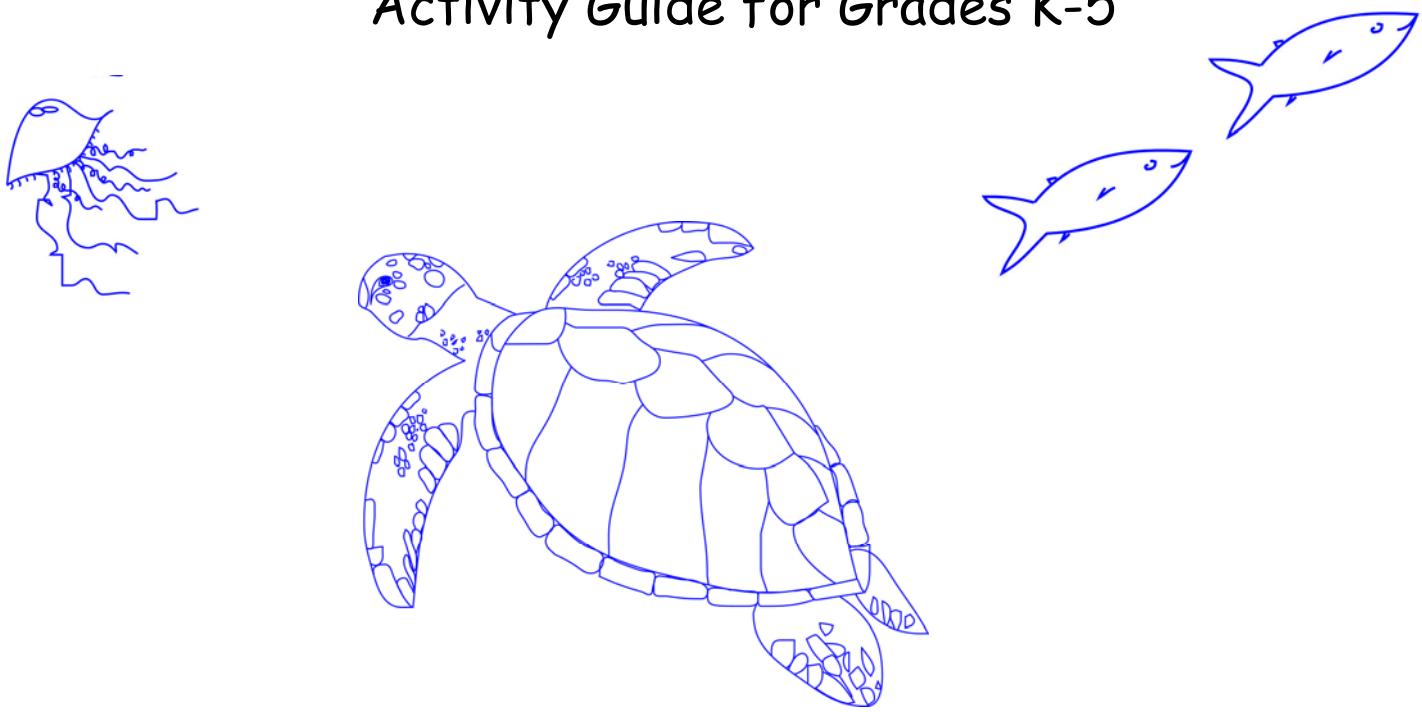
LOGGERHEAD
Marinelife Center

Ocean Explorers

Activity Guide for Grades K-5



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Community Foundation
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Loggerhead Marinelife Center Mission Statement

The Loggerhead Marinelife Center is a non-profit organization dedicated to "promoting the conservation of Florida's coastal ecosystems through education, research and rehabilitation, with a special focus on threatened and endangered sea turtles".

To The Teacher

This "Ocean Explorers" guide was designed by the Education Department of the Loggerhead Marinelife Center to help your students better understand the ocean. Not only will you find useful information about the ocean and marine life, but there are also fun activities for your students to enjoy. This book has been designed to be used with kindergarten through 5th grades and has many activities that can be modified for use with other grade levels. These activities have been aligned with Florida Sunshine State Standards. At the back of the guide you will find puzzles, games and coloring pages, just for fun!
We thank you for visiting the center and hope that this book will be useful in you classroom. Please return the survey found in the beginning of this book; we appreciate your feedback and are always looking for ways to improve.

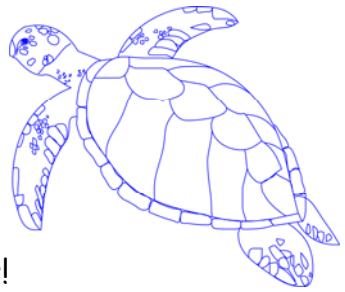
Objectives

After completing the Ocean Explorers Guide, students will have a better understanding of ocean habitats, its wildlife, and conservation concerns.
Students will be able to:

- Understand that the ocean supports diverse and abundant wildlife
- Recognize that much of life on Earth depends upon the ocean
- Share their knowledge and appreciation of the ocean with others
- Recognize that conservation is an on-going process and that our actions can make a difference.

Contents

Educator's Survey



Please help us improve this guide by sending us your suggestions!

How could we improve this packet to better help you in teaching your "ocean unit"? _____

_____

_____

Did the activities need more explanation? Yes / No

If yes, please describe: _____

Would this Educator's Resource Guide be more beneficial to you…

Before or After (please circle) your field trip or outreach program?

On a scale of 1 (poor) to 5 (excellent) please rate the overall content of the resource guide: 1 2 3 4 5

Additional Comments: _____

_____

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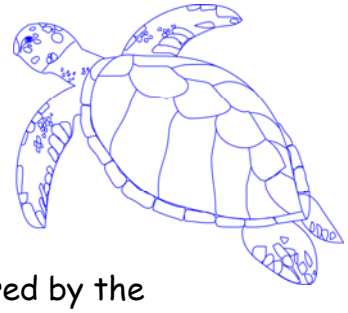
School name: _____

(Optional) Your Name:_____

Email: _____

Thank you for taking the time to complete this survey. We hope to improve and would like to hear any further comments you may have!

Please fax this form to 561-721-1098



Our Watery World

FACTS:
The ocean is a very big place, 71% of the Earth's surface is covered by the ocean. The average depth of the ocean is 12,238 ft. In some places it can be over 6 miles deep. The deepest place in the ocean is the Marianas Trench, which reaches 6.73 miles. The Marianas Trench is so deep that if you put Mt. Everest into it, the top would still be more than 1.24 miles under water. The ocean floor isn't flat and smooth like some people think; there are many topographical differences like deep trenches, high mountains and flat sea bottoms also called abyssal plains.

THE OCEAN FLOOR:
The sediment on the ocean floor is primarily made up of organic remains and rock particles. The composition of the sediment depends greatly on the local actions of land masses and underground volcanoes. Shells of small organisms and other marine life can also be found in the sand.

SALINITY:
What makes the ocean salty? One source appears to be minerals and chemicals that erode and dissolve into fresh water and then flow into the ocean. This not only includes river run off, but also includes rain water that has filtered through the ground into the sea. Another source of salt in the ocean includes coastal rocks eroded by waves and surf. Hydrothermal vents add some materials while removing others. Salt can be removed from the water through chemical and biological processes and reactions that occur within the seawater and the seafloor. It's is believed that these processes counterbalance each other so that the average salinity of seawater remains constant around the world.

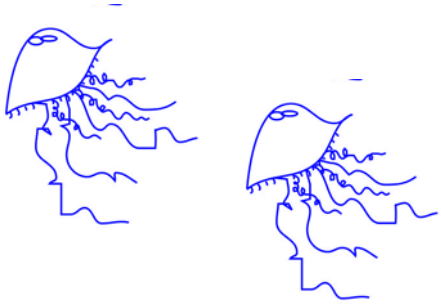
CURRENTS & TIDES:
The water in the ocean doesn't just stay still, as you may have noticed if you have ever been to the beach on a windy day. Most of the currents in the ocean are driven by winds. Some large areas of currents called ***gyres***, exist and stay in motion or are altered slightly by the rotation of the earth. Underwater events like earthquakes, volcanoes, and weather anomalies can adjust these currents. The tides, which occur twice a day, are caused by the gravitational pull of the moon. Seasonal changes occur based on the distance from the moon to the earth at various times of the year.

Density of Salt Water

Objective:
To demonstrate the difference in densities between salt water and fresh water.

Background:
Salt water is made up of dissolved material from a variety of sources. Even though the average salinity (amount of dissolved salt) of ocean water is 35 parts per 1000, the salinity does vary from location to location. Density is measured by mass divided by volume. Salt water is denser than fresh water because salt water has more dissolved material in it.

Materials:
- Table Salt
- Food coloring
- Water
- 3 clear containers



Procedure:
1. Break students up into small groups.
2. Fill one container with fresh (tap) water.
3. Mix salt and water in one of the containers to make a salt water solution. Add food coloring to mixture so students can tell the difference between the salt water and fresh water.
4. Slowly add the fresh water to the empty container, and then slowly add the fresh water to the same container. Do the two mix together or do they form layers? Which layer is on top?
5. Have students write down their findings.

Extensions:
Have students make five salt water solutions with different salinities. Make each solution a different color so students can tell them apart. Slowly add each solution, one at a time, to the empty container. Have students observe the layers. Which solution is the densest?

Waves in a bottle

Objectives:

1. To demonstrate the motion of waves and to help students understand why waves are important.
2. To demonstrate that simple models can be used to represent real world objects that may not be easily transported (such as the ocean).

Background:

The study of waves is an important part of oceanography. Surface waves are caused by winds. As the wind blows over the water, if the distance is great enough, the size of the wave will increase. The top of the wave is called the crest and the lowest part of the wave is called the trough. Waves are very important to tide pool animals. They bring food and oxygen to the tide pools, while carrying away wastes.

Materials:

- 2 liter soda bottle with lid
- Food coloring
- Water
- Vegetable oil

Procedure:

1. Fill soda bottle 2/3 of the way full with water.
2. Add food coloring.
3. Fill the bottle the rest of the way with oil and screw on lid.
4. If there are any air bubbles remove the lid, slightly squeeze the bottle and recap the bottle.
5. Have students tilt bottle back and forth slowly to create a wave.
6. Ask students to describe what they see. Do the waves in their bottles remind them of real waves?

Ocean Ecosystems

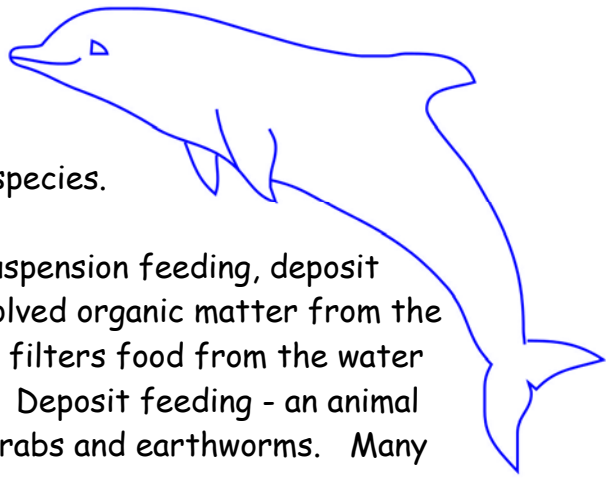
When you think of the ocean, you can't just think about it in terms of length and width but you must also think about depth. That leaves a lot of room for many ecosystems to co-exist. An **ecosystem** is made up of all the interacting parts of the living and non-living environment. There are many different ecosystems that exist in the ocean; below are just a few examples.

COASTAL ECOSYSTEMS:
Coastal ecosystems are usually very productive. They are usually high in nutrients because of runoff from the land. They are shallow in depth so they receive lots of light. These ecosystems are usually very diverse because of high nutrient levels, ample light and shelter. They make good nursery habitats for juveniles of open ocean species.

There are many different types of coastal ecosystems, including estuaries, salt marshes, mangrove swamps, and sea grass beds. Other examples include inter-tidal zones, beaches, and coral reefs.

Human activity has a big impact on coastal ecosystems. Pollutants can have a more severe effect on costal ecosystems due to the fact that they reach these ecosystems in more concentrated forms. Coastal development also impacts these areas by destroying beaches and dune habitats.

DEEP SEA (BENTHIC) ECOSYSTEMS:
The sun's light and warmth never reach the deep, dark, depths of the ocean. The average temperature at the bottom of the ocean is about 35.6°F. Since there is no sunlight, there is no primary productivity (photosynthesis), which means there are no plants or algae growing. The lack of food appears to be a major limiting factor here although a small amount of food from the oceans' surface does reach the bottom. Despite these factors, the ocean bottom is still very diverse. In fact, as the depth increases so does the number of different species.



Benthic animals have four main ways of feeding: suspension feeding, deposit feeding, scavenging/predating, and absorbing dissolved organic matter from the surrounding water. Suspension feeding - an animal filters food from the water above the sediments, like clams and sea anemones. Deposit feeding - an animal eats particles lying in the sediments, like fiddler crabs and earthworms. Many

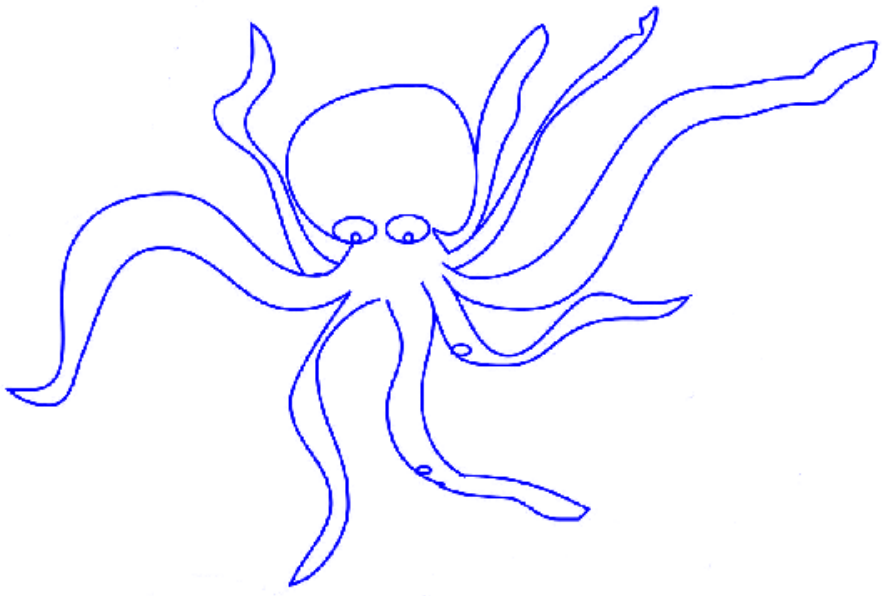
benthic animals are both scavengers and predators, like amphipods, snails, and brittle stars.

CORAL REEFS:
Coral reefs are probably one of the most diverse ecosystems in the oceans, rivaled only by tropical rainforests on land. It is also a very fragile ecosystem. Coral reefs are found in clear, shallow, warm waters throughout the world.

Corals are made up of many polyps (small vase-shaped animals). These animals have tentacles for capturing food. Those tentacles contain stinging cells called nematocysts. Coral polyps may live alone (solitary) or they may live in colonies.

There are three types of coral; hard, soft, and hydrocorals. **Hard corals** have a calcium carbonate skeleton. Brain, staghorn, elk, antler, lettuce, and flower coral are all examples of hard corals, which are major reef-forming organisms. **Soft corals** have a flexible internal skeleton made of keratin. Examples include sea fans, sea pens, and whip corals. **Hydrocorals**, also known as false corals, are more closely related to hydroids, while soft and hard corals are more closely related to sea anemones. Divers may be familiar with one species of hydrocoral – fire coral! As the name implies, fire coral "burns" the skin if you touch it. In actuality, the coral polyps are utilizing their stinging cells – much more powerful in the fire coral than in other coral species.

