ORGANISMS AND THEIR ENVIRONMENT

Grades 3-5

3rd grade
TEKS 9.ABC, 10.AB

4th Grade
TEKS: 7B, 9B, 10A

5th Grade
TEKS: 7B, 9AB, 10A

Nikki Fitzgerald - Coastal and Marine Resources Extension Agent

Teacher Resources:

Engage: 10 - 15 minutes

Materials needed: student engage page

- Teacher can show picture of a rock and a fish.
- Teacher asks students what makes the fish living compared to the rock.
- Explain that biotic means living and abiotic means non-living
- Read short passage about the flounder and read statement questions to determine what biotic trait it is discussing.
- Fill in the t-chart writing all the things that are living and non living

TAMU-SG--20--403

Explore - 30 minutes

Materials needed:

- clear tub (15 to 18 qt)
- playground sand
- expo markers
- panty hose (optional to place shell in to make reef)
- oyster shell / shell
- plastic binder dividers
- fake plastic grass pushed in styrofoam and hodge podge
- student explore sheet
- small plastic toy organisms (fish, crab, etc.) or laminated bay organisms

Instructions

- Students will be in groups with one tub half filled with sand.
- Begin with just sand and water in the ecosystem and ask students if they can identify any biotic organisms (none present).
- Have students draw a before line with expo marker of the sand on the outside of the box
- students will use plastic binder dividers to push 10 waves onto the shoreline.
- Students will draw after line to show how much shoreline erosion happened
- Ask students what biotic organism could we add to this ecosystem to help with erosion and to provide habitat to animals.
- Have students reset the sand
- Place grass, oyster reefs (shell in panty hose) and animals in estuary and have them design their living shoreline
- Have students do before shoreline mark, make 10 waves, and do after shoreline mark
- Answer Discussion Questions

Explain part 1 - 20 minutes

Materials needed- student worksheets

Instructions

- Have students read aloud passage about animal adaptations and ecosystems
- Students will fill in vocabulary blanks and short answer questions

Explain part 2 - 20 minutes

Materials needed- student worksheets

Instructions

- Have students get in groups of no more then four.
- Give students one of the four marine organisms to read about.
- Students will fill out graphic organizer about their marine animals
- Everyone will share their information about their marine organism with the rest of the group.

Elaborate - 30 minutes

Materials : yarn, animal cards, student instructions and questions, large area for a circle

Vocabulary
carnivore – an animal that eats only animals
community – all the plants and animals that live in one place, and that interact and depend on one another.
energy – the capacity for change: all living things need energy from food to live and grow.
food chain – transfer of energy in sequence, for example, from green plants, to animals that eat plants, to animals that eat other animals.
food web – a network of food chains that are interconnected within a particular community.
herbivore – an animal that eats only plants.
interact – to influence one another
omnivore – an animal that eats both plants and animals

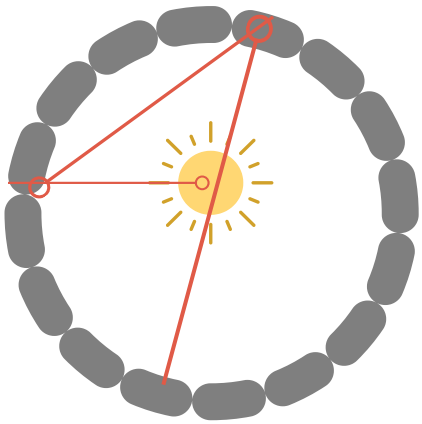
Instructions:

1. Print out pictures of members of the reef ecosystem and use yarn to create signs students can wear around their necks. You need only need one sun!

2. Define a food chain, food web, producers and consumers for your students: write the words sun, phytoplankton, jellyfish, and sea turtle on the board and draw pictures to symbolize each one. Share with students the idea that phytoplankton gets its energy from the sun, the jellyfish gets energy by eating the phytoplankton, and then the sea turtle gets its energy by eating the jellyfish. Explain that most animals eat more than one thing. Tell them that the transfer of energy through food between life-forms in an ecosystem is called a food web.

3. Take students out to playing area, and have them form a large circle. Give everyone an animal card to wear. Have them introduce themselves as a producer or a consumer.

4. Have the person who is wearing the sun card hold one end of the string. Explain that the ball of yarn represents sunbeams or energy from the sun. You might explain if there was arrows that the arrows would point in the direction that the way energy flows. Ask the student representing the sun to hold the end of the yarn tightly and toss the ball to someone who can use that energy (producer). When a student representing the producer catches the ball of yarn, he or she should hold a piece of the yarn and throw the ball to someone else who could use the energy or whatever would eat a plant. Keep the yarn going asking the students what would what would eat what and is the energy increasing or decreasing. Once you get a food chain made you cut the yarn or use another ball of yarn to start another food chain. It may look like this below.



5. Continue building the web until all the students is holding string at least once. Some students may hold multiple strings. Direct students to gently and carefully lay the yarn on the ground so that the web stays intact. Have them step back and notice the pattern created by the interaction of organisms.

6. Explain that many factors can disrupt a food web: pollution, overfishing, and habitat destruction. The leader could ask what would happen if a species were removed from the web. Have a student pull on the strings they hold; anyone who feels a tug is directly affected by that organism. Those “organisms” affected directly could then pull on their strings and more organisms are affected. Have different students pull on their strings. When the “sun” pulls on its string, everyone should be affected. Have some organisms drop their string (become extinct) and see who is affected. Have students tell you if certain populations will grow or decline.

7. Have the students pick up the yarn again. Explain that many factors including pollution, habitat destruction, and overharvesting resources destroy ecosystems.

8. Discuss what would happen if all of the predators were removed. Some species might exhaust their food supply and starve, but others will continue to reproduce only until the food supply becomes limiting or their interactions limit population size.

Question Answers:

Have we made food chains? (Yes, lots of them!)

What do all of our food chains together look like? (A food web.)

What is the difference between a food chain and food web? (A food web is made up of several food chains. A web is more complicated than a chain because it has connections among the chains.)

Who is holding the most pieces of yarn? (The sun.)

Why? (Because each food chain starts with the sun.)

Who else is part of many food chains? (Green plants)

Evaluate:

Have students fill out the evaluate quiz

Answers:

1. C
2. C
3. B
4. D
5. B
6. A
7. D
8. A
9. C
10. A

Engage:

Name:_____

Living & Nonliving

Biotic = Living

Abiotic = Nonliving

Read the passage about the flounder fish.

Flounder are the largest flat shaped fish in Texas. Flounder's have cool adaptations, like their eyes are on the "up" side of their head, and they are good at camouflaging themselves! Small flounder grow rapidly and may reach 12 inches in length by the end of their first year. Adult flounder leave the bays during the fall for spawning (reproduction) in the Gulf of Mexico. The female flounder can lay up to 50,000 eggs. Juvenile or baby flounder undergo eye metamorphosis where their right eye moves over to the left side of their body when they are about a quarter to half inch long. After metamorphosis, the juvenile flounder will migrate to the estuary or bay and live in the sea-grass habitat. The flounder's favorite snack is the mud minnow. A flounder will breathe by taking in water in its mouth and forcing it over it's gill passages. The oxygen passes over the gills and moves into its bloodstream making it's way to it's cells.

