahorse is used to glide through the water and can be used to cling onto plants.



Another interesting thing about the seahorse is that the male seahorse is the one who gives birth to its young. The female lays eggs, but then the male seahorse stores them in a special pouch on the front of its body and carries them around. In about 3 weeks, the dozens to hundreds of eggs hatch and the seahorse pushes the babies out of the pouch. Baby seahorses look just like the adults, except they are very tiny.

Just like their parents, the baby seahorses use their fins to carry themselves to shelter. They will wrap their tails around a piece of sea grass and begin life on their own.

There are about 47 species of seahorses found in the world. They are considered highly endangered because of loss of habitat, pollution, and over-fishing. Since seahorses prefer the shallower waters, changes to the water quality have a big impact on seahorses and their food supply. **Conservation**, which means to take care of our natural world and education may be the most important way to protect these bizarre and delicate creatures.

The seahorse has bony plates around its body that protect it from predators. The plates cause the seahorse to move by gliding, unlike how other fish move. On top of the seahorse's head is the 'coronet.' Resembling a crown, the coronet is as unique to the seahorse as a fingerprint is to a human.

Octopus

An **invertebrate** is an animal that does not have a bony skeleton. What is the smallest invertebrate in the ocean? You guessed it, the octopus! This eight-legged bizarre creature is known as a **cephalopod** and is part of the family of creatures that has flexible movement. Like their friends the jellyfish, octopus move by using **propulsion**, which means they move in the opposite direction as the water being pushed against their body. Living mainly on the ocean floor, the octopus can shoot itself quickly through the water or into a small crack in the rocks to hide. The soft body allows the octopus to fit into any space so long as it the size of its eye or beak.

There are about 300 different species of octopuses each species has adapted to different habitats. The largest, the giant octopus, can grow up to 23 feet (that's 23 rulers end to end) from arm to arm and weigh about 400 pounds, while the smallest is less than an inch long. Known for its building skills, the octopus often collects shells to construct a home where it can hide from larger creatures. Oceanographers refer to this type of home as an octopus garden. Female octopuses lay their eggs in these homes for protection.



The octopus has suction cups are on the underside of its arms. There are two rows of suction cups that go all the way to the tip of each arm. These help it grab tightly to almost any surface. The '**beak**' is the mouth of the octopus and is located at the center under the body. The beak is used to break apart the food such as crabs, shrimp and clams.

While each species of octopus is different in some way, they all have adapted to life in the ocean. The eyes of the octopus are located on each side of its head and provide a great view of the surroundings. Octopuses cannot hear but instead very good eyesight. An octopus has three hearts and each serves a purpose. Two hearts pump blood through the gills so the octopus can breathe and the other heart pumps blood through the rest of its body.

If an octopus feels threatened, it can shoot out black 'ink' to cloud the water and make a fast getaway. Another master of disguise, the octopus can mimic its



surroundings by altering its shape and color. **Chromatophores** are the cells in the skin of octopus and other Cephalopods that help them change color and texture.

Jellyfish

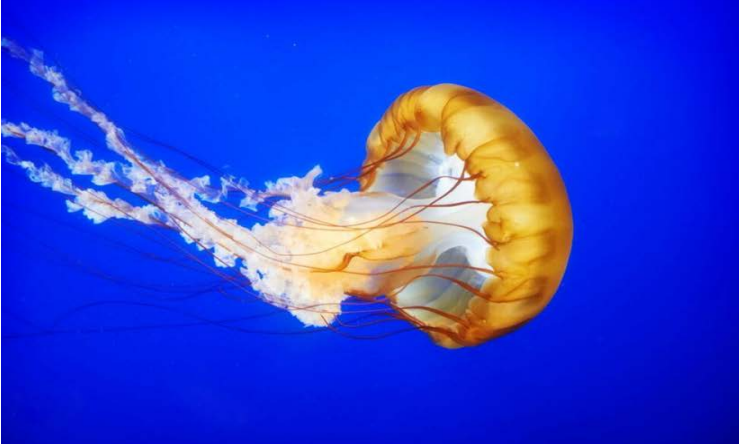


Jellyfish are **invertebrates** that live in the ocean without a brain, skeleton. So, what does a jellyfish have in its body? These creatures are filled with a jelly-like substance called **mesoglea**. They are part of the group of creatures that also includes sea anemones and corals. Because they are an invertebrate they do not have backbone, this means even though they are called jelly “fish” they are not true fish.