Corals have a **symbiosis** (*a relationship between two dissimilar organisms*) with a type of algae called zooxanthellae (zo-zan-thelee). The zooxanthellae help provide energy to the coral during the day, while the corals provide raw materials that the algae need for photosynthesis. This is why corals cannot grow in the shade; the zooxanthellae need the light for photosynthesis.

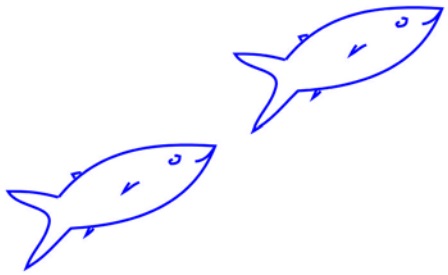


Ecosystem Exploration

Objective:
To help students understand what makes up an ecosystem by observing one.

Background:
An ecosystem is composed of all the interacting parts of the abiotic (non-living) and biotic (living) environment. When we talk about an ecosystem, we are talking about everything from the non-living material, like the soil or sand, to the living plants and animals that may be found there. There are many different types of ecosystems; coral reefs, rainforests and estuaries are just a few examples. You don't have to travel far to observe an ecosystem, just as far as your backyard.

Materials:
- Ecosystem worksheet (included)
- Pen or Pencil
- Thermometer



Procedure:
1. Make sure that each student has a worksheet and a pen or pencil.
2. Discuss with students what makes up an ecosystem. Remind them that an ecosystem includes everything from the ground to the sky.
3. Take the students outside to observe an ecosystem. It could be a field, pond, or forest, whatever is there (this could be right outside the classroom or on a field trip).
4. Have students observe the area for about fifteen minutes. This gives them time to fill out their sheets and hopefully see some cool things. Remind the students that they are observing, so they want to be as quite as then can and not touch anything so they won't disturb the ecosystem.
5. Once they are done, go back inside and discuss what they saw and see if they can tell you any connections between living and nonliving parts of the ecosystem.

Ecosystem Observation Worksheet

Name: _____ Date: _____

1) Describe the location of the ecosystem that you are observing. Draw a picture of it on the back of this sheet.

2) Record the time of day, temperature, and describe what the weather is like.

3) List all plant and plant parts, like seeds, leaves, roots, etc.

4) List all animals and insects seen.

5) List any signs of animals (tracks, scat, etc.).

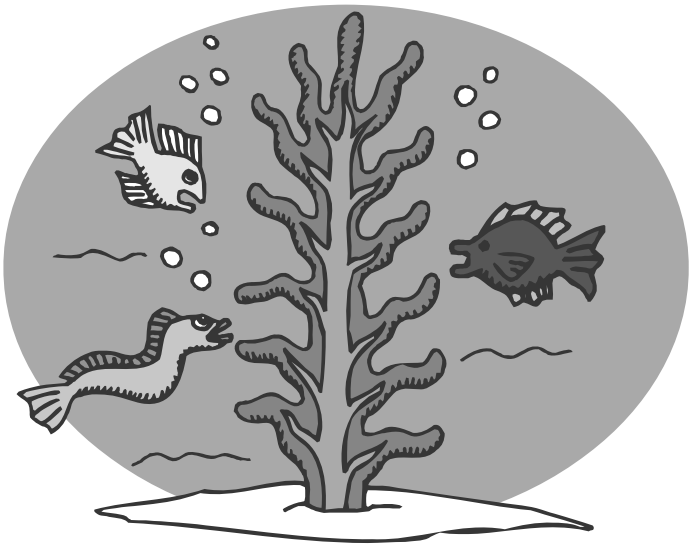
6) List all non-living things in the ecosystem.

7) Describe an interaction between two things in the ecosystem (living and living or living and non-living)

Don't Forget the Algae!

Algae is a type of plant which can be made of a single cell or multiple cells. Trillions of tiny single-celled plants can be found in the upper layer of the ocean. Algae, just like other plants, use sunlight to produce food and oxygen. This process is called **photosynthesis**.

What makes algae different from other plants? Alga (plural for algae) has no true stems, roots, leaves, or seeds. There are a few different types of algae. Green algae does better on sunlit shores. Red algae can be found in tide pools, but can also be found at depths up to 200 ft. Brown algae can be found near shore and at lesser depths than red algae. Blue-green algae can be found on rocks along the shore, where they form a slippery dark coating on the rocks. Algae is an important food source for many animals in the ocean, as well as for humans!



There is Algae in My Ice Cream!

Objective:
To help students realize the importance of algae, not just in the ocean but in our everyday lives.

Background:
Algae is an important food source for many animals in the ocean. It is not only a food source for animals that live in the ocean, but it is also a food source for humans. In Japan, seaweed and algae make up 10% of the people's diet. The most commonly consumed algae in the world is a red algae called nori and is most often served with sushi.

Algae can be found in many products on the market today. Most people are surprised when they find out how much algae they actually consume. The product called algin is made from the mucus in kelp and other marine algae and is used in food processing and other applications. It can be found in many different products, from salad dressing and ice cream to paints and abrasives.

Materials:
- Non-toxic household items (food, lotions, shampoo, soaps, etc.)
- Paper
- Pencil

Procedure:
1. Have each student bring in a non-toxic item from home. It can be food, soap, lotion, just make sure that the list of ingredients is on the package.
2. Have students read the ingredients. Tell them they are looking for an ingredient called algin.
3. Have the students make two groups of products, ones with algin and ones without.
4. Students should create 2 columns on a piece of paper and write down all the products that contain algin in one column and all the products that don't contain algin in another.
5. Discuss with students the importance of algae. Ask if they realized how many products have algae in them.

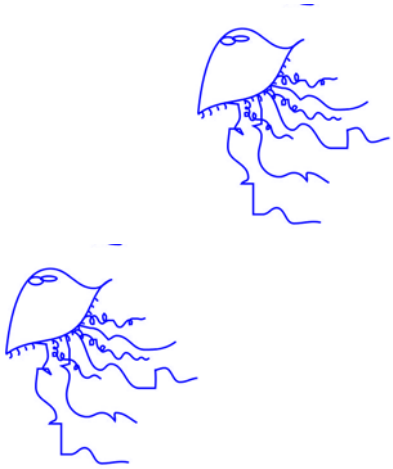
Extension:
Have students go home and look for other products that contain algin. Have them make a poster of their findings and present it to the class.

Spineless Animals

FUN FACTS:
95% of all living creatures are **invertebrates** (*animals without a backbone*). Many of these animals live in the sea, including mussels, clams, jellyfish, starfish, sponges, and lobsters. Some invertebrates are so tiny you need a microscope to see them, like coral polyps. Others can be some of the largest animals in the world, like the giant squid.

EXOSKELETONS:
Some of these animals may have a type of skeleton, however just because they have a skeleton, doesn't mean they have a backbone. Crabs and lobsters have an **exoskeleton** (*hard skeleton located on the outside of the body*). This exoskeleton is made out of a material called chitin (kīt'n), the same material your fingernails are made of. Mussels, clams, some snails, and other animals have a shell made of calcium carbonate.

JELLYFISH:
Some animals, like jellyfish, don't appear to have an exoskeleton. Jellyfish retain their shape through a network of connective tissues. Water is pumped into this network and forms a hydrostatic skeleton. This gives them the appearance of being more solid to the touch than they actually are.



Make a Giant Squid

Objective:
Students will gain a basic understanding of the external anatomy of a squid.

Background:
The squid is a type of invertebrate, an animal without a backbone. They have two long tentacles which they use to help catch their prey and they have eight shorter arms that are used to hold onto their prey. The tentacles and arms have suckers on them that also help them hold onto their prey.

Squid are very good swimmers and they swim backwards unlike a fish that swims forwards. When these animals feel threatened they expel ink that they store in an ink sack which is located inside their body. That ink creates a big black cloud between the squid and whatever is trying to eat it, the squid then swims backwards to get away.

Materials:
- Cardboard paper tube
- Construction paper
- Tape
- Scissors
- Wiggly eyes
- Glue
- Marker
- Picture of a squid

Procedure:
1. Show students a picture of a squid; point out different body parts (arms, fins, tentacles, etc). Explain to students that they are going to make their own squid.
2. Wrap the construction paper around the tube and tape it to the tube
3. Cut eight strips of paper to make the arms.
4. Cut two longer strips to make the tentacles. The students can make the bottom of these two strips wider and more rounded so that they look like the tentacles of a squid.
5. Have students tape the arms and the tentacles inside one end of the tube.
6. Next have them cut out the fin. Have them leave a small tab so they can tape it to the inside of the tube.
7. Have the students tape the fin on the side of the tube opposite the arms and tentacles.
8. Glue on wiggle eyes. Draw suction cups on the squid's arms and rounded part of the tentacles.

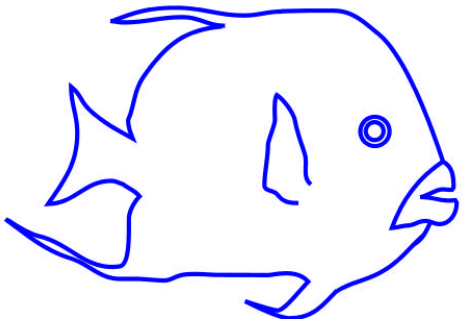
Fishy Facts

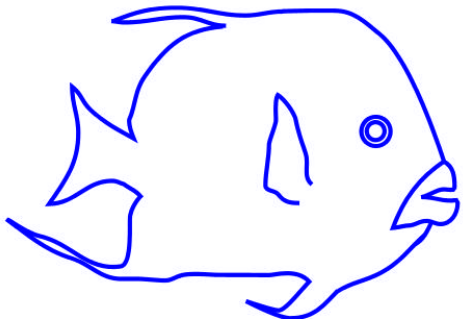
Scientists estimate that there are between 20,000 and 40,000 different species of fish in the world. How long a fish lives depends on the species. Some fish may only live for a few weeks, while others can live for over 50 years.

BONY FISH:
Fish come in all shapes and sizes. The world's largest fish is the whale shark, which can grow to be over 50 ft long and weigh several tons. The world's smallest fish is the tiny goby, which is rarely longer than 1/2 inch.

Fish have many different adaptations which allow them to live underwater. They use feathery gills to absorb oxygen from the water. Fish also have **lateral line** (*lines of sensory pores along the length of the body that detect vibrations and differences in water pressure*). Fish don't sleep like humans do because they don't have eyelids, but most do rest. Some fish float in place, others hide themselves. Parrotfish will even enclose themselves in a mucous "bubble" each night for protection while they sleep! Fish must always be alert for danger, even though they might be resting.

Many fish have a **swimbladder** (*sac filled with gas located in their body which is used to help keep the fish buoyant in the water*). Sharks don't have a swim bladder; instead they have a very large liver that produces oil which helps keep them buoyant.



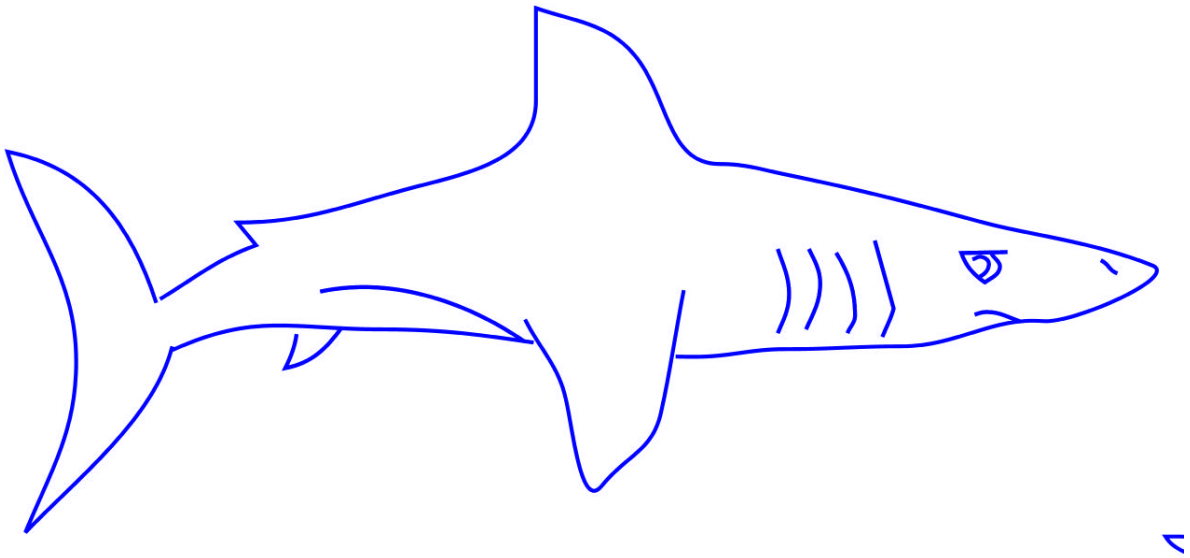


SHARKS & RAYS:

Sharks and rays have a skeleton made of cartilage, instead of bone. There are over 350 different species of sharks. The largest is the whale shark which eats only plankton. The smallest is the spined pygmy shark, which grows to be less than 10 inches long and is found in cold, deep waters. The fastest shark is the shortfin mako shark, which has been clocked swimming at speeds over 30mph.

Some sharks must swim constantly, so that water can pass over their gills in order to breath. Others, like the nurse shark, can rest on the ocean floor. Their skin is made up of **dermal denticles** ("skin teeth"); basically their skin is made out of the same material as their teeth. This makes their skin very tough and durable.

They have 5 to 15 rows of teeth in each jaw. Sharks will lose a tooth almost every time they eat and can replace a tooth in less than 24 hours with a conveyor-belt type system. A single shark may lose thousands of teeth in a lifetime.



A Day in the Life of a Shark

Objective:
Students will be able to portray a shark's ecosystem.

Background:
Sharks are adapted to a wide range of habitats. Some sharks live in shallow water, like the nurse shark, while other sharks live in deep waters, like the gulper shark. Some sharks are found only in the open ocean, while others are found in coastal environments. Sharks vary in size, from less than 10 inches long to over 50 feet.

Different sharks eat different things. Whale sharks, the largest living shark species, eat nothing but plankton while tiger sharks have been called the "garbage cans of the sea" since they have been known to eat live animals, dead animals, and even trash. A shark's diet can include other sharks, fish, marine mammals, sea birds, crustaceans, other invertebrates, and sea turtles.

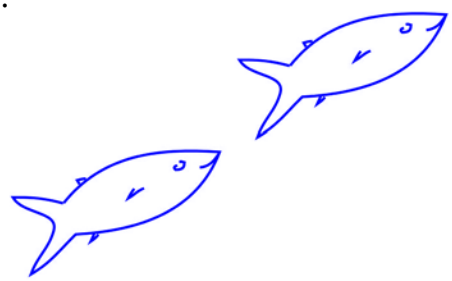
Materials:
- Construction paper
- Writing or drawing paper
- Hole punch
- Crayons and pencils
- Fasteners (yarn, brads, clasps, rings, pipe cleaners, etc.)

Procedure:
1. Discuss with students where sharks live, what sharks eat, and what habitats a shark may be found in. Discuss what other organisms are found in these areas.
2. Have students write a story about a shark. Make sure students answer the following questions:
   What does your shark look like?
   What does your shark eat?
   Where does it live?
   What might it see?
3. Have students draw pictures that answer the above questions.
4. Use the construction paper to make the cover of the book.
5. Punch holes into the paper and put the book together using the fasteners.