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BIOTIC & ABIOTIC

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After reading the flounder passage, read the statements and circle what biotic characteristic the statement is talking about!

1. Small Flounder grow rapidly up to 12 inches in their first year of life!

- Growth
- Reproduction
- Takes in Nutrients
- Changes or moves
- Breathes

2. The female flounder can lay up to 50,000 eggs!

- reproduction
- Takes in Nutrients
- Growth
- Changes or moves
- Breathes

3. Flounder's favorite snack is the mud minnow!

- Growth
- reproduction
- Takes in Nutrients
- Changes or moves
- Breathes

4. Flounder goes through metamorphosis as their eye moves to the left side of their body!

- Growth
- reproduction
- Takes in Nutrients
- Changes or moves
- Breathes

5. A flounder will breathe by taking in water in its mouth and forcing it over it's gill passages.

- Growth
- reproduction
- Takes in Nutrients
- Changes or moves
- Breathes

STUDENT NAME: _____ TEACHER: _____

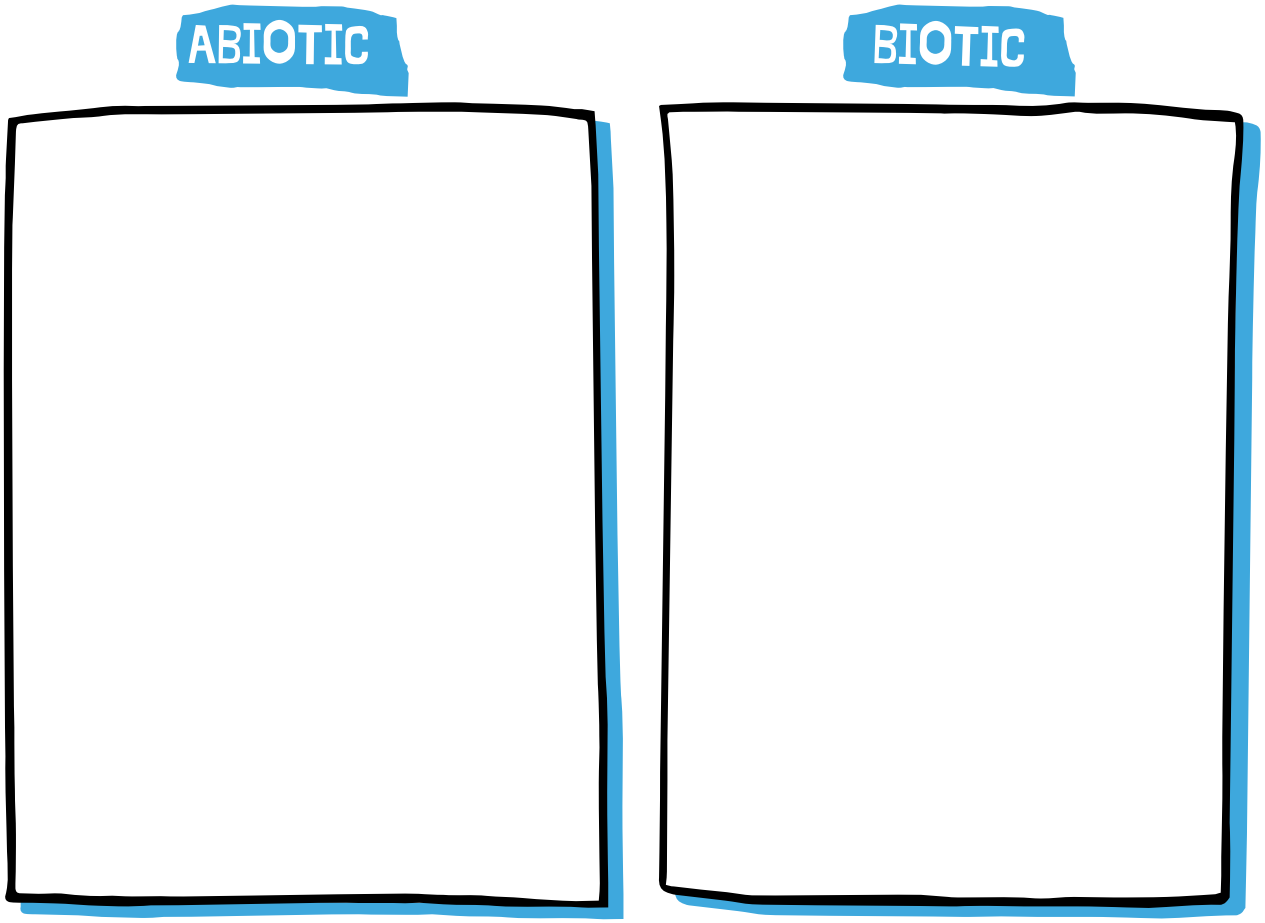
CLASS: _____ DATE: _____

Name _____ Date _____ Year _____ Teacher _____

ABIOTIC AND BIOTIC

After Reading about Flounders place the words below under Abiotic (non- living) or the biotic (living) categories.

water, fish, sea grass, soil, oxygen, minnows, oysters, rocks



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Explore

ESTUARY ECOSYSTEM

Name_____

Estuaries connect land and sea. An estuary is a partly enclosed body of water located at the edge of land and are often called bays, harbors, inlets, swamps, marsh, lagoons or wetlands. They are the nurseries of the oceans with many fish and shellfish spawning there. Estuaries are rich in nutrients providing food and a habitat for many organisms. The estuary is an ecosystem – a group of living and non-living things interacting with each other. The physical environment of the ecosystem is the habitat in which organisms live. Today you are going to construct a mini estuary and explore how a living shoreline functions.

Part 1 - Coastline 1 (Abiotic, Non-living shoreline)

Instructions:

1. Get in small groups at a mini estuary filled with sand and water.
2. Trace the shoreline on the side of estuary box with an expo marker and draw a before picture in the chart below.
3. Take a wave paddle and create 10 waves on the coastline.
4. Trace a new shoreline after creating the waves to show how much coastline was damaged by erosion

Before	After

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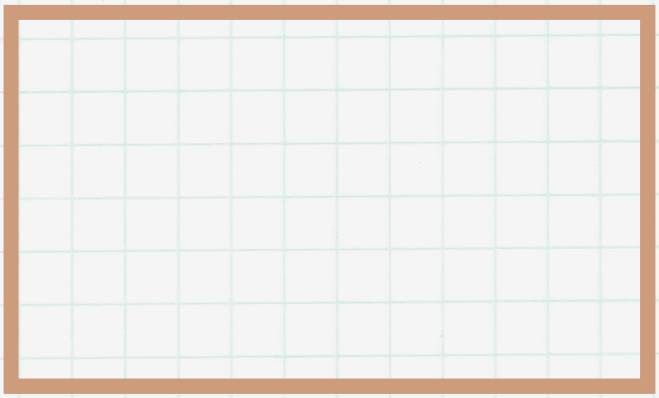
Explore