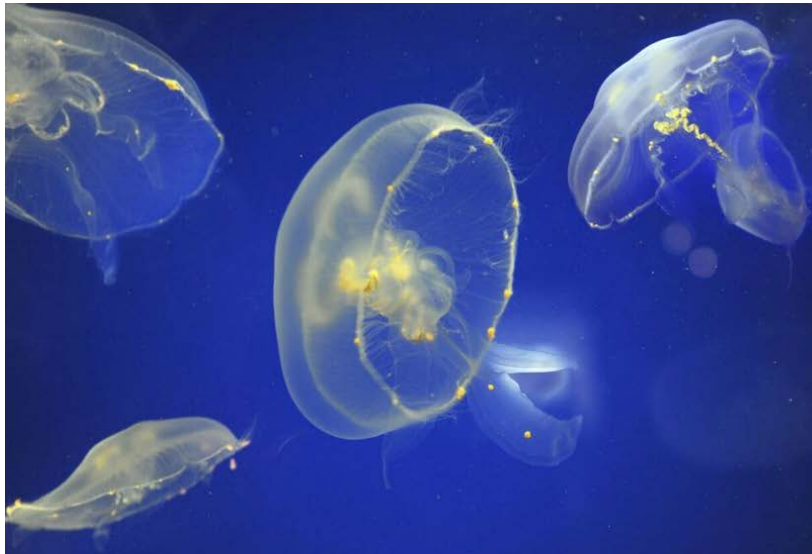
Jellyfish have a central body with long and short tentacles. Most jellyfish have stinging cells on the tentacles. These cells allow the jellyfish to catch prey. Its mouth located under the center of the body. The preferred diet for a

jellyfish is fish eggs, fish larvae, plankton eggs, small plants, and even other jellyfish. Natural predators of jellyfish are large fish and turtles.

In the wild, jellyfish live about a year, depending on the species. In the **medusa** (adult) stage of the life cycle, the jellyfish can float with currents as its tentacles hang down into the water. The young produced by both male and female jellyfish float down to the ocean floor landing on rocks or shells and begin to grow quickly. As an adult, the jellyfish will drift along in the ocean.



Jellyfish can be found around the world and have been seen in some areas floating in large groups of thousands, which scientists call a 'bloom.' It is believed that blooms occur when ocean currents come together. While no one is completely sure what causes blooms, scientists are studying them.



Moon Jellies

Lionfish

Among the bizarre creatures that swim in the deep are the spiny lionfish. These beautifully colored fish are a species to stay away from. The lionfish have venom on the tips of the fins used for self-defense if a predator gets too close. Of course, the flashy colored fins can attract prey too. These meat eaters like to eat fish and crustaceans, often using a surprise attack to catch prey while swimming and hunting during the day.



Lionfish can grow up to 16 inches long and are known for their beautiful stripes. Lionfish prefer being alone and defending their personal territory. Which may be a small patch or coral or cervices, they will defend it by ether biting or stinging. In the wild, lionfish can live up to 15 years.

Once native to the South Pacific and Indian Ocean, lionfish are now found in many other warm water areas of the ocean. These slow movers rely on their venom to keep them safe from predators like eels and bigger fish.

Scientists have reported that lionfish produce young rapidly and in large numbers, which can have a negative impact on habitats. Since they have few natural predators, large numbers of lionfish can consume the food supply in a habitat very quickly. For example, lionfish were introduced to the Atlantic Ocean when people released their aquarium pets, and now there are thousands of lionfish that are eating the food supply of other types of fish. Lionfish are not currently considered endangered or threatened.