Fingerprint Fish

Objective:
Students will gain an understanding of how schooling behavior of fish is an adaptation for avoiding predators.

Background:
Fish have many ways of defending themselves. Some have spines, some have toxins, some blend in and some even stick together. Schooling is a type of behavior where large numbers of fish swim in a group. This confuses predators because it is difficult to pick out just one fish. Sometimes, from a distance, a school of fish may look like one big fish. Schooling fish are able to move together because of their lateral line, which detects movement in the water. When one fish moves, the others feel it and move in sync.



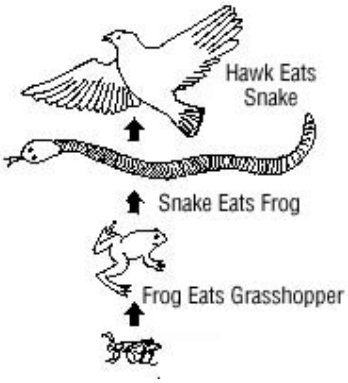
Materials:
- White construction paper (one sheet per student)
- Pencils
- Non-toxic red or orange stamp pads
- 1 non-toxic black stamp pad
- Thin markers, crayons, or tempera paint and brushes

Procedure:
1. Have students draw the outline of a fish on the white paper. If desired you can make a template that students can trace.
2. Have students place a thumb on the black stamp pad and then stamp their black thumbprint on their paper where their fish's eye would be.
3. Then have students add red and/or orange thumbprints all around their black thumbprints, filling the inside of the fish pattern.
4. Have students use markers to add fins, a tail, and a mouth to each of their thumbprints, making them look like tiny fish.
5. If desired, have students draw a background, the habitat where their fish might be found.
6. When completed take one of the papers and hold it up in front of the class. Ask the back row of students what they see, then ask the front row of students what they see. The back row should see one big fish, while the front row should see a school of small fish.

Food Web

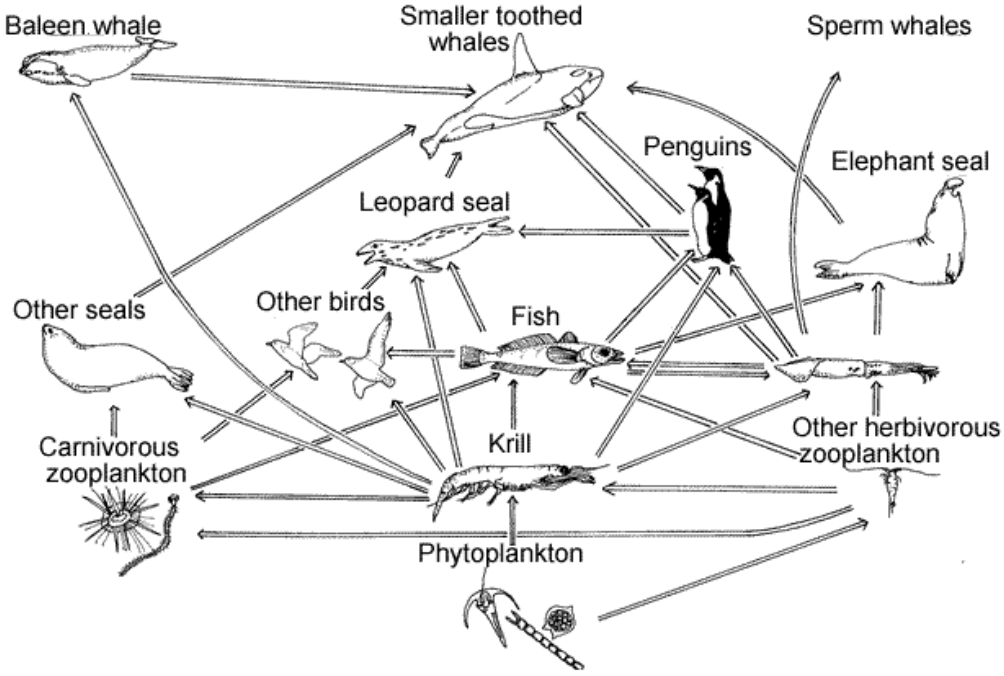
FACTS:

Everyone has heard of the **food <u>chain</u>** before. It starts with plants, also know as **primary producers**. These organisms get energy from the sun and create energy-rich compounds (carbohydrates). These organisms are then eaten by **primary consumers**; many of these animals are called **herbivores** because they eat only plants. The primary consumers are eaten by the **secondary consumers**. These relationships continue up the chain until you get to the **top predators**. For example, phytoplankton gets energy from the sun. The phytoplankton is eaten by zooplankton, tiny marine animals. The zooplankton is eaten by a baleen whale. Each level consumes the level below…



COMPLEXITY:

The problem with the example above is it's too simple. In real life, animals depend on more than one food source. For example loggerhead sea turtles eat both crustaceans and shellfish. A food web better represents the flow of energy in nature. A **food <u>web</u>** is a series of connecting food chains…



Food Web Interactive

Objectives:

1. Students will discover how living and nonliving components of ecosystems are interconnected
2. Students will learn to differentiate between the living and nonliving parts of a food web
3. Students will predict the outcome if parts of a food web are removed.

Background:

A food web is a series of connecting food chains which show the many possible energy links between living organisms. Most organisms do not rely on one food source. Food webs also rely on nonliving elements, like the sun. All of these relationships are affected by everything in their ecosystem.

Materials:

- Ball of yarn
- Index cards
- Masking tape

Procedure:

1. Label one index card the sun, then label the rest of the cards with plants and animals that are found in an ecosystem that the students are currently studying.
2. Have students sit in a circle
3. Hand out index cards to students and have them tape the card to their shirt.
4. Hand the ball of yarn to one "plant" and ask them to name another organism in the circle with which they interact with. Have the "plant" hold on to the end of the yarn and then pass the ball to the organism that they named. Ex: "I am a loggerhead I eat crabs" or "I am seagrass I need the sun to make my food."
5. As the yarn is passed, have the students wrap the yarn around their wrist once before they pass it on.
6. Continue passing the yarn until all the connections have been made.
7. Have students pick one organism in their web that seems less important than the others. Have the student with that index card drop their yarn. Ask if any other organisms should drop their yarn because they depended on that organism.
8. Have students reflect on what happened to the web and how certain connections had been affected.

Graphic Food Web

Objective:
To help students understand food webs by having them make a visual representation.

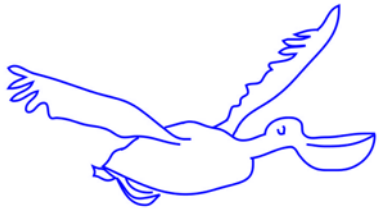
Background:
The food chain is easier to envision because it only deals with a few things. Food webs are more complicated and many times harder to visualize. Most animals don't eat just one thing; they usually have multiple food sources. This activity will help students better understand how the food web works.

Materials:
- Push pins
- Index cards
- String

Procedure:
1. Label on index card "sun."
2. Pick a habit that the class is studying. Have the students discuss what is found in that habitat
3. Label the other index cards with different animals and plants that are found in that habitat and hand them out to students.
4. Have students discuss whether their index card represents a plant or an animal and how that organism gets its energy. Does it make is own or does it have to eat a plant or animal?
5. Place the "sun" on the wall with the push pin. Then have students put their cards up on the wall, based on the food chain.
   (Ex: sun → grass → insect → frog)
6. Connect the chain together with the string.
7. Now take the string and make the rest of the connections. For example; the insects are not only eaten by frogs but birds eat them too. Some birds may even eat the frogs.

Extension:
Take one of the index cards off the wall. Tell the students that this animal went extinct. Ask students what happens to the web if one piece is taken away. The food web is nature's population control. Explore with the students the impact extinction can have on a food web and the ecosystem.

Predator Strategies



FACTS:
A predator is defined as "an animal that feeds on other organisms (usually other animals)". There are three main ways that animals find their food: 1) sit and wait; let food come to them, 2) look around for food, or 3) be a **parasite** (an organism that feeds on another living organism without killing it).

SIT & WAIT PREDATORS:
Animals that wait for their food to come to them are called "**sit and wait**" predators. Many of these animals use camouflage and mimicry. Some moray eels are camouflaged and hide in rocks, corals, or eelgrass beds waiting for an animal to get close enough for them to catch. Think about a moray eel…would you be able to see him if he was hiding in crevices in the coral? There are even some animals that attract their prey with trickery! Angler fish lure other fish with a light that dangles in front of it's mouth. When the curious prey gets close enough, the angler fish chows down!

SEARCHERS:
Other animals go looking for their food. Some of these animals can travel great distances to find food. Sharks are one example. From their excellent sense of smell to being able to detect small amounts of electricity that living organisms produce, sharks use many senses to help them find food.

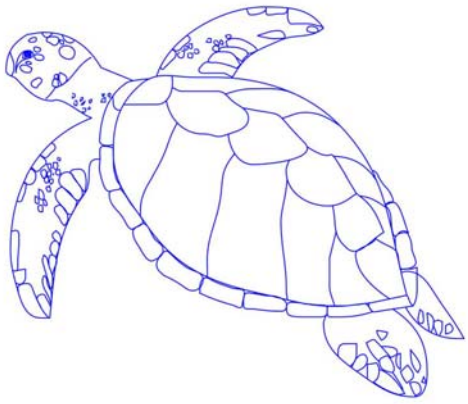
PARASITES:
Other animals are what we call parasites. A parasite feeds on another living organism (**host**) without killing it. It would be bad for the parasite if they killed their host because they would have to find a new host or they would die. There are many different parasites that live in the digestive tract. If you have any pets you may have heard about your animal having "worms", these are parasites. Another example of a parasite is a leech.

PICKY EATERS:
Some animals are **herbivores** (eat only plants), some are **carnivores** (eat only meat), and some are **omnivores** (eats both). Animals not only have different strategies for getting their food but they also have different adaptations to make it easier to get food. Loggerhead sea turtles have very strong jaws that allow them to crush the outer shells of crustaceans and shellfish.

Milk Jug Whale

Objective:
For students to gain an understanding of how certain whales eat.

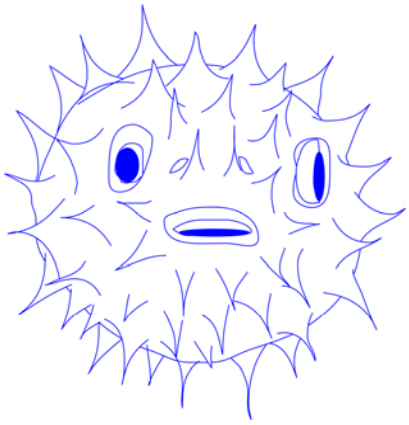
Background:
Most whales have teeth to help them hunt fish and squid, but there are a few that don't. Most of the larger whales, with the exception of the sperm whale, are toothless. These whales have baleen instead. The baleen in a whale's mouth is tough and springy and is used for straining plankton and krill from the ocean. Examples of baleen whales include humpbacks, right whales, blue whales and gray whales.



Materials:
- Clean plastic gallon jug (like a milk or juice container)
- Permanent colored marker
- Craft knife
- Large baking pan
- Water
- Teaspoon
- Glitter or dried herbs, such as oregano or parsley

Procedure:
1. Holding the jug on it's side with the handle at the top so it resembles a whale's head, outline a whale's mouth on the bottom of the jug and an eye on the side of jug.
2. Using the craft knife cut out the mouth. To make the whale's baleen, outline the shape and a series of vertical lines along on side of the "jaw. Cut along the lines to form slits.
3. Fill the baking pan halfway with water. Stir in a couple of teaspoons of dried herbs or glitter. Tell students that the dried herbs/glitter represents **krill** (small shrimp-like plankton.)
4. Grasp the jug by the handle, and with the baleen facing the bottom of the pan, slowly scoop water into the mouth of the whale.
5. Lift the jug just above the pan so the water can drain through the baleen.
6. Ask the students how successful their whale was at catching its food. Compare their milk jug whale to a real whale. Does their baleen work the same way?

Animal Defenses



Animals have many different ways of defending themselves against being eaten. It may be their coloration or they may have spines. Some animals even have toxins that make them taste bad to predators. Sometimes these adaptations may not only help them escape becoming dinner, but may help catch dinner too. Here are just a few of the many ways animals defend themselves…

CAMOUFLAGE:

Camouflage is the disguising of an animal so that it blends into its surroundings. Many animals use this not only to hide from predators, but also to hide from prey. There are a few different types of camouflage.

Counter shading - the animal is a dark color on the top of its body and a light color on the bottom. If a predator is looking down from above, the animal blends in with the dark ocean bottom. If a predator is looking up from below, the animal blends in with the lighter surface water. Penguins and many sharks, like the dogfish shark, are counter shaded.

Cryptic Coloration - the animal matches its background. Rock fish blend in so well that it is very hard to tell the difference between the fish and the rocks.

The third type of camouflage is called **disruptive coloration**. Disruptive coloration helps break up the animals' outline and makes them harder to see. Animals may have stripes, spots, blotches, or a combination of these to confuse predators. Some animals have a false eyespot so a predator can't tell where the head is, while other animals may have a line running through their eye to confuse a predator. One animal that has disruptive coloration is the clown fish. Can you think of other animals that have any of these types of camouflage?

COLOR:

Some animals are able to change their color. Squid and octopus have cells that hold pigment called **chromatophores** - cells that change the color of the body so that the animal can hide or warn other animals.

Many animals have bright **warning coloration** that act as a warning to other animals. These colors tell predators that this animal is poisonous or that the animal may taste bad. Many sea slugs are brightly colored for this reason.

An animal may look like, or **mimic**, a more dangerous animal to avoid being eaten; however, sometimes a more dangerous animal may mimic a harmless animal. The false cleaner fish looks like a cleaner wrasse. When an animal offers themselves to be cleaned the false cleaner fish takes a bite out of it and swims away.

Animal Defenses (coun.)

ARMOR:
There are many animals that have spikes or spines to protect themselves. When the porcupine puffer fish inflates, its spines stick up making them difficult to eat. Some animals may also have venom in their spines. Lionfish not only have disruptive coloration but they also have spines with venom to protect themselves.

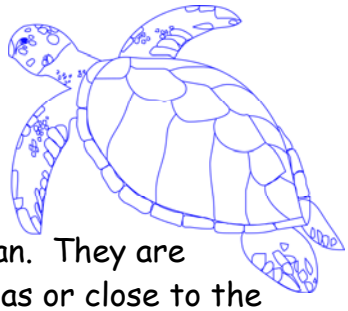
Camouflage Game

Objective:
To help students understand why camouflage can be useful to some animals

Background:
Camouflage is very useful to many animals. It helps some animals hunt their prey, while it helps others hide from predators. There are three different types of camouflage; when an animal matches its background (cryptic), when an animal is darker on the top of its body and lighter on the bottom (counter shaded), and when an animal has patterns or colors that help break up the outline of the body (disruptive).

Procedure:
1. This game should be played where there are a lot of places to hide.
2. One student is the "predator" and the rest are the "prey.
3. The "predator" closes their eyes and counts to 20, allowing everyone to hide. Remind the students to think about what colors they are wearing and how that might help them hide.
4. When the "predator" is done counting they have to try to find the ones that are hiding. However the predator can not take more than one step in any direction away from their start point.
5. When the "predator" finds someone, they have to say where the person is hiding and either say their name or what they saw. For example "I saw a red shirt from behind that tree," or "Timmy is hiding behind the big rock."
6. The "predator" can close their eyes and yell "closer" if they are having trouble finding people. The students hiding then have to the count of 15 to find a hiding spot closer to the "predator."
7. The game ends when only one student is left hiding.