Part 2 - Coastline 2 (biotic, living shoreline)

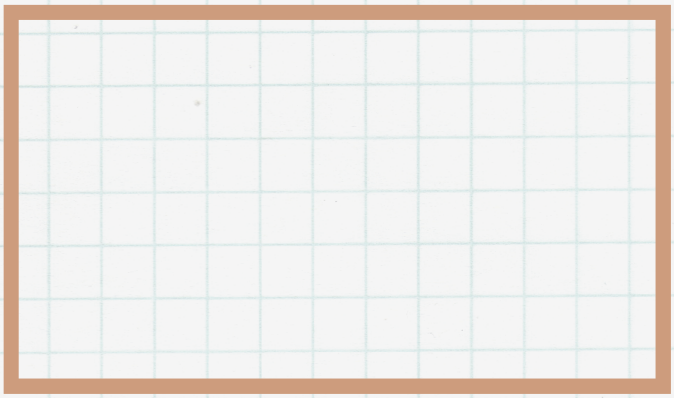
Instructions:

1. Erase the shoreline marks on the side of the box from part 1 and reposition the sand in the box
2. Your teacher will bring you some sea-grass, oyster shells, and organisms to construct a new estuary living shoreline
3. After designing your new shoreline, trace your shoreline on the side of your mini estuary box and draw in the chart below
4. Create 10 new waves using the wave paddle and trace a new shoreline on the side of the box and sketch the after shoreline below

Before



After



Questions

1. What was the difference between the two coast lines in part 1 and part 2 of this activity?

2. Which coastline had the **least** amount of erosion and why?

3. List all the **biotic** and **abiotic** features of Coastline 2.

Biotic -

Abiotic

4. Describe how the different organisms are interacting with each other in this ecosystem.

-

Explain part 1

Animal Adapations & the Environment

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An ecosystem is a community made up of living and nonliving things in their environment. Organisms interact with their environment every day. These interactions help organisms survive. Some organisms have special **structures** that help them function in the ecosystem like certain body colors or fins on the side of a fish that help them swim in the water. A flounder fish survives in its ecosystem by swimming close to the bottom of the sea floor. Flounders can quickly **camouflage** or blend in with the sand on the sea floor. This helps them hide from predators. **Mimicry** is another survival technique to help organisms survive by two organisms imitating each other. For example, A toby pufferfish and a file pufferfish look like each other but the toby is poisonous and the file is not. Predators do not want to eat either fish in fear of being poisoned. Many organisms are born with certain behaviors called **innate behaviors** that help them survive like the knowledge to know how to eat or breath. Organisms also learn behaviors from their parents like the ability to hunt and these are called **acquired behaviors.** Some animals go into a deep sleep during the winter to survive and conserve energy and this is called **hibernation**. Another survival technique is **migration.** Most sea turtles migrate between foraging and nesting grounds, and seasonally to warmer waters. Often these migrations take them hundreds and even thousands of miles. Both males and females will migrate to nesting areas to breed, generally in the area where they were born. Sometimes animals will migrate to be able to survive when food and water is low or a natural disaster has occured.

name _____ class _____ teacher _____ date _____

Explain

Animal Adapations & the Environment

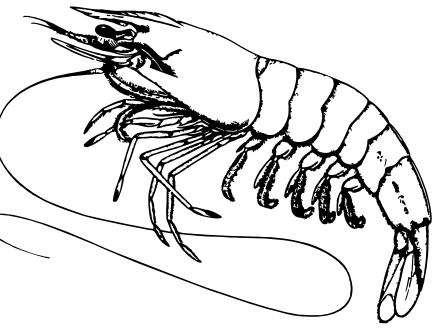
Fill in the blanks

1. The physical adaptation of an animal to blend into their environment is called _____.
2. The animal's ability to imitate another animal is called _____.
3. An animal's color, body shape, and _____ are examples of adaptations.
4. The behavior that animals are born with are called _____.
5. When animals move to a different place during certain seasons, it is called _____.
6. Some animals go into a deep sleep called _____ to survive during winter.
7. The behavior that animals can be taught is called _____.

What are other ways animals physically adapt to their environment?

Why do animals migrate to a different location when the season changes?

name _____ class _____ teacher _____ date _____



Explain pt 2:

Organisms and their Environments

In order to survive in their particular environment, all animals must have structures and behaviors that enable them to obtain food and water, move, maintain body temperature, and attract or find mates. The specific characteristics that an animal possesses which help it survive are called adaptations. Adaptations can be structural (e.g. a bird's beak) or behavioral (e.g. migration patterns).

Read the passages below and fill out the chart while reading.

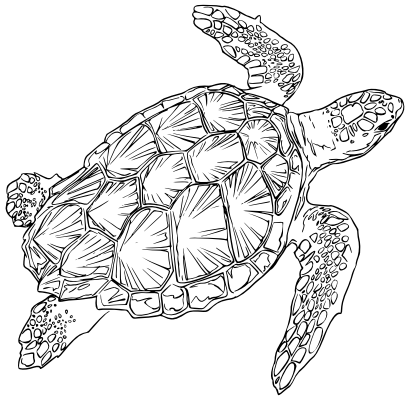
OYSTERS

Oysters live in our bays or estuaries and are adapted to live in different temperatures and salinity by closing and opening it's shell. Oyster's reproduce externally creating a swimming "veliger" oyster which goes through metamorphosis and attaches to hard surfaces as "spat" to create oysters. They improve water quality by removing sediment and other materials from the water through their filter feeding activities (one oyster will filter up to 50 gallons of water per day); oyster reefs provide essential habitat for many important fish species and much of the prey they depend on; and oyster reefs provide protection to shorelines from wave energy that can result in erosion and loss of property.

SHRIMP

Shrimp are strange looking creatures. The body is segmented and is encased in a shell. To grow, shrimp must shed its shell and form another one; this process is called molting. Shrimp are adapted to swim and walk with 5 pairs of swimming legs and 10 slender walking legs. Shrimp start their life as a larvae in the estuary to grow, obtain food, and for shelter. As shrimp grow from a larvae to a mature shrimp they will swim into the Gulf of Mexico. Juvenile and adult shrimp feed on the bottom at night. They are omnivorous, and feed on worms, algae, microscopic animals, and various types of organic debris.

Explain pt 2:
Organisms and their Environments



KEMP RIDLEY'S SEA TURTLES

Kemp's ridley turtles are the smallest marine turtle in the world. Kemp Ridley sea turtles have a crushing feature on its jaw to eat with and are omnivores. They like to eat crabs, fish, algae, seaweed, and jellyfish. They primarily live in Texas in the Gulf of Mexico and are very endangered species. The Kemp's ridley sea turtle is unique from other sea turtle species because it nests during the day and nests in group events called "arribadas." Female Kemp's ridleys return to nest on the same beach where they were hatched (from May to July) to lay two to three clutches of approximately 100 eggs, which incubate for 50 to 60 days. Once hatched it takes 10 to 15 years before Kemp Ridley's become mature sea turtles. The Kemp's ridley is the only sea turtle with an almost circular carapace (upper shell) and they are adapted to swim in the ocean with their two front flippers.