Crabs and Lobsters

Meet some members of the group of animals called **crustaceans**, including crabs and lobsters. Crustaceans are known to have a shell, or exoskeleton, jointed legs



and sometimes claws! There are numerous species of crabs and lobsters living in the oceans of the world.

Crab and lobster have shells called a carapace which functions as an **exoskeleton**. An exoskeleton is external skeleton that supports and protects an animal's body. The shell will be shed as the crab grows. The process is called

molting, and it takes place often in young crabs and less often as adults. Crabs have legs and claws to move them along and assist them in catching food.

Lobsters are **crustaceans** that live on the ocean floor. Lobsters can be found on the open sandy floor or in rocky crevices where they can tuck their body away from predators. Lobsters have ten legs and poor eyesight. Using a keen sense of smell, lobsters locate their favorite food, fish, and mollusks. Some lobsters like Maine lobster are known for their very large claws, but California Spiny Lobsters do not

have claws and instead have spines covering their body for protection. Lobsters also shed their shell to grow and can live in the wild for 50 years.



For many years, lobsters have faced the fate of the dinner plate. Being considered a delicacy, lobsters have been fished and provided as food for humans around the world. The commercial lobster trade may have contributed to the decline in certain species of lobster.

As with any marine species, humans must continue conservation efforts to manage clean oceans and clean air for the balance of life on earth to be maintained.

California Moray



California Moray Eels live in the Pacific Ocean off the coast of California in the reef rocks and crevices. While you may only see the moray's head, he has a long snake-like body with no fins or scales. The moray has sharp, pointed teeth that come in handy as he dines on fish, shrimp, and octopus. In the wild, the moray can live about 30 years. They can grow up to be about 5' long.

His skin provides a protective film of mucus to help the moray avoid being injured as he swims in and around rocky areas. These morays share their homes with red rock shrimp that live in a mutually beneficial relationship with the eel. The shrimp crawls inside the moray's mouth to eat bits of food stuck to his teeth. The moray eel gets his mouth cleaned while the shrimp gets the bites of food. Both creatures benefit, unless the eel bites down too quickly!



Cleaner shrimp

Sea Anemone

If you look at a Sea anemones you may think it is a plant when it is an animal. They are related to jellyfish, because they have stinging tentacles around a mouth. Sea anemones attach themselves to the ocean floor, reef rocks, and corals. Their beautiful tentacles wave in the water attracting prey that will fall victim to the sting of their venom. There are over a thousand varieties of sea anemone that all have a stinging touch to paralyze prey before the prey is carried into the anemone's mouth.



Even though Anemones can sting animals still live around or in them, the most famous being the clown fish. Clown fish are immune to the sting of the anemone and can swim freely in and within the tentacles. The clown fish help keep the anemone clean while the anemone provides protection for



the clown fish. That is another mutually beneficial partnership.

Sources: National Oceanic and Atmospheric Administration (NOAA); U.S. Fish and Wildlife Services; Alaska Department of Fish and Game; Jellywatch.org; National Geographic; South Carolina Department of Natural Resources; Aquarium of the Pacific; A-Z Animals. Photos: OdySea Aquarium; Public Domain.

Additional Resources:

Sea Horse Birthing Video: https://www.youtube.com/watch?v=b_nEA3dtOZs

Pygmy Seahorse Camouflage Video:

<https://www.youtube.com/watch?v=Q3CtGoqz3ww>

Mimic Octopus: <https://www.youtube.com/watch?v=os6HD-sCRn8>

Octopus Squeezing through Hole:

<https://www.youtube.com/watch?v=949eYdEz3Es>

Jellyfish Life Cycle: <https://www.youtube.com/watch?v=U7aqO1L8gXA>

Lionfish Hunting: <https://www.youtube.com/watch?v=JxSPWOxYu7Y>

Crab Molting: <https://www.youtube.com/watch?v=4QIgW639Oog>

Eel Feeding: <https://www.youtube.com/watch?v=taguVjkRXtl>

Procedures and Activities:

1. State the learning objective. Review previous instruction as it relates to the topic.
2. Review vocabulary and additional words as needed.
3. Read related literature and follow-up with discussion and open-ended questioning.
Ask students about their experience with the ocean or aquariums.
4. Discuss marine life and have students suggest different marine animals. Review the concept of a habitat and the relationship with certain marine animals.