Sea Turtle Basics



FACTS:
Sea turtles are one of the few reptiles found living in the ocean. They are **ectotherms**, which means their body temperature is the same as or close to the temperature of their environment (often referred to as "cold-blooded"). They have a hydrodynamic body shape and paddle-shaped flippers, making them excellent swimmers. Sea turtles use their front flippers for power and their back flippers for steering. They have special glands near their eyes to help them get rid of excess salt in their bodies.

GENDER:
There is no way to tell the difference physically between male and female turtles until they reach adulthood. As full-grown adults, male turtles have significantly longer tails than females. Males also have larger, more curved claws on their front flippers, while females have smaller claws.

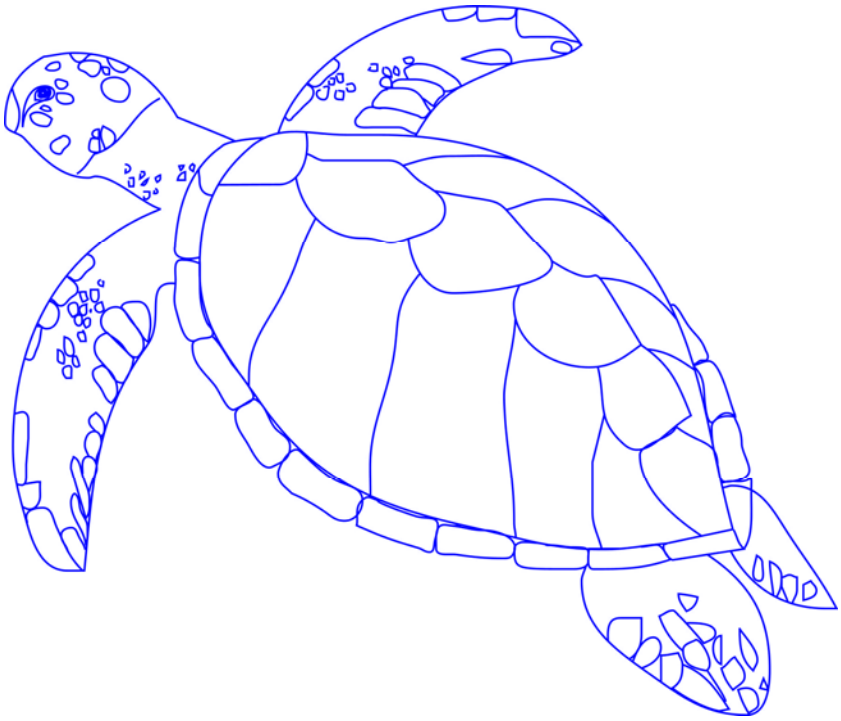
BREATHING:
Sea turtles have lungs, not gills like fish have, so they must come up to the surface to breathe. If a turtle is resting, it can hold it's breath for a few hours. If the turtle is active, the size, stress level, and activity of the turtle will determine how long it can hold its breath.

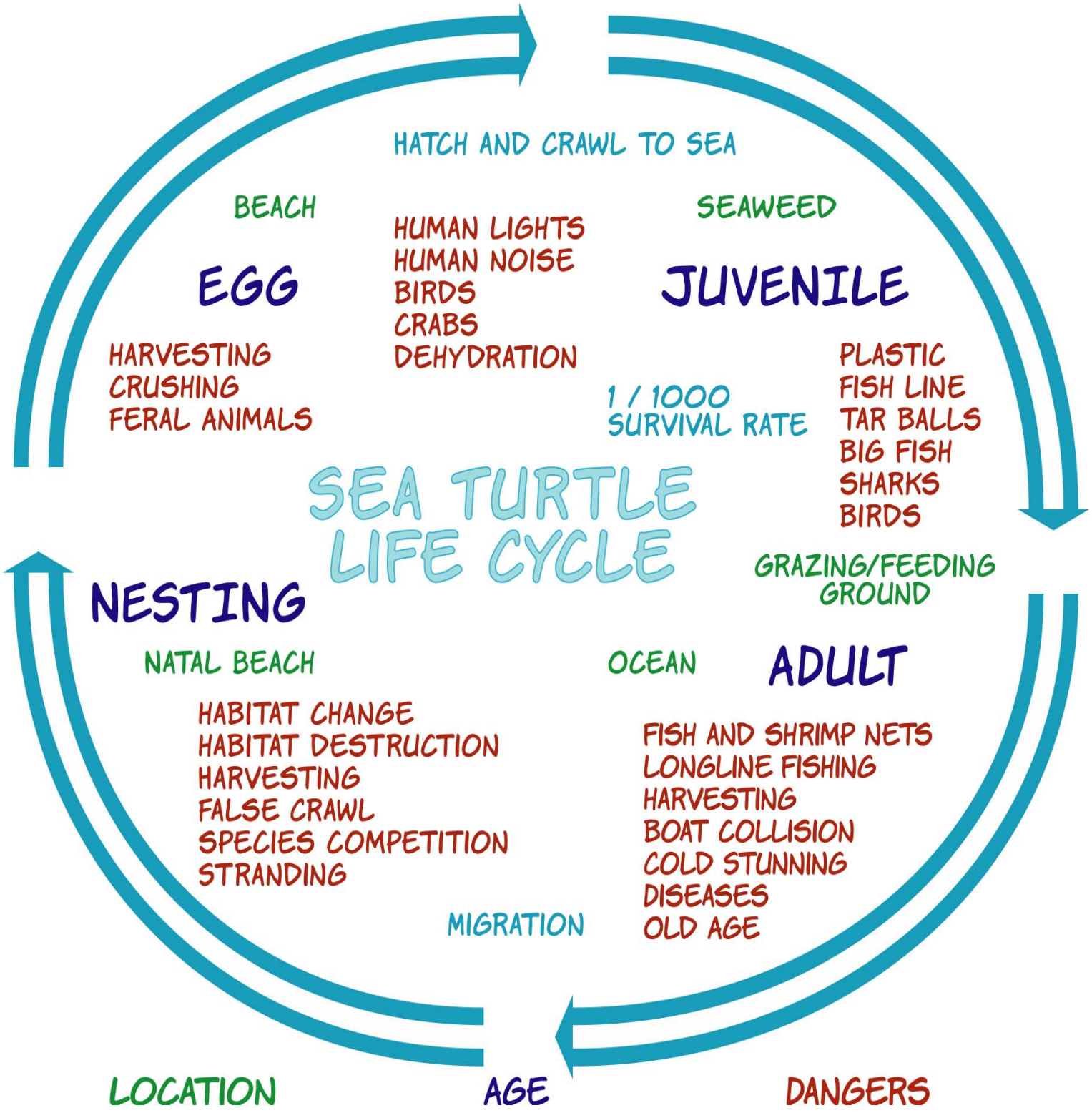
NESTING:
Most sea turtles spend their entire life in the ocean, except for the females who come onto the beach to lay their eggs. Some turtles will sun themselves on rocks or beaches to warm up. They nest on tropical and subtropical sandy beaches and scientists believe that female turtles return to the beach near where they hatched to lay their own nests. A female turtle usually nests every 2-3 years. Some turtles may nest 1-2 times in a season, while others nest 10-11 times that season. Depending on the species, a female can lay anywhere between 50-160 eggs in each nest. Sea turtles may live up to 100 years.

THREATS:
There are many problems that sea turtles face today. One of the biggest problems is pollution. Some turtles eat plastic bags because they mistake them for jellyfish. One thing that everyone can do is make sure their garbage goes where it belongs, and if you can recycle it - even better! Other threats to sea turtles include, but are not limited to: loss of nesting habitat, entanglement in fishing nets & line, ingesting discarded fishing hooks and collisions with boats.

THREATS (COUN.):
Tens of thousands of sea turtles have drowned in nets used to catch shrimp. Now, in the United States, these nets must have a TED (Turtle Excluder Device or Trawling Efficiency Device) installed. The TED is a round grate with bars that are too close together for a turtle to get through but are far enough apart to let shrimp in. It fits down into the narrow neck of the net and right next to it is an opening. It's basically a "trap-door" for the turtles that get caught in the net. If a turtle gets into the net it can swim out the opening.

SPECIES:
There are seven different species of sea turtles currently found in the ocean; leatherback, green, loggerhead, hawksbill, kemp's ridley, olive ridley, and flatback. Out of those seven, five can be found in the waters around Florida: leatherback, green, loggerhead, hawksbill, and kemp's ridley. Loggerhead, green, and leatherback turtles can all be found nesting here in Palm Beach County. All seven species are protected by law.




HATCH AND CRAWL TO SEA
BEACH
SEAWEED
HUMAN LIGHTS
HUMAN NOISE
BIRDS
CRABS
DEHYDRATION
EGG
JUVENILE
HARVESTING
CRUSHING
FERAL ANIMALS
1 / 1000
SURVIVAL RATE
PLASTIC
FISH LINE
TAR BALLS
BIG FISH
SHARKS
BIRDS
SEA TURTLE
LIFE CYCLE
GRAZING/FEEDING
GROUND
NESTING
NATAL BEACH
OCEAN
ADULT
HABITAT CHANGE
HABITAT DESTRUCTION
HARVESTING
FALSE CRAWL
SPECIES COMPETITION
STRANDING
FISH AND SHRIMP NETS
LONGLINE FISHING
HARVESTING
BOAT COLLISION
COLD STUNNING
DISEASES
OLD AGE
MIGRATION
LOCATION
AGE
DANGERS

Loggerhead Sea Turtles

FACTS:
The loggerhead turtle is the most commonly spotted sea turtle in Florida. They are found along the inshore and coastal waters of the Gulf of Mexico, the Florida Keys, and along the eastern seaboard as far north as New England. These turtles get their name because of the size of their head. Their shell is a brown to reddish brown color. Adult loggerheads can weigh 200 to 350 lbs and measure about 3 feet long. They have powerful jaws which are used for crushing mollusks, crabs, and encrusting animals attached to reefs and rocks. The shell of the loggerhead is very thick, especially toward the back. This may serve as protection from sharks. This species is a relatively slow swimmer and does occasionally fall prey to sharks.

NESTING:
Loggerheads can be found nesting in Florida from late April to September. They lay on average 110 eggs in each nest, which takes about two months to hatch. It's estimated that 18,000 females nest in the southeastern U.S. annually.

STATUS & THREATS:
Loggerhead turtles are listed as a threatened species under the U.S. Endangered Species Act. They have many major threats to their survival, including drowning in shrimp nets, long line fishing, loss of nesting habitat, ocean pollution, and collisions with boats.

Loggerhead Turtle FAST FACTS

- Most common sea turtle in Florida waters
- Named for its large head
- Adults weigh 200 to 350 lbs and measure about 3 ft in length
- Hatchlings are 2 in long
- Nest in Florida from late April to September
- They lay 105-120 eggs per nest
- Average 60 days for eggs to hatch
- Feeds on crustaceans, shellfish, and encrusting animals attached to reefs and rocks

Green Sea Turtles

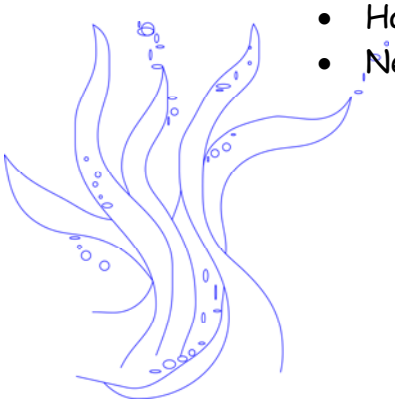
FACTS:
Green turtles get their name not because of the color of their shell but because of what they eat and the color of their body fat. Adult green turtles are herbivores, eating only seagrass; this is the reason for the greenish color of their body fact. Hatchlings, on the other hand, are omnivores (they will eat whatever they can find). Green turtles are found mostly in tropic parts of the Atlantic, Pacific, and Indian oceans. They are found in sandy, shallow areas with sea grasses or on reefs where seaweed can be found. They can be found sleeping near scattered rocks, sandbars, and coral heads. Everyday they migrate from their sleeping sites to their feeding sites, which can be separated by a few miles.

NESTING:
Green turtles are found nesting in Florida from June through late September. They nest every 2 to 4 years and sometimes lay up to 9 nests per season. Green turtles will lay between 75 and 100 eggs per nest, which will hatch after 48-70 days.

STATUS & THREATS:
The green turtle is considered endangered in Florida and the Pacific coast of Mexico. They are considered threatened everywhere else. For many centuries there was a high demand for green sea turtle meat, shells, and leather. Other major threats to these turtles include poaching, drowning in nets, loss of nesting habitat, and ocean pollution.

Green Turtle FAST FACTS

- Only adult sea turtle with a diet of seagrass and seaweed
- Named for the greenish color of their body fat
- Average weigh is 300 lbs and average length is 3.5 ft
- Females lay up to 9 nests per season and nest every 2 to 4 years
- They lay 75 – 150 eggs per nest
- Average 48-70 days for eggs to hatch
- Hatchlings are about 2 in long
- Nest in Florida from June through late September.



Leatherback Sea Turtles

FACTS:
Leatherback turtles are the largest of the sea turtles. Their average weight is around 1,100 lbs and the average length of these turtles is about 6ft long. The largest leatherback found was a male and he was almost 10ft long and weighed close to 2,000 lbs. These sea turtles travel the farthest, dive the deepest, and swim into the coldest water. They are also the only "soft-shelled" sea turtle. Instead of having **scutes** (*boney plates*) covering their shell like most sea turtles, they have a leathery, scaleless skin made of tough, oil-saturated tissue raised into seven ridges. Leatherbacks feed on jellyfish and they often mistake plastic debris as their food source. Active leatherbacks can be found in very cold waters, below 43°F. It is believed that these turtles regularly migrate north in search of large concentrations of jellyfish. Leatherbacks can live in cold water because they can retain heat produced by muscular activity. They may also be able to actively regulate their body temperature, unlike other sea turtle species. Leatherbacks are also incredible divers. Turtles have been recorded diving to depths of over 3,300 feet! This is greater than reported for any air-breathing vertebrae with the possible exceptions of sperm whales and elephant seals.

NESTING:
They nest in Florida from March through August and each year about 550 nests are reported state-wide. Leatherbacks tend to nest every other year, producing between 2 and 8 nests per season with 50-180 eggs per nest.

STATUS & THREATS:
Leatherbacks are highly endangered due to long line fishing. These turtles feed on jellyfish found in pelagic regions and often encounter the same fishing grounds as swordfish and tuna fisheries, leaving them exposed to the long line hooks.

Leatherback Turtles FAST FACTS

- Named for their smooth, rubbery shell
- Feed on jelly fish
- Adults weigh between 700 to 2,000 lbs and measure between 4 and 8 ft
- Hatchlings are 2.5 in long
- Nest in Florida from March through August
- Lay between 50 and 180 eggs per nest

Hawksbill Sea Turtles

FACTS:
Hawksbill turtles are small to medium-sized turtles, weighing around 120 lbs and measuring about 2.5 feet long. They have a slender body and head. They have a narrow beak that resembles that of a hawk, hence the name "hawksbill". These turtles are found in the Atlantic Ocean, Pacific Ocean, Indian Ocean, and the Caribbean Sea. They live around coral reefs, rocky shallows, shallow coasts and lagoons in tropical and subtropical areas. They eat a wide variety of invertebrates, but they prefer sponges. Hawksbills have a very unique shell. It's a reddish or dark brown color and is the only turtle whose scutes overlap each other.