JELLYFISH

Jellyfish are some of the oldest surviving members of the animal kingdom. They have existed in our oceans since before dinosaurs roamed the earth. They are adapted to live in all levels of water and can withstand a wide range of temperatures and salinities, from the surface of shallow coastal waters to the very depths of the marine world. Jellyfish have a complex life cycle and pass through two different forms before reaching the medusa stage, which is the familiar adult form. Jellyfish have no brain; instead they have a nerve net capable of detecting light, smell, and other stimuli and reacting accordingly. Jellyfish eat many different types of things, such as small plants (phytoplankton), copepods (crustacean zooplankton), fish eggs and other small fish called larvae.

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TEXAS A&M AGRILIFE EXTENSION

Explain:

Organisms and their Environments

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Name: _____ **Date:** _____

Instructions:
Read the passages about oysters and shrimp and fill in the boxes below.

List one adaptation for each organism	How does each organism obtain energy?
What are some structures that help each organism survive?	Describe one of the organism's life cycle.

TAMU-SG--20--403

Name:

Date

Food Chains and Food Webs

Food webs are many food chains put together. All food chains and food webs start with a producer which is a organism that can uses sunlight for energy like plants. Energy travels through the food web and steadily decreases with each **trophic or energy** level it passes. In general, as you move through the food web, each higher level of consumer is made up of fewer, larger organisms. Most marine mammals are top level consumers, meaning that they are at the end (or close to the end) of their food chain in the web. This means that anything that affects their prey or food will affect the numbers and health of those specific marine mammals. Marine mammals can also be affected by competition with other species for the same resources Overfishing, changes in prey numbers and distribution in response to climate change, and other factors affect the food web.

In this lesson, students will learn about the marine food web and trophic levels and be able to place marine mammals in their proper place on the food web. They will explore the relationship between all the organisms on the web and hypothesize how impacts on one species in the web can impact the whole food web. They will discuss how humans affect the food web and what they can do to make a difference.

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Questions:

1.Have we made food chains?

2. What do all of our food chains together look like?

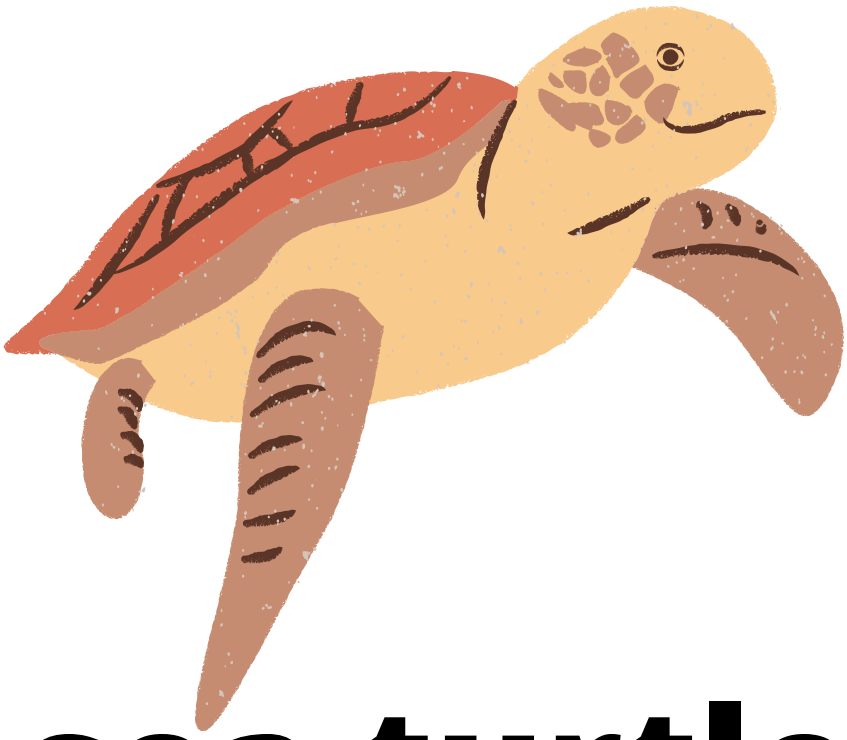
3.What is the difference between a food chain and food web?

4.Who is holding the most pieces of yarn?

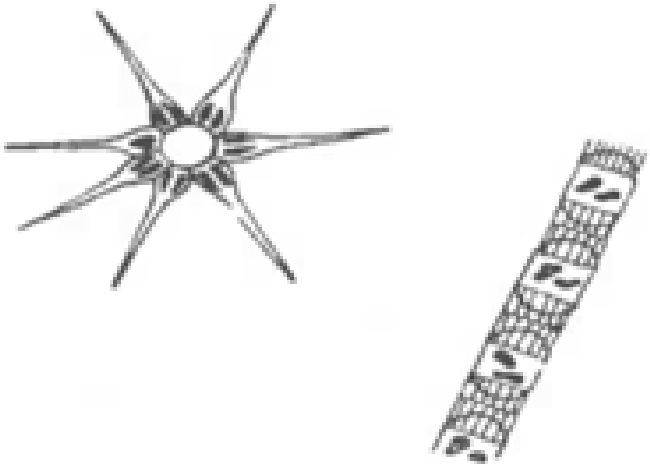
Why?

5.Who else is part of many food chains?