5. Discuss how aquariums offer an opportunity for people to see marine life and how aquariums are protecting marine species.
6. Discuss the difference between vertebrate and invertebrates as it relates to marine animals. Ask students to give examples of each.



Indicates ‘take along’ activity.

Activity: Students create their own aquarium picture by using construction paper as a base. Students outline the space of the aquarium on the construction paper. Be sure there is about an inch border around the edge of the paper. Students cut out or make their aquarium animals and plants from other colored paper. Determine the bottom of the aquarium and students glue glitter as the bottom about 1-2 inches. Next, place and glue the plants and animals in the aquarium. Once the picture is dry, cover the top with a clear sheet of plastic wrap. Secure one side first by taping it to the back of the construction paper. Students will need help to get the plastic wrap smooth. Secure all 4 edges with tape. Once in place, the aquarium is complete.

Materials: Construction paper (shades of light blue); Cut outs of fish, anemones, seahorses, shells, octopus, aquatic plants, etc.; Option: students make their own marine creatures and plants with other construction paper. Glue; glitter; tape; scissors; clear plastic wrap.

Activity: Prior to the fieldtrip and after discussing the ocean, students decorate the classroom with sea creatures. Students use construction paper to create fish, starfish, sharks, crabs, lobsters, penguins, otters, etc. and hang them around the room. Talk about visiting the aquarium to see these creatures.

Materials: Construction paper; scissors.

Activity: Cover work tables (centers) with bulletin board paper. Play ocean wave music and students rotate about every 5 minutes (when the music stops) to each table. While at the table, students use crayons to draw ocean animals. As each group goes to a new table, they add to the drawings. Once the activity is complete, the drawings become ocean murals to be displayed in the classroom.

Materials: Bulletin board paper; crayons, ocean music.

Activity: Students have an opportunity to create an ocean animal out of clay.

Display a few pictures of various ocean animals so students have a guide for their clay figures. Using art clay, students create a creature to display. When the activity

is complete, each student gets to show the animal and tell others what it is and how it lives.

Materials: Art clay

Activity: ‘Label the Seahorse’ provides a check for understanding and can be used prior to or as a follow-up to the fieldtrip.

Activity: ‘Got Bones?’ allow students to make connections with animals and their internal anatomy. Students are able to demonstrate their understanding the difference between invertebrates and vertebrates with this activity.

Activity: ‘Color the Seahorse’. After discussing how many seahorses can change color to match their environment, students color the seahorse and select unique colors for the environment around it.

Activity: ‘Day at the Beach’ is a snack activity. Students will enjoy creating this ocean-related snack.