STATUS & THREATS:
Hawksbill turtles are highly endangered throughout the world. Hawksbills were hunted for their shells for many years, which gave rise to the tortoise shell jewelry trade. This caused a rapid decline in their population, from which the species is still recovering.

Hawksbill Turtle FAST FACTS

- Can weigh 120 lbs and be 2.5 ft long
- Females nest every 2 or 3 years and lay several nests per season
- Lay about 160 eggs per nest
- Hatchlings are 1.75 in long
- Prefer to eat sponges
- Have been harvested for their beautiful shells

Kemp's Ridley Sea Turtles

FACTS:
The Kemp's ridley turtle is a small sea turtle. Adults weigh 85 to 100 lbs and measure 2 - 2.5 ft long. They are found primarily in the Gulf of Mexico, but they do migrate up and down the Atlantic Coast. These turtles live in shallow coastal areas, bays and lagoons. Their shell color ranges from an olive to a gray-green color and is oval or heart shaped. Kemp's ridleys feed on crustaceans, clams, mussels, fish and jellyfish. In many areas their preferred food is blue crab.

NESTING:
These turtles have a very interesting nesting behavior. Instead of coming up onto the beach to nest alone at night like most other turtles, female Kemp's ridleys come up to nest in groups at the same time during the day, rather than at night. The term used to describe this event is "arribadas", which is Spanish for "arrivals". They only nest on a 20 mile stretch of Mexican coastline. A female will lay about 100 eggs per nest and may nest several times each season.

STATUS & THREATS:
The Kemp's ridley is the rarest and most endangered of the sea turtles. Their nesting behavior has made it easy for poachers to collect their eggs. Females used to be caught before they even reached the shore, just to harvest their eggs. Now, the only beach where they nest, Rancho Nuevo on Mexico's gulf coast, has been declared a Natural Reserve and programs have been put in place to protect this nesting beach. Other threats to the Kemp's ridley include drowning in shrimp nets, habitat destruction and pollution.

Kemp's Ridley FAST FACTS

- Rarest and most endangered of the sea turtles
- Only nest on a 20-mile stretch of beach in the western Gulf of Mexico
- Females synchronize egg laying in mass nestings
- Nesting occurs during the day
- Adults weigh between 85 and 100 lbs and measure 2 – 2.5 ft
- Feed on blue crabs, clams, mussels, fish and jellyfish
- Hatchlings are 1.5 in long
- Lay about 100 eggs per nest
- Nesting usually occurs from April to July

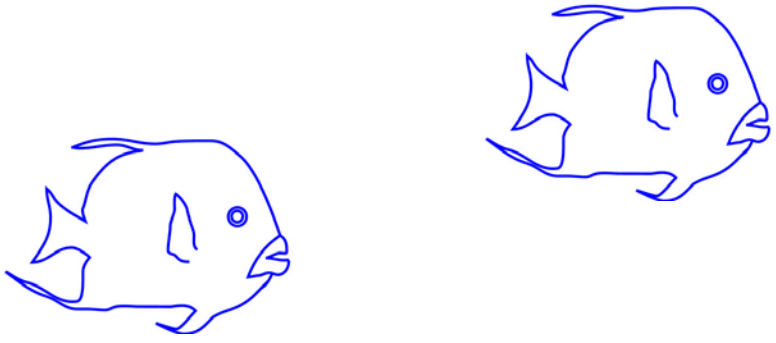
Olive Ridley Sea Turtles

FACTS:
The olive ridley is the smallest of the sea turtles and gets its name from the olive color of its shell. The shell is heart shaped, just like the Kemp's ridley. They are found in the tropical waters of the northern Indian Ocean, eastern Pacific Ocean, and in the eastern Atlantic Ocean along the coast of Africa. They forage offshore in surface waters and can dive to depths of up to 500 ft to feed on bottom-dwelling organisms such as shrimp, crabs, sea urchins, and occasionally jellyfish.

NESTING:
Most olive ridleys nest on mainland shores near the mouths of rivers or estuaries. These turtles synchronize their nesting just like the Kemp's ridleys do. They nest in relatively large numbers on a few protected beaches, however due to harvesting of eggs and the turtles themselves for their meat, skin, and shells, most populations have collapsed.

Olive Ridley FAST FACTS

- They can be 85 lbs and 2.5 ft in length
- They lay about 100 eggs in a nest
- Hatchlings are about 1.5 in long
- Nesting occurs mainly in summer and fall
- May lay multiple nests per season
- Adults eat lobsters, fish, crustaceans, mollusks, algae, fish eggs and jellyfish



Flatback Sea Turtles

FACTS:
The flatback gets its name from its flat **carapace** (top shell); other turtles have an arched shell. The adults have an olive-gray color to their shell. They can weigh 200 lbs and can be 3 – 3.5 ft. Flatbacks live in inshore waters, bays and shallow sea beds. They are only found in the tropical areas of the Australian continental shelf. This includes the Indonesian archipelago, Irian Jaya, and Papua New Guinea. Their diet consists of sea cucumbers, jellyfish, mollusks, seaweed, and other invertebrates.

NESTING:
Flatbacks only nest in Australia and lay approximately 50 eggs per nest. These turtles nest from November to February, however in the Northern Territory, nesting occurs year-round with August being the peak month.

STATUS & THREATS:
This species of turtle is listed as vulnerable under the Australian Commonweath's Endangered Species Protection Act. Some of the major threats to this species include harvesting of adults and eggs, drowning in nets, and ocean pollution.

Flatback Turtle FAST FACTS

- They can weigh 200 lbs and be 3.25 ft long
- Nests only in Australia
- They lay about 50 eggs per nest.
- Nesting usually occurs from November to February (remember seasons are opposite in the southern hemisphere)
- In the Northern Territory nesting occurs year-round with a peak in August
- Adults eat sea cucumbers, jellyfish, mollusks, prawns, bryozoans, other invertebrates and seaweed

Brainstorming Sea Turtles

Objectives:

1. Students will describe their knowledge of sea turtles.
2. Gain a better understanding of the interconnectedness of certain species.
3. Reinforce and demonstrate proficiency of vocabulary.
4. Display what they have learned about sea turtles.

Method:

Students provide themes and vocabulary to create a semantic map through group brainstorming.

Materials:

- Whiteboard/chalkboard/ or large easel pad
- Appropriate writing materials (markers, chalk, pen, etc…)
- Eraser

Duration:

Two 15-30 minute sessions (one session at the beginning of the curriculum and one session upon completion of lessons).

Background:

This activity, also known as semantic mapping, is great either as a group discussion or as part of a creative writing activity. It is a brainstorming session that allows the students to share their knowledge of a subject, reinforces the information they already have and helps build vocabulary. It can be modified for any age group or type of class.

Procedure:

1. Start by writing the words "sea turtle" on the board.
2. Draw a circle around the words.
3. Ask the students to think of things that are in some way "connected" to sea turtles.
4. Write each new idea in another circle connected by a spoke to the sea turtle circle. Some of the circles may be connected to each other as well.

5. The teacher may want to pose prompting questions such as:
   • What do sea turtles eat, and what animals eat sea turtles? Are any of those animals related to each other in some way?
   • Where do sea turtles live?
   • What do sea turtles look like?

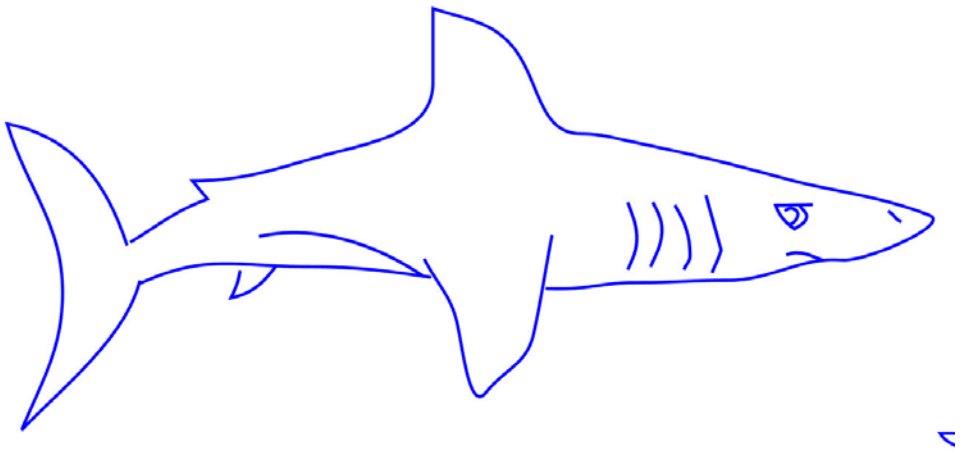
- Do sea turtles have any enemies?
- How do sea turtles reproduce?

Extensions:

1. Use the completed concept and vocabulary for a free-writing exercise.
    a. This could be done as a story, poem, journal writing or a fictional news report.
2. Instead of using words, have the students artistically demonstrate their knowledge of sea turtles.
    a. This could be done as a poster, collage, mobile, etc…
    b. Display the finished projects for others to enjoy.

Evaluation:

Use this activity as both an introduction to the material as well as a posttest. This will provide a concrete baseline to determine the effectiveness of the lesson as well as the knowledge retention of the class.



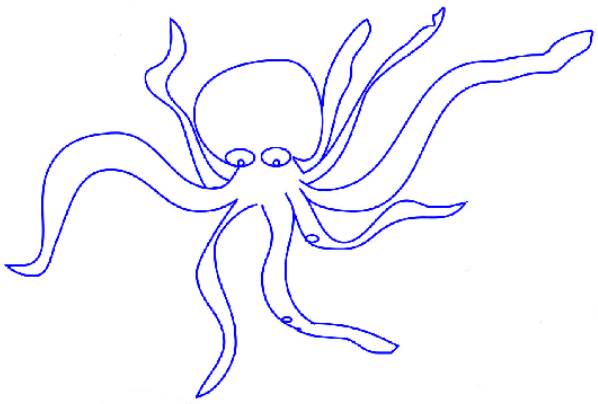
Lights Out Turtle Crawl

Objective:
For students to gain an understanding of hatchling behavior and what we think makes hatchling turtles head for the ocean.

Background:
When hatchling sea turtles break out of their shells and find their way out of the sand, they crawl as quickly as they can for the ocean. There are many predators of hatchling turtles, such as birds, crabs and fish. That is one reason why these turtles usually wait until it is dark to crawl across the beach to the ocean - it makes it harder for them to be seen by predators.

Procedure:

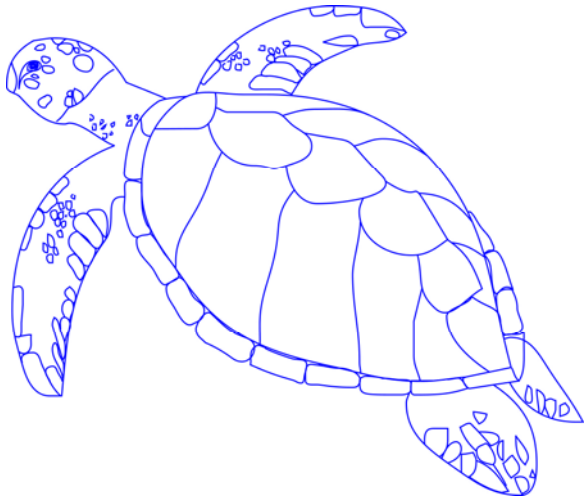
1. Clear a space in the room. Pick one side to be the nest and the other side to be the ocean.
2. Choose as many students as your space allows, these are your hatchling turtles. Tell them that their goal is to make it from their nest to the ocean.
3. Have someone turn on and off the lights. Students can only move when the lights are off. If they move when the lights are on, they are out of the game because they were eaten by a predator.
4. Continue to turn on and off the lights until one student has made it to the ocean.
5. Have students explain to you why the hatchling turtles are still in danger even after they get to the ocean. Are there predators in the ocean? How do hatchlings protect themselves from predators in the ocean?



Making a Loggerhead Turtle

Materials:

- Paper plates
- Scissors
- Pencil
- Stapler
- Piece of string
- Black Marker
- Green and brown paint



Procedure:

1. Cut the rim off the paper plate, leaving the rim in one piece.
2. Make a cut in the circular piece from the edge to the center of the plate. Overlap the two edges and staple them together to make the turtle's shell.
3. Cut three 3.5 in long pieces and two 1.5 in from the rim. These pieces will be your head and flippers
4. Trim the pieces to make two front flippers, a head, and two back flippers. Use the marker to draw small scales on the pieces. You can also draw eyes and nostrils on the head.
5. Staple the head and flippers to the edges of the shell.
6. Paint the shell a greenish-brown color. Paint the flippers and head brown.
7. Make a knot in one end of a short piece of string. Thread it through the center of the shell from underneath and tie a small loop in the top end.

"Race for Survival"

Objective:
Students will participate in a game where they role-play sea turtles trying to survive by gathering the necessary resources. Students will be able to identify three basic needs of sea turtles and explain what will happen if those needs are not met.

Duration: 30-40 min

Background:
All animals, including humans, share the same basic needs for survival: food, water, shelter, and space in a suitable arrangement appropriate for the animals needs. These components make-up an animals' habitat or environment in which it lives. The amount of food, water, shelter, and space is directly proportional to population size.

The sea turtles' habitat is within the ocean. It is a harsh environment composed of differing salinity regimes and heavy predation. So, in an environment as such, how do they get fresh water, what do they eat, and where do they find shelter? Sea turtles are hypo-osmotic. This means that they tend to lose water to the surrounding salt water. However, their skin and shells are resistant to water diffusion and the intake of seawater that they drink. In addition, they have glands that help pump salt water out of their bodies, leaving fresh water behind. Sea turtles also get water from the foods they eat. Their diet varies from plants to soft-bodied jellyfish to hard-bodied crustaceans. When sea turtles are not feeding or looking for food, they tend to rest in safe havens, hidden from predators such as sharks, in sea grass beds or coral reefs.

Aside from living in a harsh environment, sea turtles also face many threats posed by humans; many of which relate to their food, water, shelter, and space. Over-fishing and habitat loss of their prey has become a large problem. A growing threat is the introduction of non-native invasive seaweeds and sea grasses. These plants dominate and kill off native plant species which make-up the diet of green sea turtles. Coral reefs are on the decline because of the use of coral for jewelry or other man-made trinkets. The loss of shelter and the decline of food resources are not the only threats to sea turtle survival. Water contamination also plays a part. For example, oil spills can clog turtles' tear ducts and salt glands, which help them to pump the excess salt out of their bodies. This reduces the amount of fresh water available to the turtles, many times causing death.