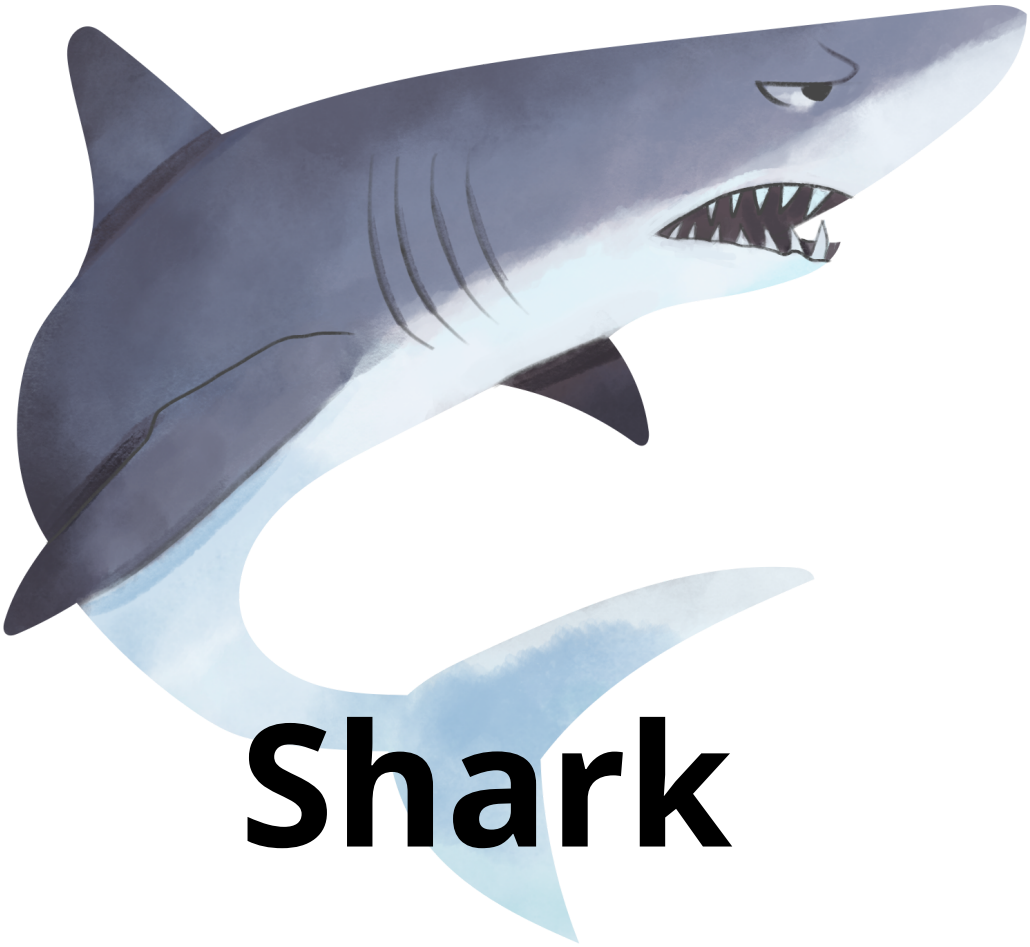
SUN



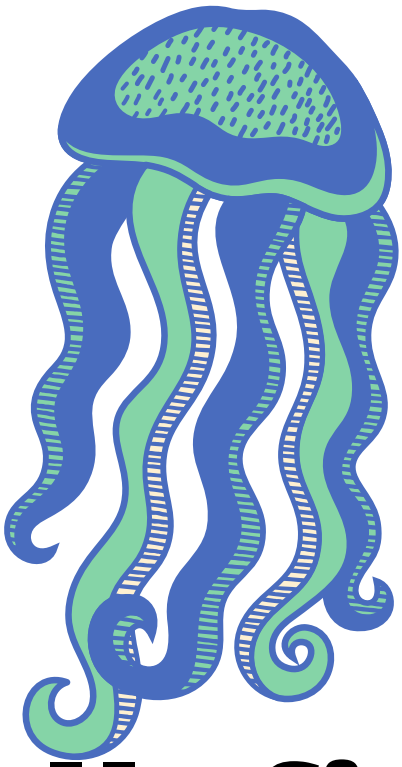
sea turtle



Phytoplankton



Shark



Jellyfish

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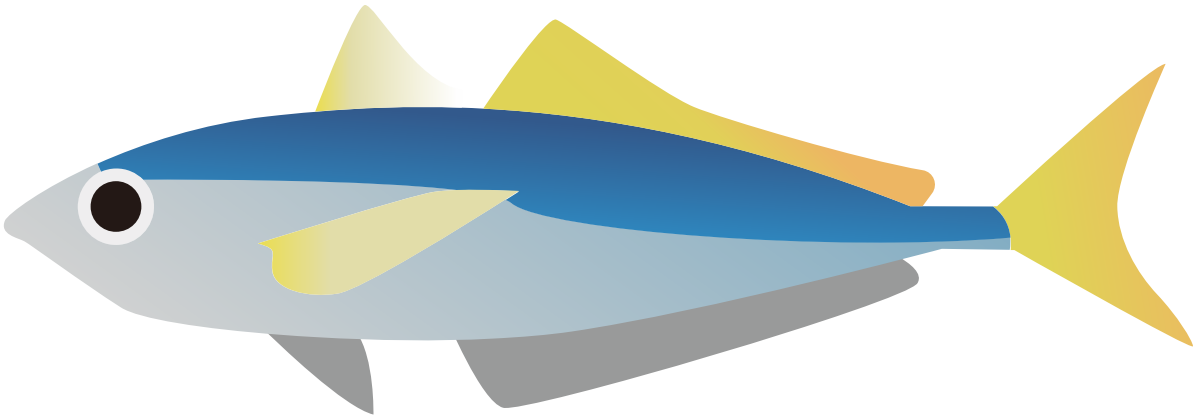
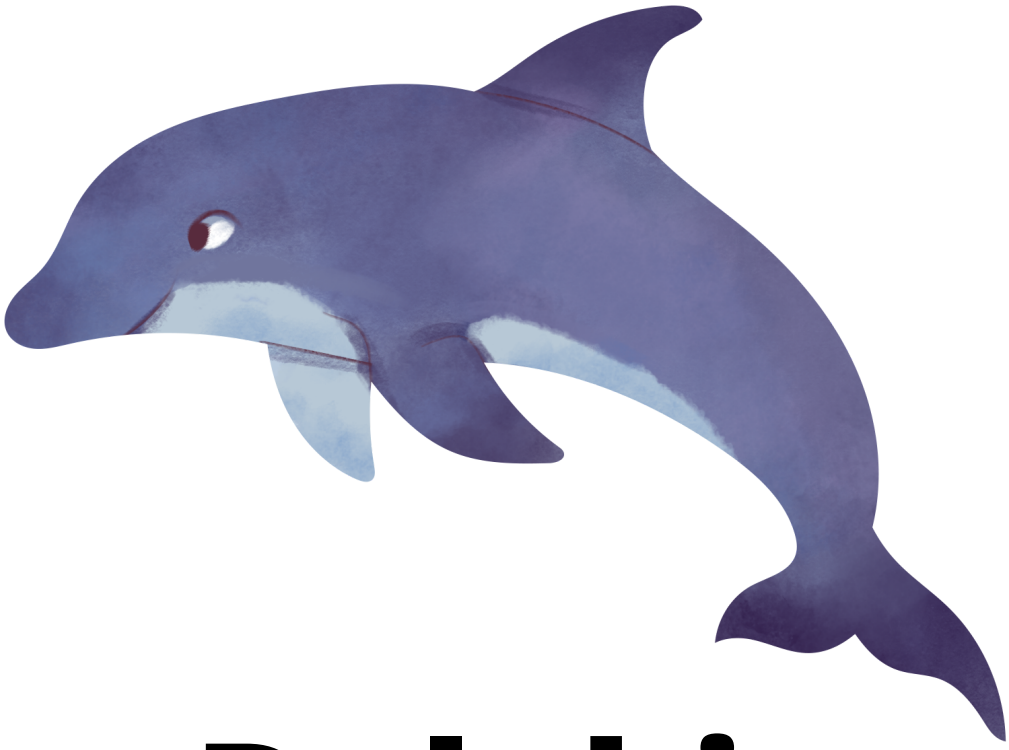
Crab