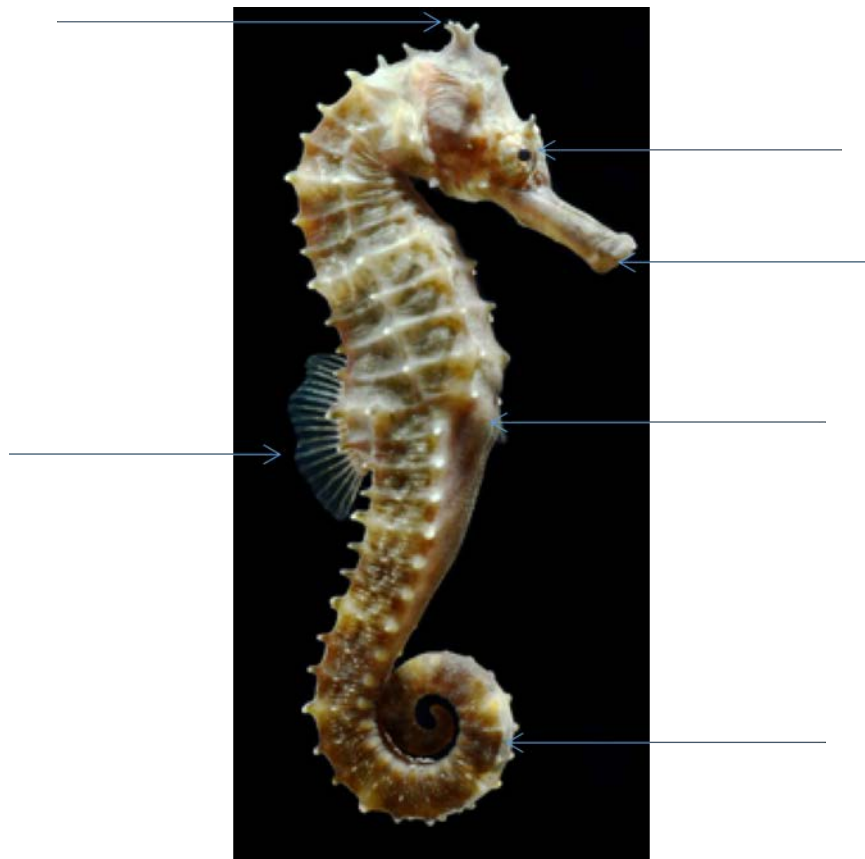
Activity: ‘Bizarre Scavenger Hunt’ is a take-along activity. Students can carry the sheet and answer the questions as they visit the aquarium. The activity can also be a follow-up to the fieldtrip.

Reflections and Assessments:

Students are assessed on varied levels depending on the activity. Participation, grade standards, and percentages may be applied to each activity. Activities are designed for flexibility and use pre-visit or as a follow-up to the visit.

Most activities meet the STEM guidelines.

Label the Seahorse



Word Bank:

Coronet
Tail

Snout
Fin

Eye
Pouch (males only)

Adaptations:

How does the tail of the sea horse help them survive?

How does the snout help the sea horse survive?

What is the males pouch for?

Got Bones?

A *vertebrate* is an animal _____ bones.

An *invertebrate* is an animal _____ bones.