Materials:

- Open space in which to play the game
- Resource cards that represent "food" and "water"
- 3 Hula-hoops to designate shelter areas

Pre-activity:

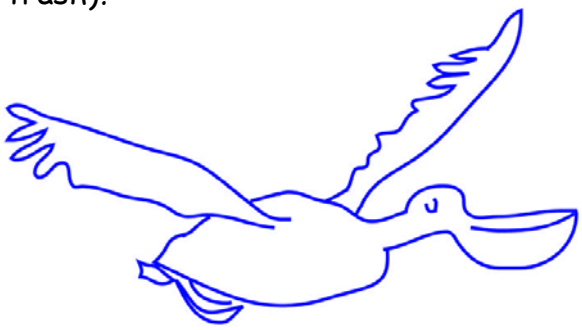
1. Ask students what all animals, including humans, need to survive?
   -FOOD, WATER, SHELTER
2. Describe sea turtles' food resources (crab, sea grass, jellyfish)
3. Describe the turtles' shelter (coral reef, sea grass, open ocean)

Activity:

1. Assign students a species of sea turtle (Loggerhead, Leatherback or Green turtle). Make sure students know what each species eats and where it lives in the ocean:
   Loggerheads > eat crabs > lives in coral reefs
   Greens > eat seagrass > live in seagrass beds
   Leatherbacks > eat jellyfish > live in open ocean
2. Place hula hoops in playing area, designating the shelter (CORAL REEF, SEA GRASS, OPEN OCEAN)
3. Scatter resource cards over playing area.
4. Each student begins by finding the designated shelter spot for their species GREEN TURTLE– SEA GRASS (sea grass is shelter & food)
   LOGGERHEAD – CORAL REEF
   LEATHERBACK –OPEN OCEAN
   When you say go, students must leave their shelter to find one food resource card. They must return to their shelter after they find a food resource and wait for the next round.
5. Next, choose 2 students to become 1) a predator & 2) a threat, and give them each a necklace (i.e. SHARK & FISHING HOOK)
6. "Predators" & "threats" can tag turtles to capture them, but then must walk them to the "turtle graveyard" (anywhere out-of-bounds) before returning to capture another turtle. Turtles are considered safe inside their shelter areas (no capturing allowed).
7. Continue until all resources are gone. What happens when the turtles run out of resources? (Not enough food, the turtles will have to find a new shelter where food is plentiful, or they will starve to death). What types of "predators" or "threats" did the turtles have to face? Were they natural predators or human-caused?

Discussion/Assessment:

1. Have one representative from each sea turtle species explain to the group what type of sea turtle they were, what they ate, and where they found shelter.
2. Have students explain to you again what all animals need to survive (FOOD, WATER, SHELTER). Ask students if everyone received at least one food resource. What happened when the resources started running out?
3. Ask the students what factors kept them from getting back and forth to their shelter safely. What could they have done to keep from being tagged by the predator? Draw out conclusions such as camouflage, being quiet, swimming fast. Explain that these are all adaptations that sea turtles have.
4. What could be some of reasons for their resources to decline? (Over-fishing, pollution kills their food source,…)
5. Ask students if they can think of anything they could do to help the turtles survive? (Recycle, don't litter, be careful when fishing, bring injured turtles to our hospital)
6. Could we eliminate any of the "threats" (fishing nets, hooks, propeller injuries, debris/trash)?



Protecting Our Oceans

There are many threats which face our oceans and the plants and animals that call it home. Pollution, over-fishing, habitat destruction and invasive species are all big problems. No only do these problems affect the ocean and its inhabitants, but they affect people too.

POLLUTION:
Pollution can be caused by many different things: throwing garbage into the sea, debris falling overboard from boats, or even when a ship sinks. Pollution in the ocean can even be caused by pollution on the land. Litter that is thrown on the ground may eventually make it to the ocean. Pollution can also be caused by chemicals spilling into the ocean, like oil or gasoline or chemicals that have been used someplace on land like pesticides and fertilizers. Even too many nutrients in the fresh water run-off can be harmful and can be considered pollution. Each year we dump about 100 million tons of plastics, 17 million tons of sewage and sludge, 5 million tons of oil, and 5 trillion gallons of toxic waste into the marine environment!

OVER-FISHING:
Over-fishing occurs when humans take a species from the ocean faster than it can reproduce to maintain its population. It is believed that about 70% of the worldwide fish stocks are over-fished. Over-fishing of a species can cut off food from upper-level predators and can also allow lower-level organisms to overpopulate because they are not being eaten.

HABITAT LOSS:
Habitat destruction is another problem. Coastal development threatens wetlands and mangroves. Animals lose their nesting and nursery habitats because of development. Coral reefs are in trouble for a number of reasons, including over harvesting, pollution, and increasing water temperatures. Scientists estimate that 25% of the Earth's corals have been destroyed due to human activities.

INVASIVE & EXOTIC SPECIES:
Invasive (or exotic) species are another problem for many ecosystems. These species may have been brought either intentionally or unintentionally to their new environment. With the lack of natural predators, these species usually out-compete native species for space and resources.

There are many ways that you can help, even without leaving home. Here is a list of things you and your family can do…can you think of any others?

Ways to Help!

- **Educate yourself!** Read the newspaper, guidebooks, watch nature programs on television, and attend lectures to find out more about Florida's fragile marine ecosystem.

- **Eradicate exotics!** Find out what exotic (non-native) species are particularly harmful to the native plant population, and remove them from your yard and encourage your parents to landscape with native plant species. This also eliminates the need for fertilizers and pesticides! Also, never release pets into the wild; you may be releasing an exotic species. Try to find a new home or a shelter that will take it.

- **Reduce, Reuse, Recycle!** Buy recycled products such as recycled paper; use Tupperware that can be used over and over, instead of plastic bags; recycle and encourage those around you to do the same.

- **Volunteer!** Call up your local wildlife refuge, environmental agency or the Loggerhead Marinelife Center, and make volunteer to a difference!

- **Watch what you dump!** Don't dump anything down the storm drains - it goes directly into lagoons (i.e. Lake Worth Lagoon), lakes and oceans.

- **Reduce household hazardous waste** and dispose of it waste properly. Take toxic waste to appropriate collection sites (i.e. SWA).

- **Be a friend to the environment!** Find environmentally friendly alternatives for harsh chemicals. Make your own household cleaners using vinegar, baking soda or good old fashion elbow grease.

- **Give a hoot – don't pollute!** Pick up litter anywhere and everywhere you see it. Place it in a trash receptacle or recycling bin.

- **Don't be a grease monkey!** Maintain your boats, and cars to reduce oil leaks.

Glossary

Adaptation: The ability of an organism to adjust to its surroundings for a better chance of survival.

Atlantic Ocean: The second largest ocean in the world that borders the east coast of North and South America and the west coast of Europe.

Biodegradable: Material that is able to decompose naturally.

Camouflage: Coloration or markings on the body to help the creature to blend in to his surroundings.

Carapace: The top shell on any turtle.

Carnivore: Any organism that eats strictly meat.

Conservation: Protecting the world's valuable resources such as the land, beaches, and seas.

Coral reef: A rock-like habitat in the tropical waters made up of small living coral polyps where many different fish and sea creatures live.

Counter shading: A type of camouflage where the animal is a dark color on the top of its body and a light color on the bottom.

Cryptic coloration: A type of camouflage where the animal matches its background.

Disruptive coloration: A type of camouflage where the animal's coloration helps break up the outline of its body and makes the animal harder to see.

Ecosystem: A community of living and non-living things that exist in a natural system (i.e. A coral reef ecosystem).

Egg: A shell used to protect and feed a growing organism before it hatches (sea turtle egg is leathery and looks similar to a ping-pong ball).

Endangered species: Animals that are at a risk of becoming extinct, due to a variety of reasons, such as, habitat loss, over fishing, pollution, etc.

Erosion: The removal of sand or soil from an area by means of wind and/or water.

Exoskeleton: A hard skeleton located on the outside of the body.

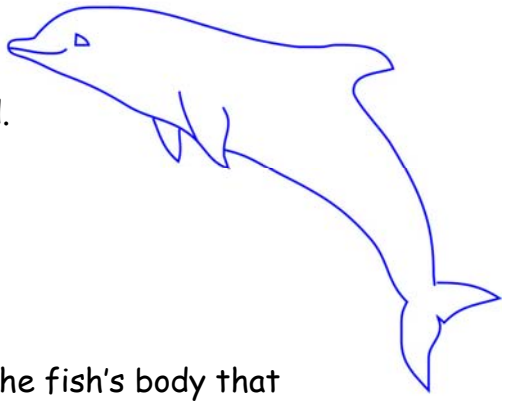
Food chain: The transfer of food energy starting with the sun making plants grow, to the animals that eat plants, to the animals that eat other animals.

Food web: The complex system of food energy transfer between living things. All things depend on the sun to survive, plants grow, animals eat plants and other animals. When the animals die they are decomposed by bacteria and, in turn, enrich the soil for plants to grow.

Gulf stream: The fast moving current found to the east of Florida's coastline. Sea turtles swim this current, which aids in migration.

Gyre: Any manner of swirling vortex often used to describe wind or ocean currents.

Habitat: A place that an organism lives. It provides shelter, food, space, and all of it's basic needs.



Hatchling: A baby sea turtle that has recently hatched.

Herbivore: Any organism that eats strictly plants.

Invertebrate: An animal that doesn't have a backbone.

Lateral line: Lines of sensory pores along the length of the fish's body that detects differences in water pressure; allows fish to detect vibrations.

Life cycle: The process of growing and maturing into an adult organism. (A sea turtle's life cycle starts as an egg, becomes a hatchling, grows into a juvenile sea turtle, then into a mature adult turtle.)

Nest: A pit dug out by a female sea turtle where she lays her eggs. The sea turtle covers her eggs with sand for protection.

Omnivore: Any organism that eats both plants and animals.

Plastron: The bottom shell of any turtle.

Pollution: Waste material and trash that is not properly disposed of, causing harm to the natural environment.

Predator: Any animal that hunts and eats other animals for food.

Prey: Any animal that is hunted and eaten by a predator.

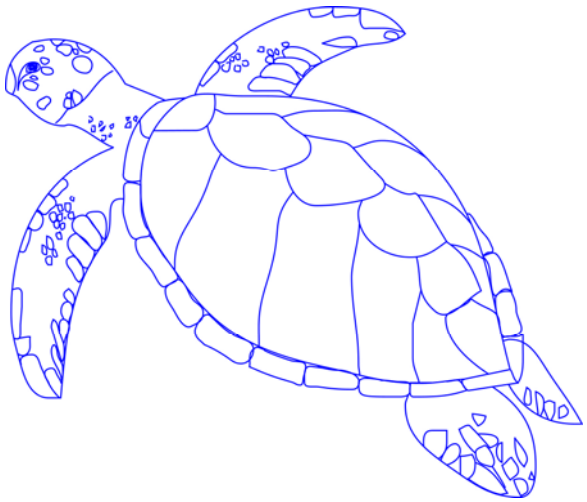
Recycle: A way to reuse materials and cut down on waste in landfills.

Reptile: A group of animals that have scales,
breathe air, lay eggs, and whose body temp is regulated by their environment.

Scutes: Boney plates covering a sea turtle's shell.

Swimbladder: Sac filled with gas located in their body which is used to help keep the fish buoyant in the water.

Symbiosis: A close, prolonged association between two or more different organisms of different species that may, but does not necessarily, benefit each member.



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Florida Sunshine State Standards

Activities included in this Guide will help support the following standards:

K-2nd
Science

SC.D.2.1.1.
SC.F.1.1.1.
SC.F.1.1.3.
SC.F.1.1.4.
SC.F.2.1.2.
SC.G.1.1.2.
SC.G.1.1.3.
SC.G.1.1.4.
SC.G.2.1.2
SC.H.1.1.1.

3rd-5th
Language Arts
LA.B.1.2.
LA.B.2.2.

Social Science
SS.B.2.2.2
SS.B.2.2.3

Science

SC.B.2.2.1.	**SC.D.1.2.2.**
SC.D.2.2.1.	**SC.F.1.2.2.**
SC.F.1.2.3.	**SC.F.2.2.1.**
SC.G.1.2.1.	*SC.G.1.2.2.*
SC.G.1.2.5.	*SC.G.1.2.6.*
SC.G.1.2.7.	*SC.G.2.2.1.*
SC.G.2.2.2.	*SC.G.2.2.3.*

Adopt-A-Sea Turtle!

You can support our sea turtle hospital by "adopting" one of our resident sea turtles or one of the leatherback turtles that we track in the ocean via satellite.

Our sea turtle hospital treats and releases dozens of patients annually. Your turtle adoption directly supports this effort by providing the funding for medications, tank maintenance, food, and veterinary care.

Our pioneering leatherback research allows us to peer into the mysterious movements of giant leatherback turtles after they have nested on our beach. Your leatherback adoption helps support our center as a whole, as well as leatherback research by offsetting the costs associated with equipment, personnel, and satellite time.

Please fill out the following information:

RESIDENT TURTLE ☐ LEATHERBACK TURTLE ☐

TEACHER'S NAME: _____

CONTACT EMAIL: _____

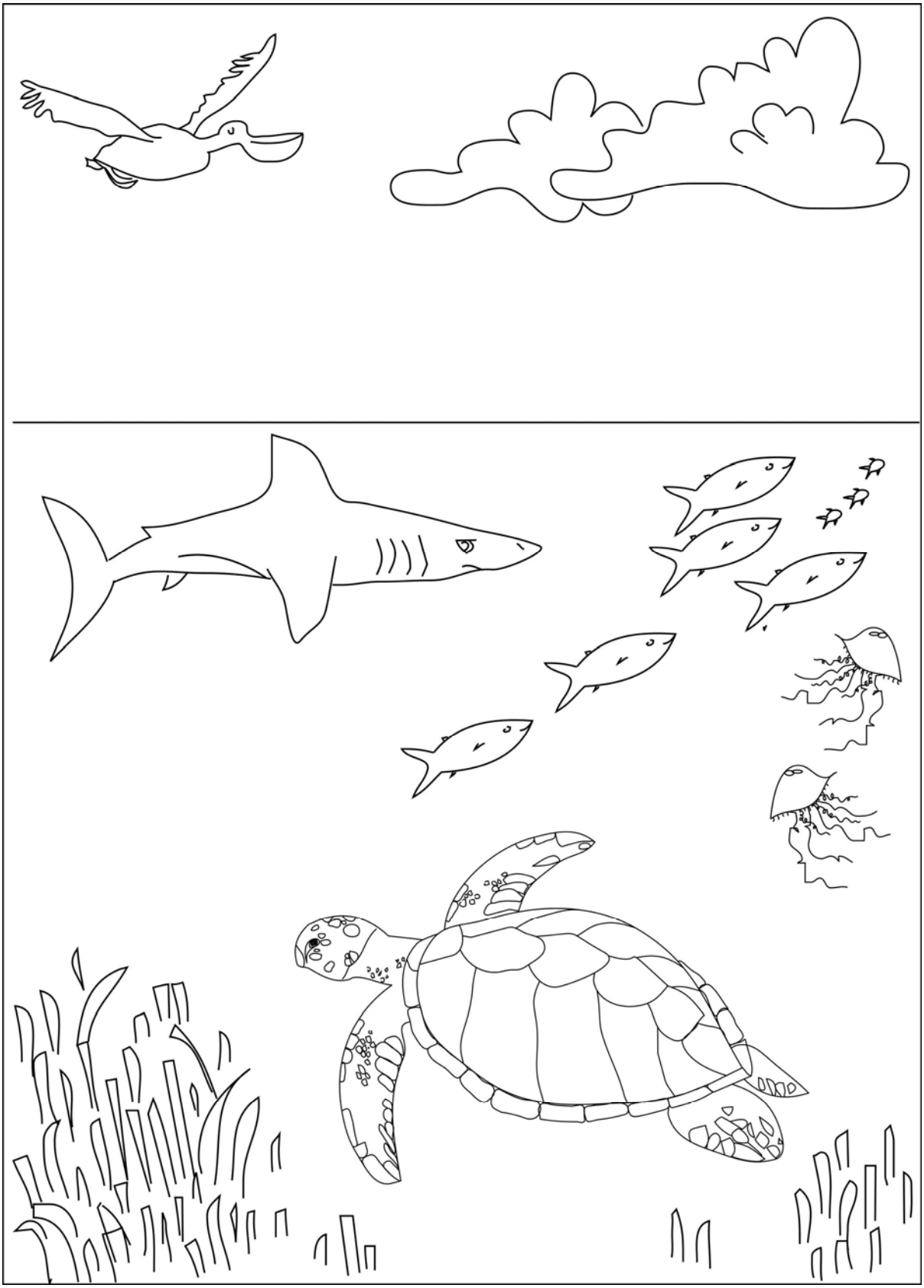
NAME ON CERTIFICATE: _____

ADDRESS: _____

CITY: _____ **ST:** _____ **ZIP:** _____

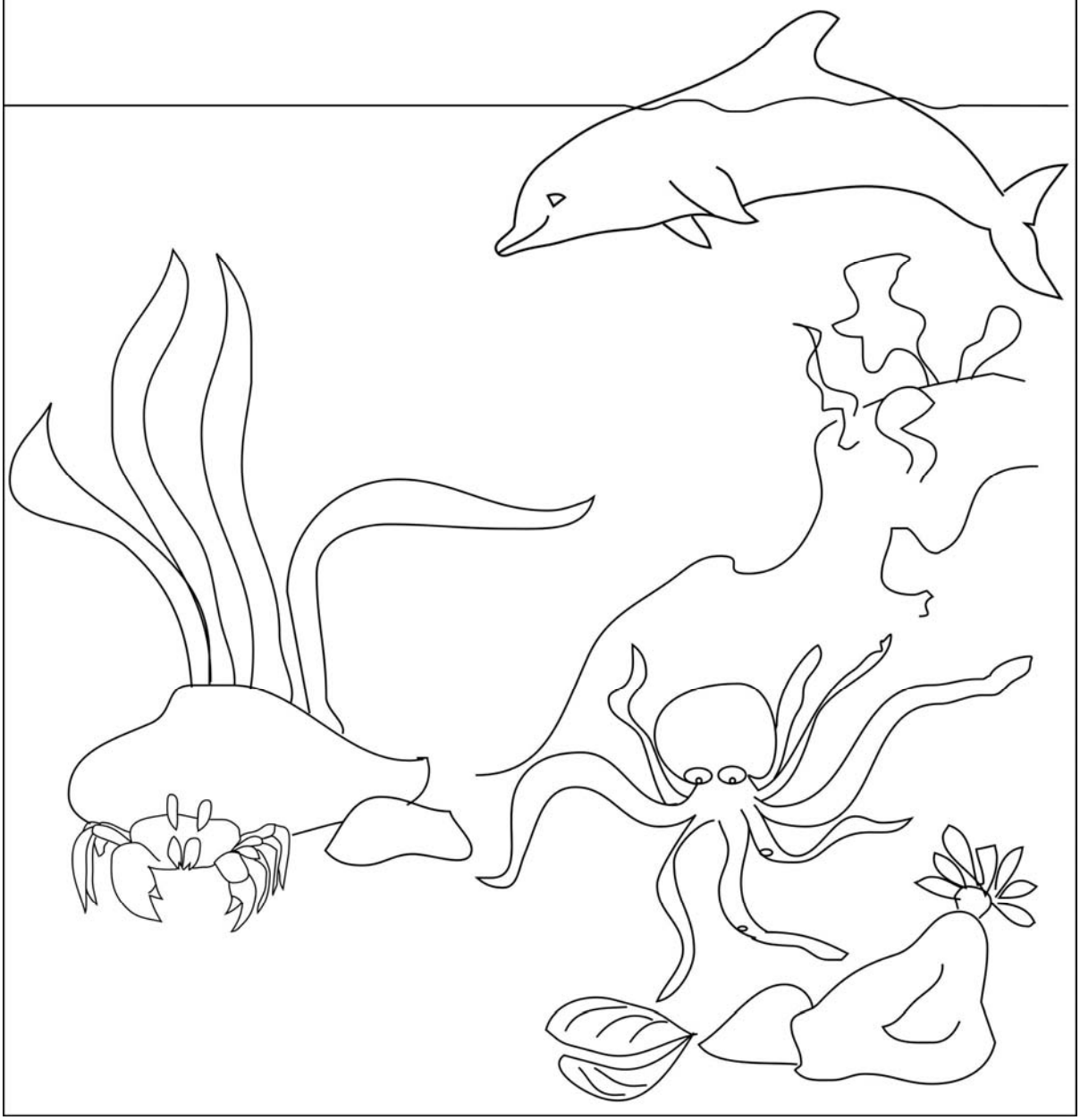
GRADE LEVEL: _____ **# OF STUDENTS IN CLASS:** _____

Mail with your check for $35 payable to "Loggerhead Marinelife Center"
14200 US Hwy 1, Juno Beach, FL 33408



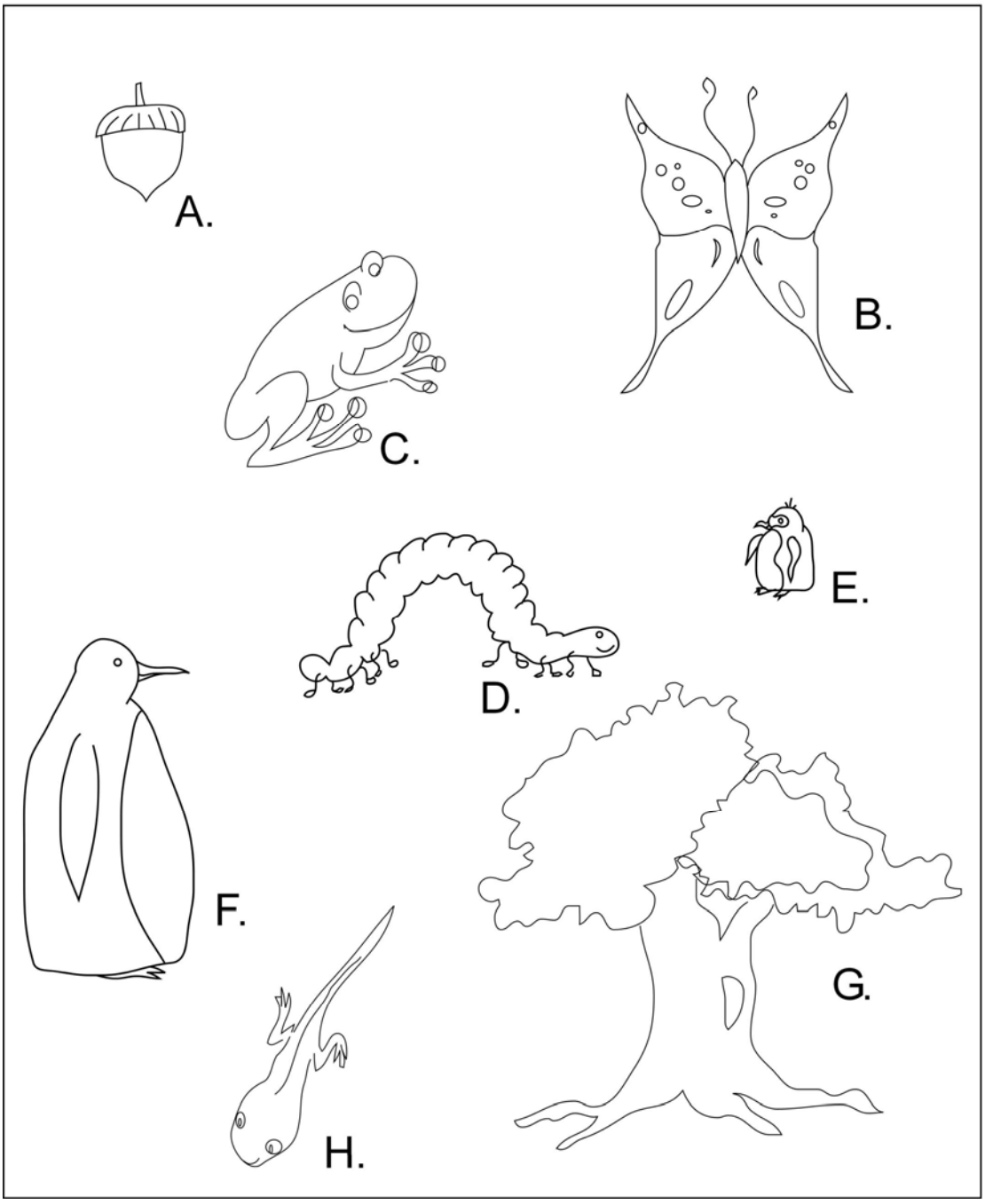
Let's make an ocean food chain!

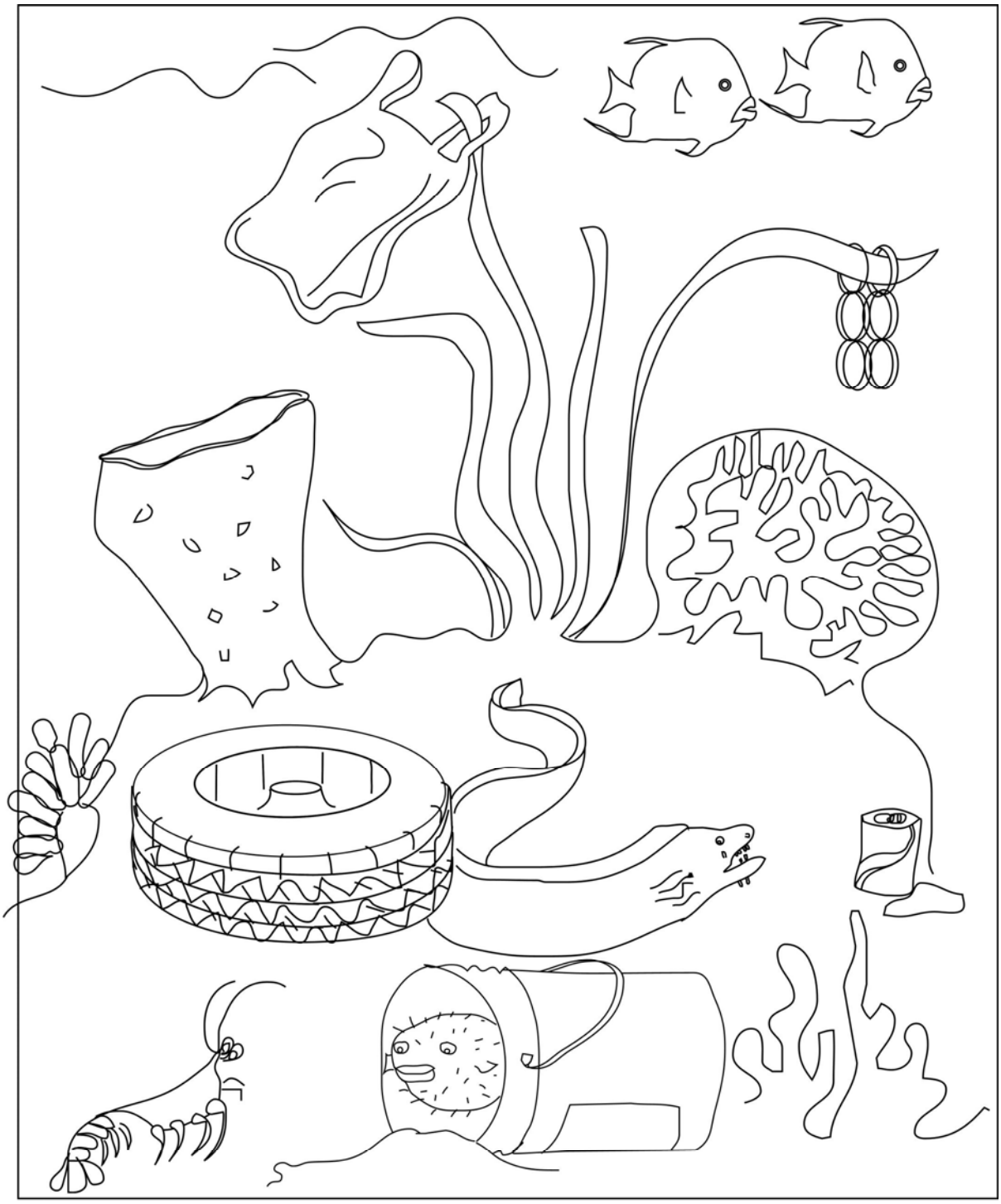
Remember to start with the sun as a source of energy.
Draw a line from one organism to another.



Growing and Changing...

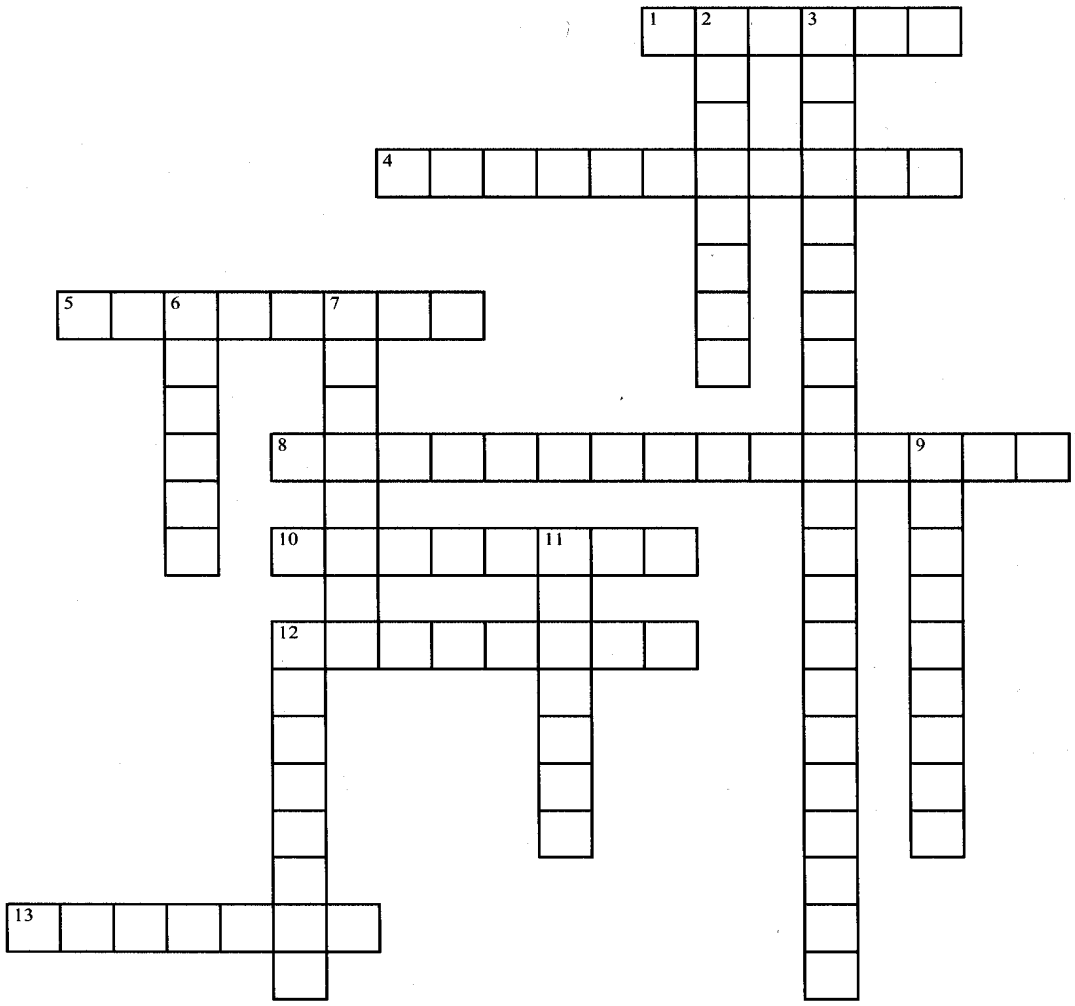
Young and old, big and small. Which go together?