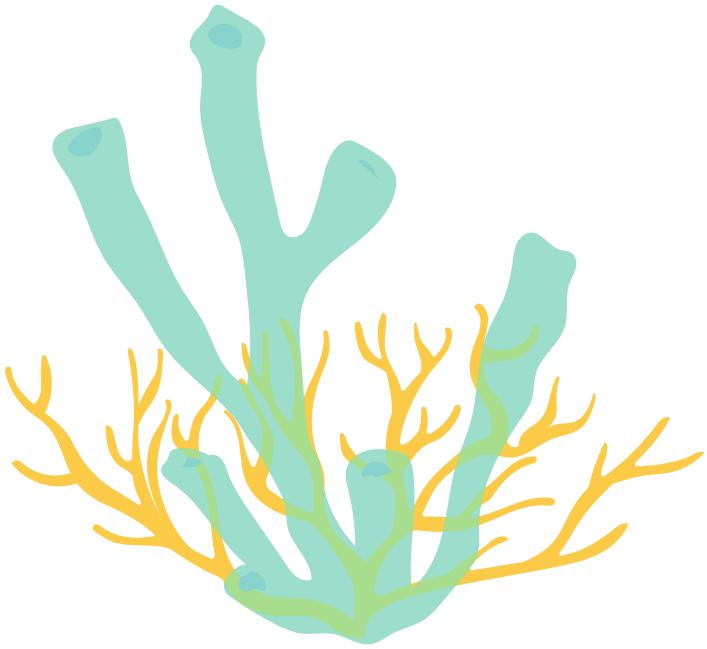
sea grass



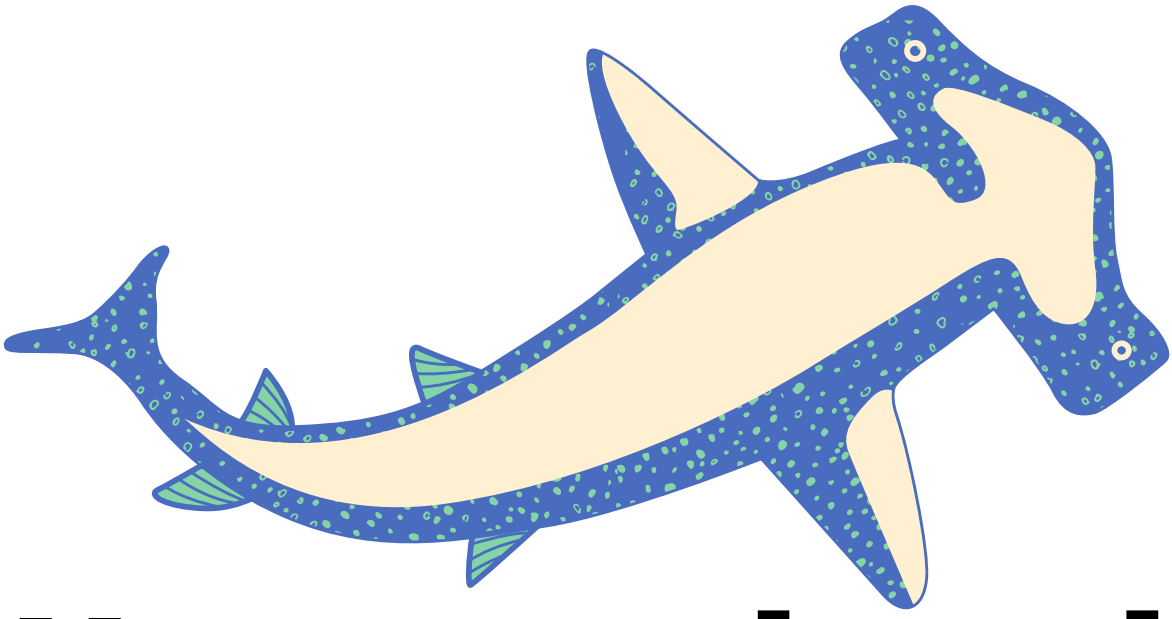
Grouper Fish



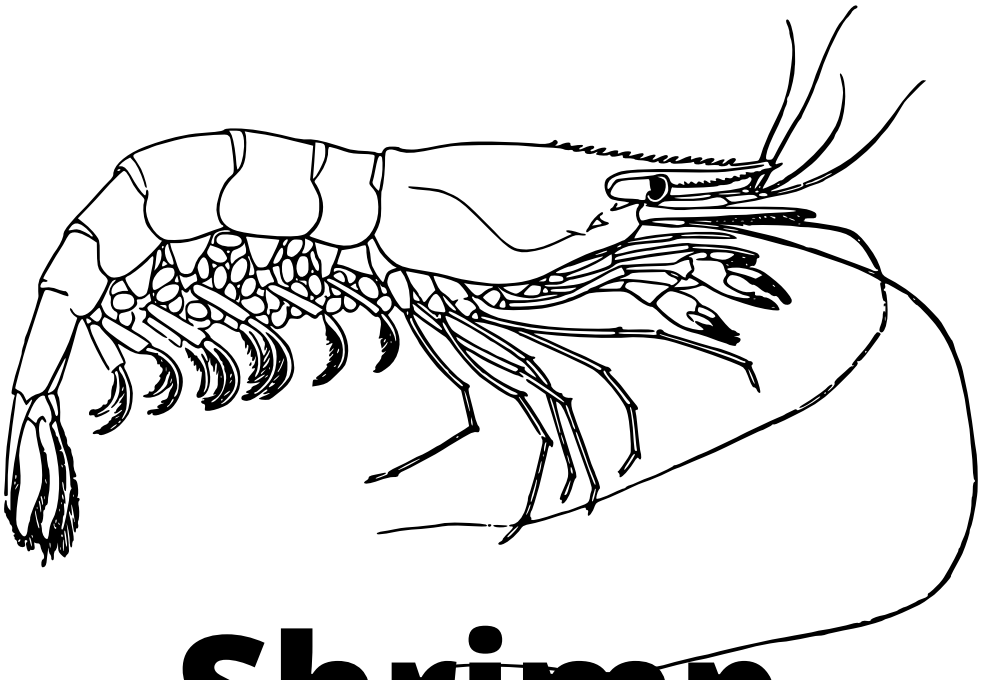
Dolphin



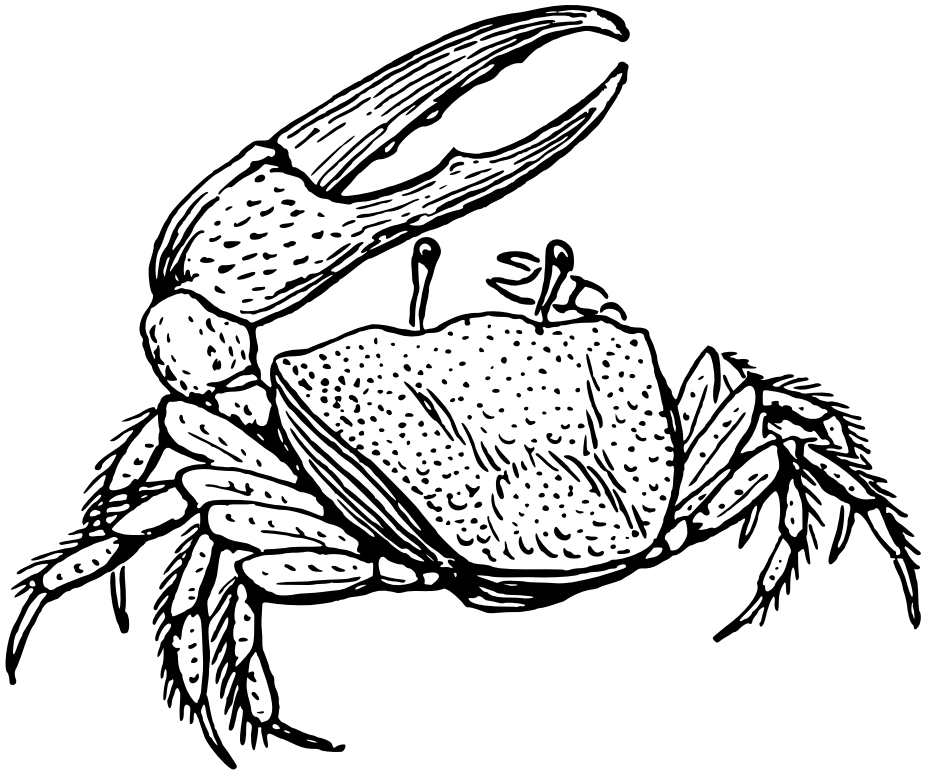