Match the animal as an invertebrate or a vertebrate

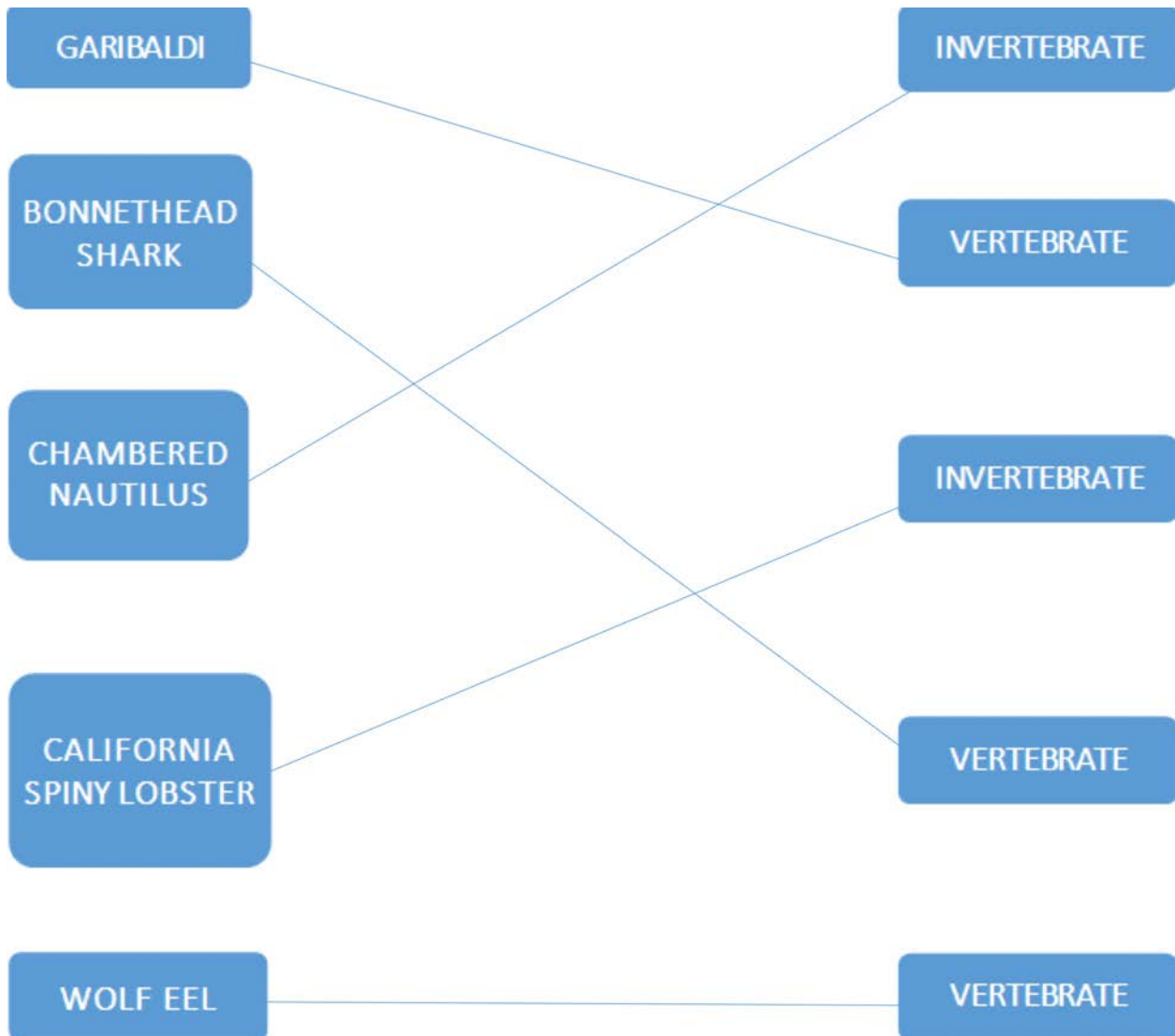
GARIBALDI	INVERTEBRATE
BONNETHEAD SHARK	VERTEBRATE
CHAMBERED NAUTILUS	INVERTEBRATE
CALIFORNIA SPINY LOBSTER	VERTEBRATE
WOLF EEL	VERTEBRATE

Got Bones? (Key)

A *vertebrate* is an animal _____ **WITH** _____ bones.