Coral



Hammerhead Shark



Shrimp



Fiddler Crab

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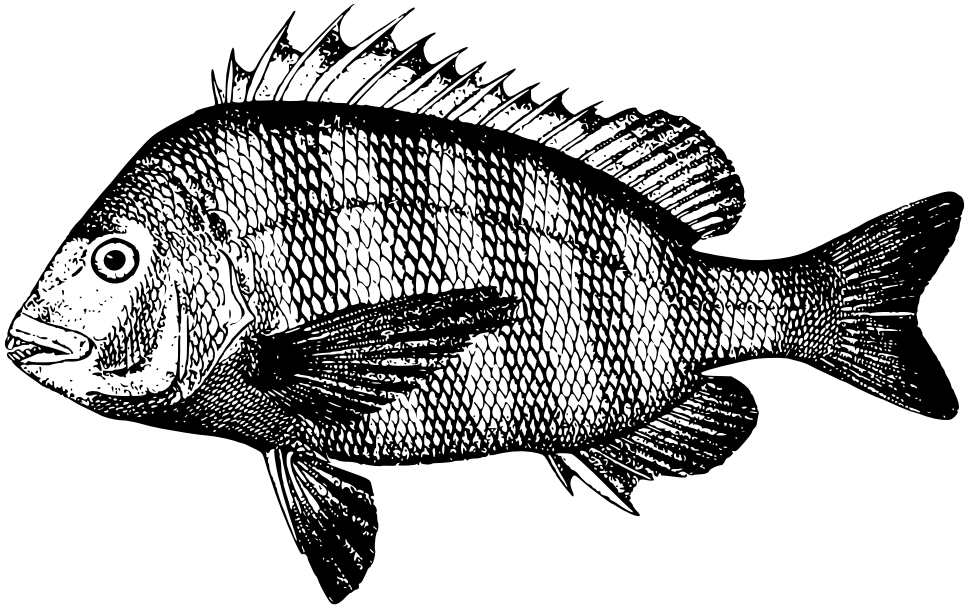
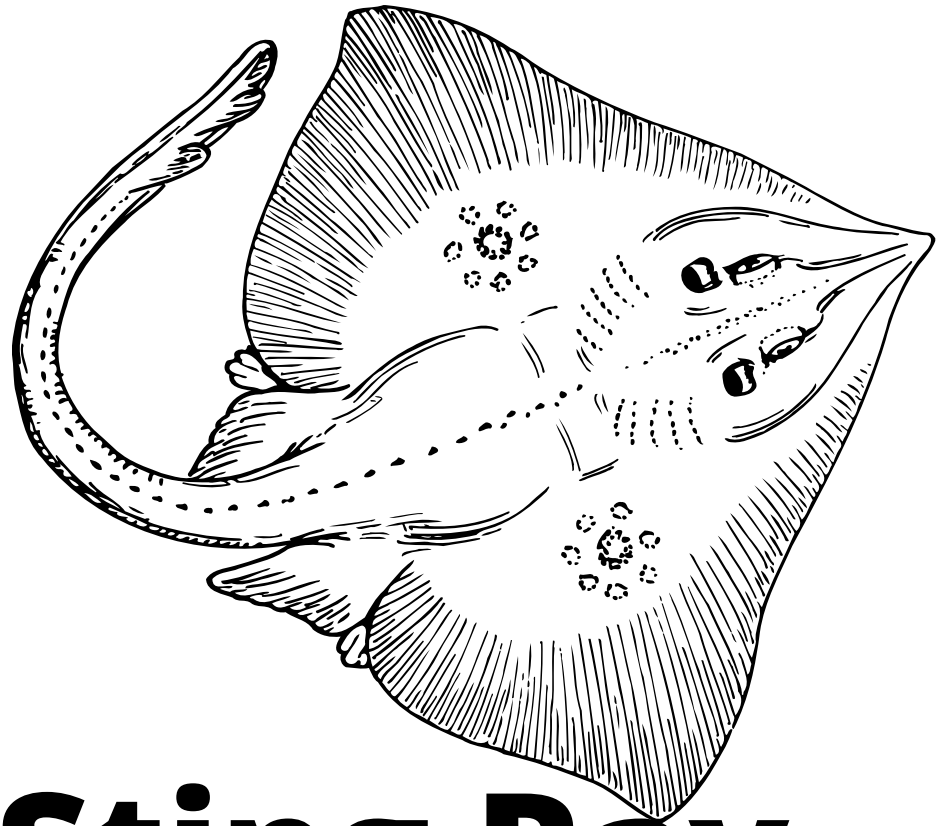


Sheepshead Fish



Sting Ray

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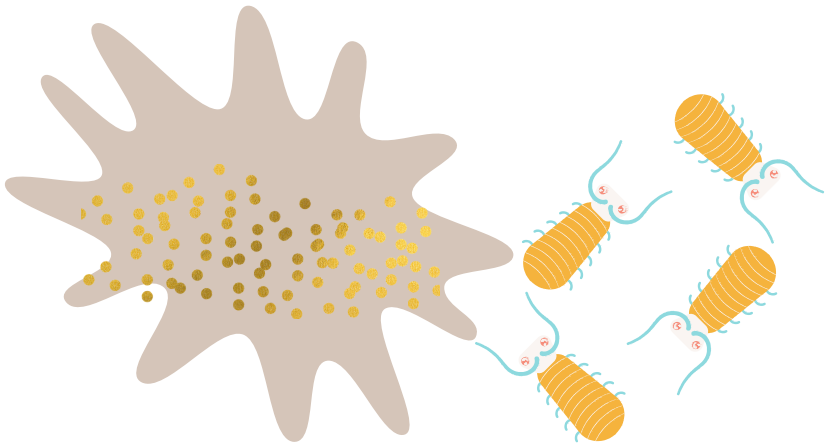
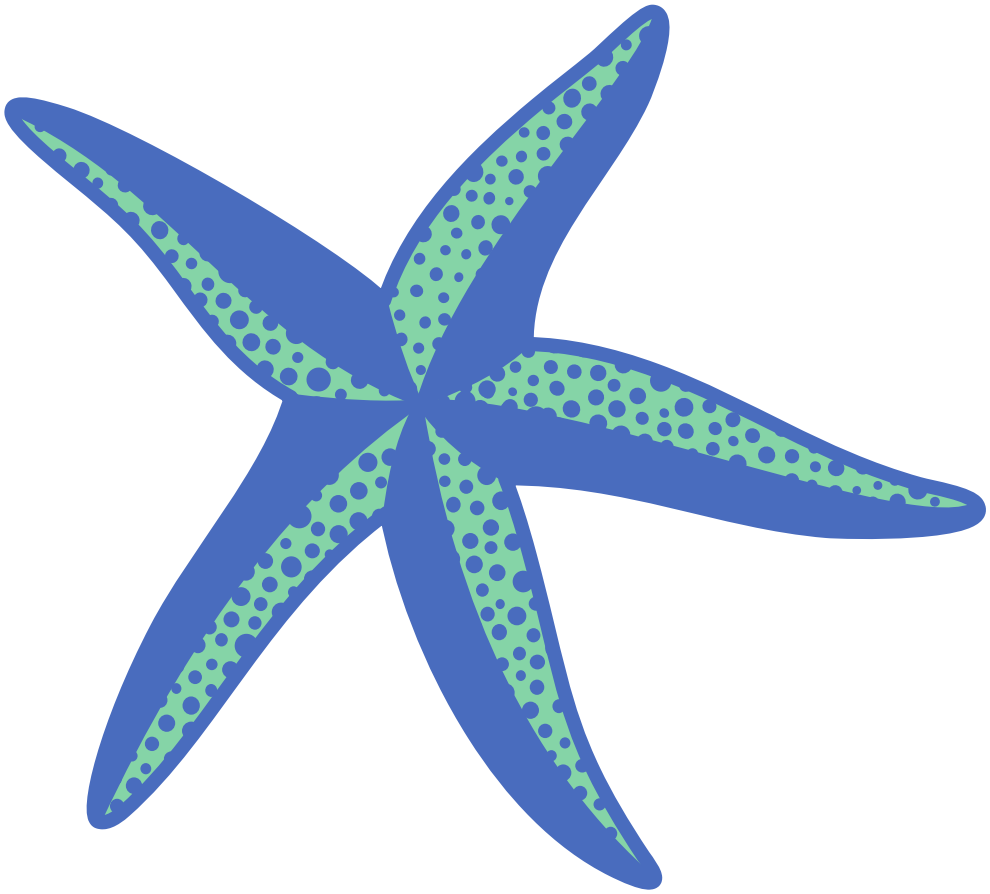
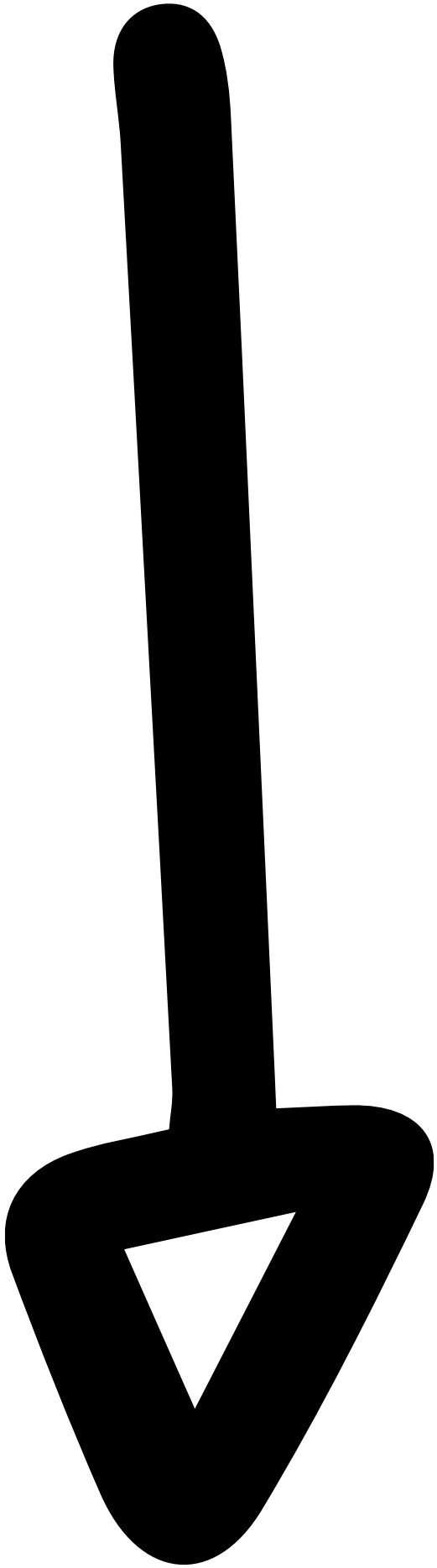


zooplankton



Starfish



Name_____

Evaluate

1. Which one of these are considered a biotic organism?
    a. rock
    b. dirt
    c. fish
    d. water

2. Which one of these characteristics makes an organism biotic?
    a. Not able to move
    b. Not able to breath
    c. takes in nutrients
    d. moves when the wind blows

3. True or False: Abiotic means the organism is not alive
    a. True
    b. False

4. Some organisms have special _____that help them function in the ecosystem like certain body colors or fins on the side of a fish that help them swim in the water.
    a. migration patterns
    b. hibernation
    c. camouflage
    d. structures

5. True or False : Food chains are many Food Webs put together
    a. True
    b. False

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TEXAS A&M AGRILIFE EXTENSION

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6. True or False: the arrows in a food chain show the flow of energy.
   a. True
   b. False

7. In order to survive in their particular environment, all animals must have structures and behaviors that enable them to obtain food and water, move, maintain body temperature, and attract or find mates these are called _____.

   a. mimicry
   b. hibernation
   c. structures
   d. adaptations

8. An _____ is made up of all the living and nonliving things interacting with each other.
   a. ecosystem
   b. food chain
   c. organism
   d. migration

9. Another survival technique is _____ like when a sea turtle travels to a beach to lay a nest of eggs.
   a. mimicry
   b. migration
   c. hibernation
   d. structures

10. True or False: Food chains and Food webs are affected by occurrences like droughts, floods, overfishing, diseases, and natural disasters.
   a. True
   b. False