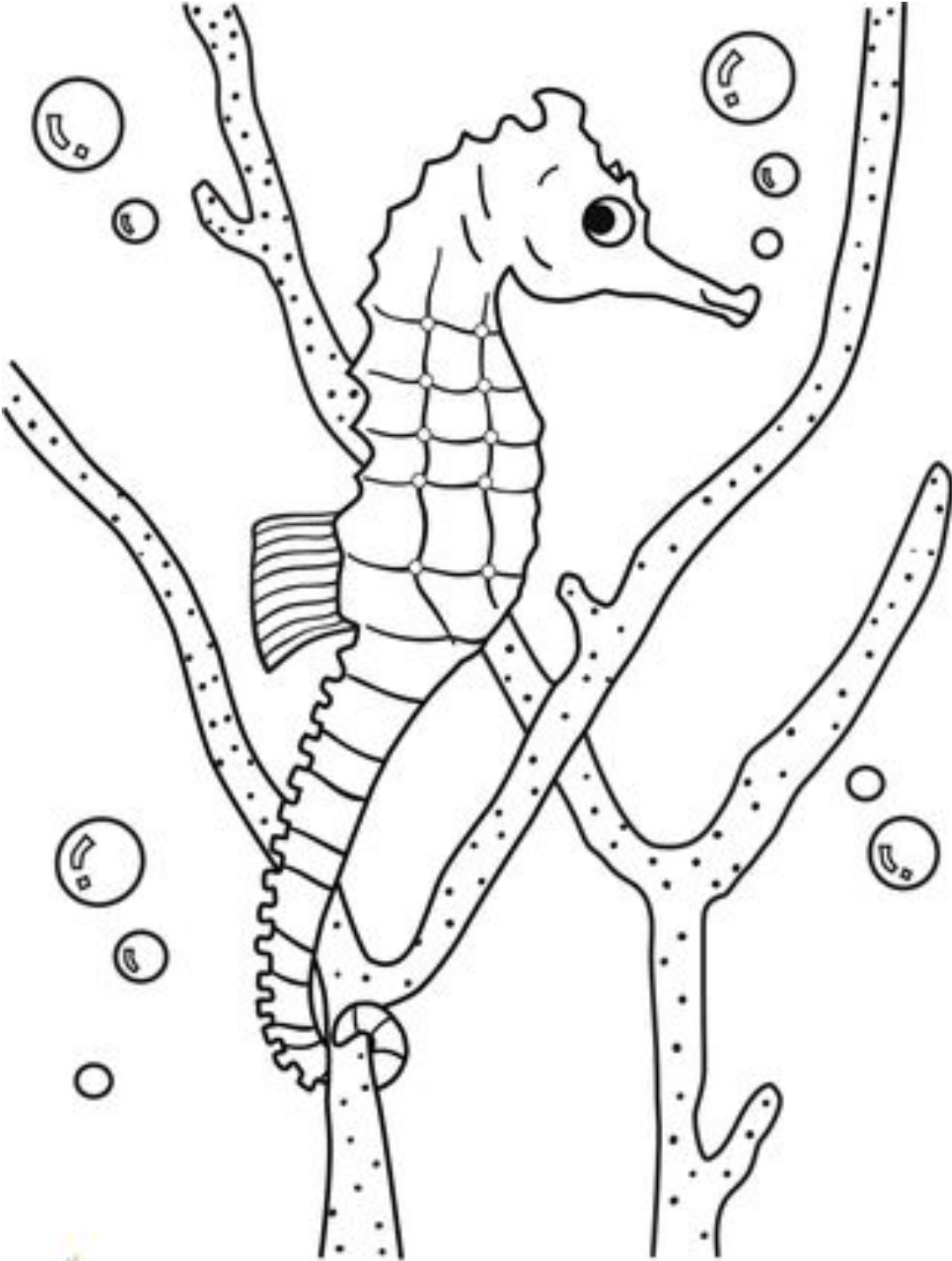
An *invertebrate* is an animal _____ **WITHOUT** _____ bones.

Match the animal as an invertebrate or a vertebrate



Color the Seahorse

Color the sea horse to *camouflage* into its habitat.



Day at the Beach



Any ocean day makes a student hungry for a snack. This ‘Day at the Beach’ snack is easily prepared ahead of class or students can create it in class.

Materials: Paper umbrellas; whole graham crackers; blue frosting; crushed graham cracker crumbs (for sand); fish sprinkles.

Spread the icing on the whole graham cracker. Sprinkle a few crumbs at one end of the cracker to represent beach sand. Add a few fish sprinkles and poke the paper umbrella in the cracker.

A Day at the beach snack for all!



Bizarre Scavenger Hunt



What am I? _____

How large can I grow? _____



What am I? _____

How did I get my name?



What am I? _____

How long have I been around?



What am I? _____

What protects me? _____



What am I? _____

Which habitat am I found?



Bizarre Scavenger Hunt (Key)



What am I? Spotted Eagle Ray

How large can I grow? 16 feet long, 10 foot wingspan



What am I? California King Crab

How did I get my name? My spines resemble a king's crown



What am I? Chambered Nautilus

How long have I been around?
500 million years



What am I? Lionfish

What protects me? Venomous spines



What am I? California Moray Eel

Which habitat am I found? Rocky Reefs or tidepools