Place an “X” over the things that don’t belong in the ocean, then color the picture.

Sea Turtle Vocabulary



ACROSS

1.The hard scales covering a turtle's shell.

4. Name for sea turtles that have been raised in captivity and released after a year. This was don in Galveston, Texas with Kemp's ridleys and was found to be unsuccessful

5.Process during which eggs develop into hatchlings.

8. A disease that causes cauliflower-like tumors to grow on sea turtles and other animals.

10. A temporary, sharp egg tooth on hatchlings used to tear open the eggshell.

12. Thick, bristle-like projections used by sea turtles to help them hold onto and swallow soft foods.

13.The removal of sand from a beach by either a gradual process or during a storm event.

DOWN

2. The dorsal or upper portion of a turtle's shell.

3. A device attached to a shrimp net to allow sea turtles and other large organisms to escape from the net while allowing shrimp to be caught.

6. A nest of eggs.

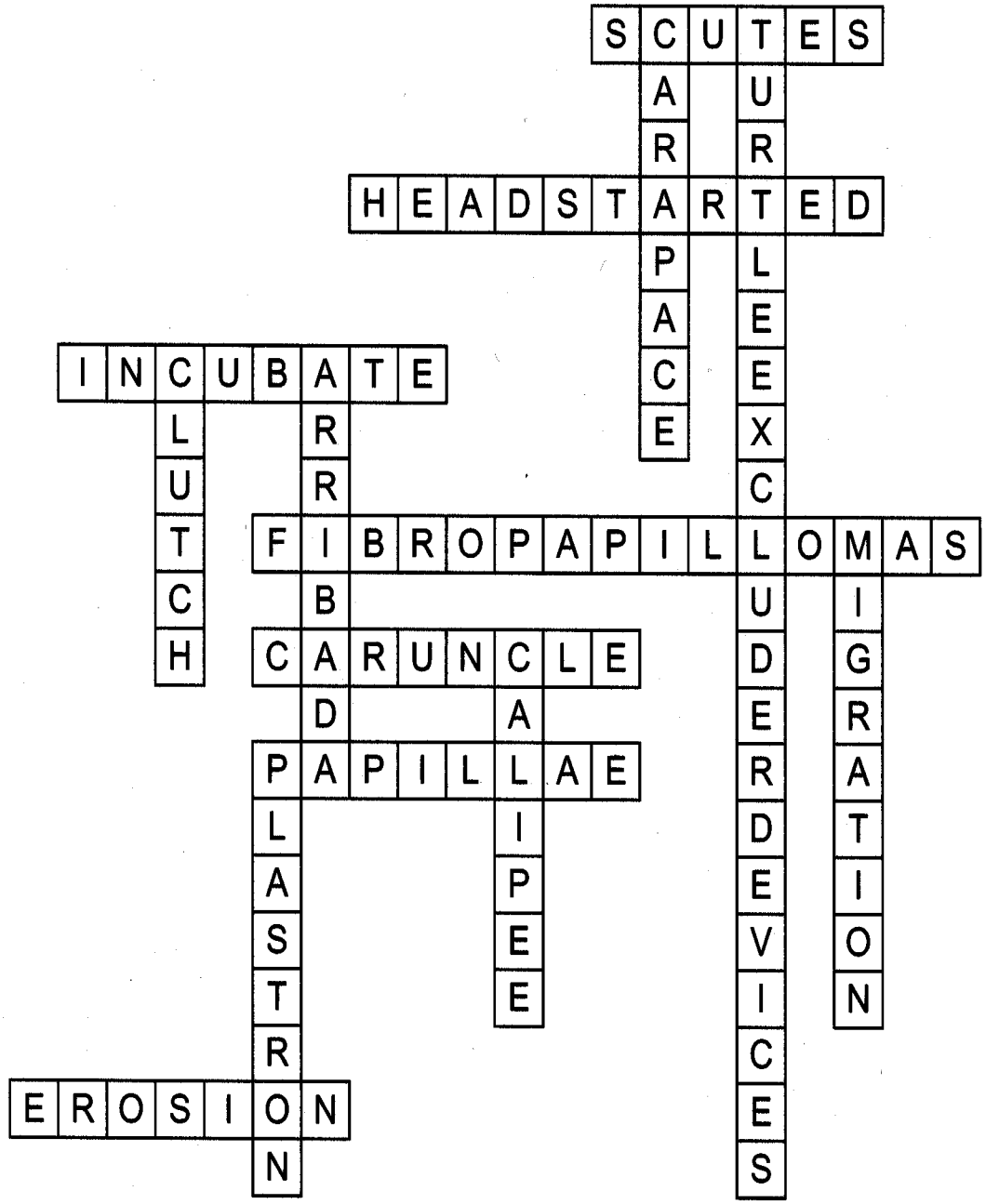
7. Spanish for arrival, used to refer to the mass, synchronized emergence of nesting sea turtles.

9. The act of moving from one place to another.

11.The green body fat found attached to the Green sea turtle's shell and body. It was used as the stock or flavoring in turtle soup.

Solution:

Sea Turtle Vocabulary



Name that Turtle!

Solve the math equations under each blank, then match the answer with the corresponding letter to find out the name of each species of turtle. Finally, add up the answers to each name and match them to the answer under each picture to identify the photos of the turtles.

A=1	B=2	C=3	D=4	E= 5	F=6	G=7	H=8	I=9
J=10	K=11	L=12	M=13	N=14	0=15	P=16	Q=17	R=18
S=19	T=20	U=21	V=22	W=23	X=24	Y=25	Z=26	

_____ 13-1=
_____ 3x5=
_____ 4x2-1=
_____ 1x7=
_____ 89+6- 90=
_____ 9x2=
_____ 16/2=
_____ 3+ 2=
_____ 9,658- 9,657x1=
_____ 16/4=

Total sum_____

_____ 13-5=
_____ 3x5-14=
_____ 4x2+15=
_____ 72-61=
_____ 3x5+4=
_____ 8/4=
_____ 16/2+1=
_____ 3x 2x2=
_____ 36/2- 6=

Total sum_____

_____ (36/18)+ 5=
_____ 265- 253=
_____ 3x 7- 20=
_____140/7 =
_____ (96/4)-(3x 7)- 1=
_____ 16,598-16,596-1=
_____ (27/3)/3=
_____ 121/11=

Total sum_____

_____ 5+7=
_____ 3x5-10=
_____ 1/1x1=
_____ (1x7+3)x 2=
_____ 89+6- 90+3=
_____ 9x2-13=
_____ 64/4 +2=
_____ 3+ 2-3=
_____ 9,985- 9,986 x (-1)=
_____ 9/3=
_____ (16/4) +7=

Total sum_____

_____ 18 x 2 -25=
_____ (8x3)/2)-7=
_____ 7+6=
_____ 96/6=
_____ 163- 144=
_____ 9x2=
_____ 3x 2 +3=
_____ (49/7) - 3=
_____ 156- (12x 12)=
_____ (9x9)-(3x25)-1=
_____ (2x3)x4)+1=

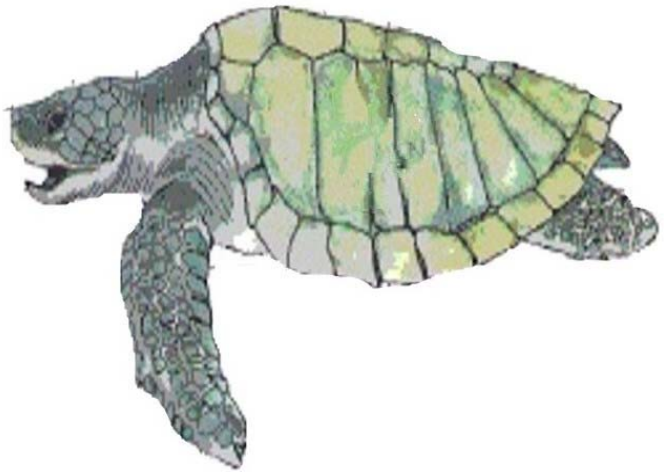
Total sum_____

_____ (899-906)x -1=
_____ (9,678-9,674)+14=
_____ (155/31)=
_____ (28/2)-9=
_____ 2x7=

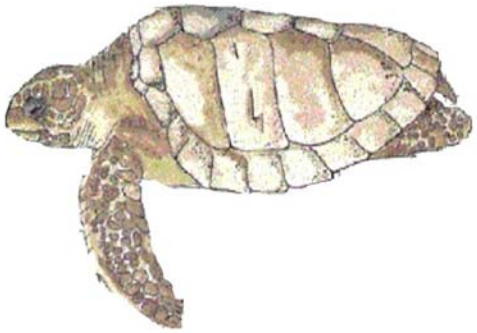
Total sum_____

_____ (3x3) +6=
_____ (2x3)x 2=
_____ 17+6-14=
_____ 110/5=
_____ (659-658) +4=
_____ (72/4)=
_____ 36/4=
_____ (3x 2 +3)- 5=
_____ (4x 4)-4=
_____25/5 =
_____ 150/6 =

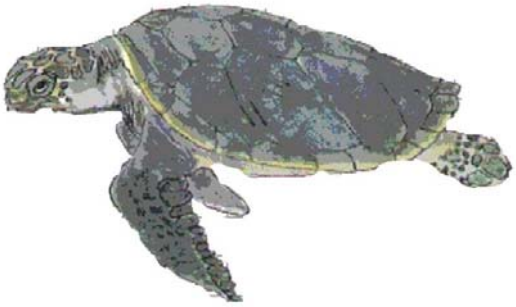
Total sum_____



Total sum: 136
Name:



Total sum: 82
Name:



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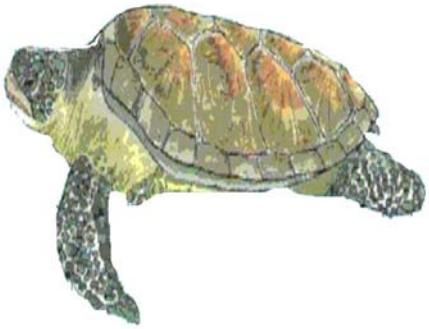
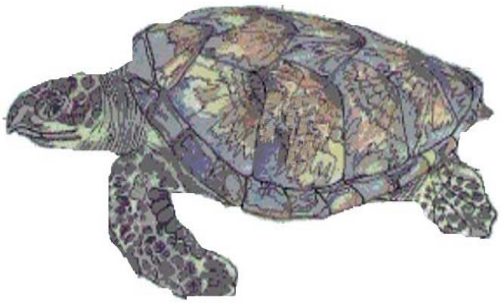
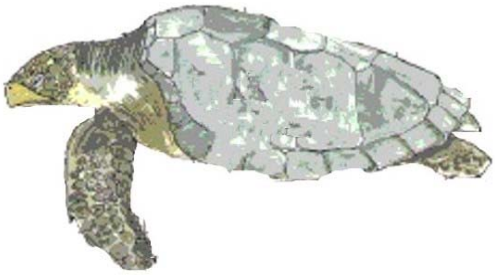


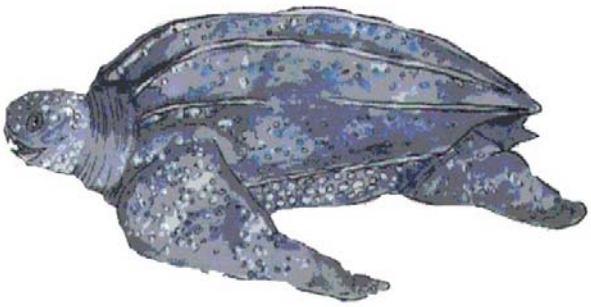
Total sum: 49
Name:



Total sum: 97
Name:



Total sum: 137
Name:



Total sum: 86
Name:

Sea Turtles and Lights Word Find

Loggerhead, green, and leatherback sea turtles nest on the coasts of Florida. When the hatchling sea turtles come out of the nest during the nighttime they find the water by crawling to the brightest area, on natural beaches this is the light from the night sky reflecting off the ocean. In areas where there are many artificial lights, the hatchlings disorient inland. They often die from dehydration, or are eaten by ghost crabs, fire ants, or birds. To help the sea turtles humans can reduce light pollution by turning off unnecessary lights, shielding lights, and allowing dune vegetation such as sea grapes to grow and block the light. Find the key words listed below in the word find puzzle. Words are listed backwards, forwards, diagonal, horizontal and vertical.

b h y z t s e n a g f j l c s o u y n d
v i s x l k j n l k r e t z e q w h i e
w h r q o p w h a q v o l k a d z u g j
p k t d p l o d k e h r e g g o l p h k
l i g a s m f p i w s r o e r u w r t i
m o b z l k l e a t h e r b a c k q t y
k l r x i o e n p l x g k s p h d k i h
j g r e e n n u e k t b n z e v v j m n
i j w s u i a d s d u f g h s j k l e p
u m q w k u t u r t r m n b v c x z s h
l i g h t p o l l u t i o n r y e w a q
y p a e m j d q a w l e r g h k l t r p
h q s d j l s p m w e x t z m n c o t l
n q d f e m b s b a r c t s o h g b g w
g a f i r e a n t s f m r i l y u j n a
b s h v y j t n e i r o s i d m k l p t
f z x b t n o p l o u k n k m j h y g e
e x z g h y a q z w s g c d e r f f v r
c d a r n g t v r d s e z x q f l p l d
s l i g h t s g y o p b f f o n r u t p

Words to find:

birds	disorient	dune	fire ants	ghost crabs	green
hatchlings	leatherback	light pollution	lights	loggerhead	nest
nighttime	sea grapes	shield	turtle	turn off	water

Sea Turtles and Lights Word Find

Answer Key

Loggerhead, green, and leatherback sea turtles nest on the coasts of Florida. When the hatchling sea turtles come out of the nest during the nighttime they find the water by crawling to the brightest area, on natural beaches this is the light from the night sky reflecting off the ocean. In areas where there are many artificial lights, the hatchlings disorient inland. They often die from dehydration, or are eaten by ghost crabs, fire ants, or birds. To help the sea turtles humans can reduce light pollution by turning off unnecessary lights, shielding lights, and allowing dune vegetation such as sea grapes to grow and block the light. Find the key words listed below in the word find puzzle.

b				t	s	e	n							s				n	
	i													e				i	
		r												a				g	
			d				d	a	e	h	r	e	g	g	o	l		h	
				s										r				t	
						l	e	a	t	h	e	r	b	a	c	k		t	
							n							p				i	
	g	r	e	e	n		u			t				e				m	
							d			u				s				e	
										r									h
l	i	g	h	t	p	o	l	l	u	t	i	o	n					a	
						d				l							t		
					l					e						c			
				e			s	b	a	r	c	t	s	o	h	g			w
		f	i	r	e	a	n	t	s					l					a
		h				t	n	e	i	r	o	s	i	d					t
	s											n							e
											g								r
										s									
	l	i	g	h	t	s						f	f	o	n	r	u	t	

Words to find:

birds	disorient	dune	fire ants	ghost crabs	green
hatchlings	leatherback	light pollution	lights	loggerhead	nest
nighttime	sea grapes	shield	turtle	turn off	water

Vocabulary Word Find

Find the vocabulary words listed below. They can be found backwards, forward, diagonal, vertical and horizontally.

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

Words to Find:

Tunicates	Calipee	Fibropapillomas	Scutes	Kemps
Headstarted	Tail	Salt Tears	Crabs	Arribada
Rancho Nuevo	Plastron	Satellite Telemetry	Migration	Papillae
Natal Beach	Carapace	Florida	Flipper	Sea Turtle

Vocabulary Word Find

Answer Key

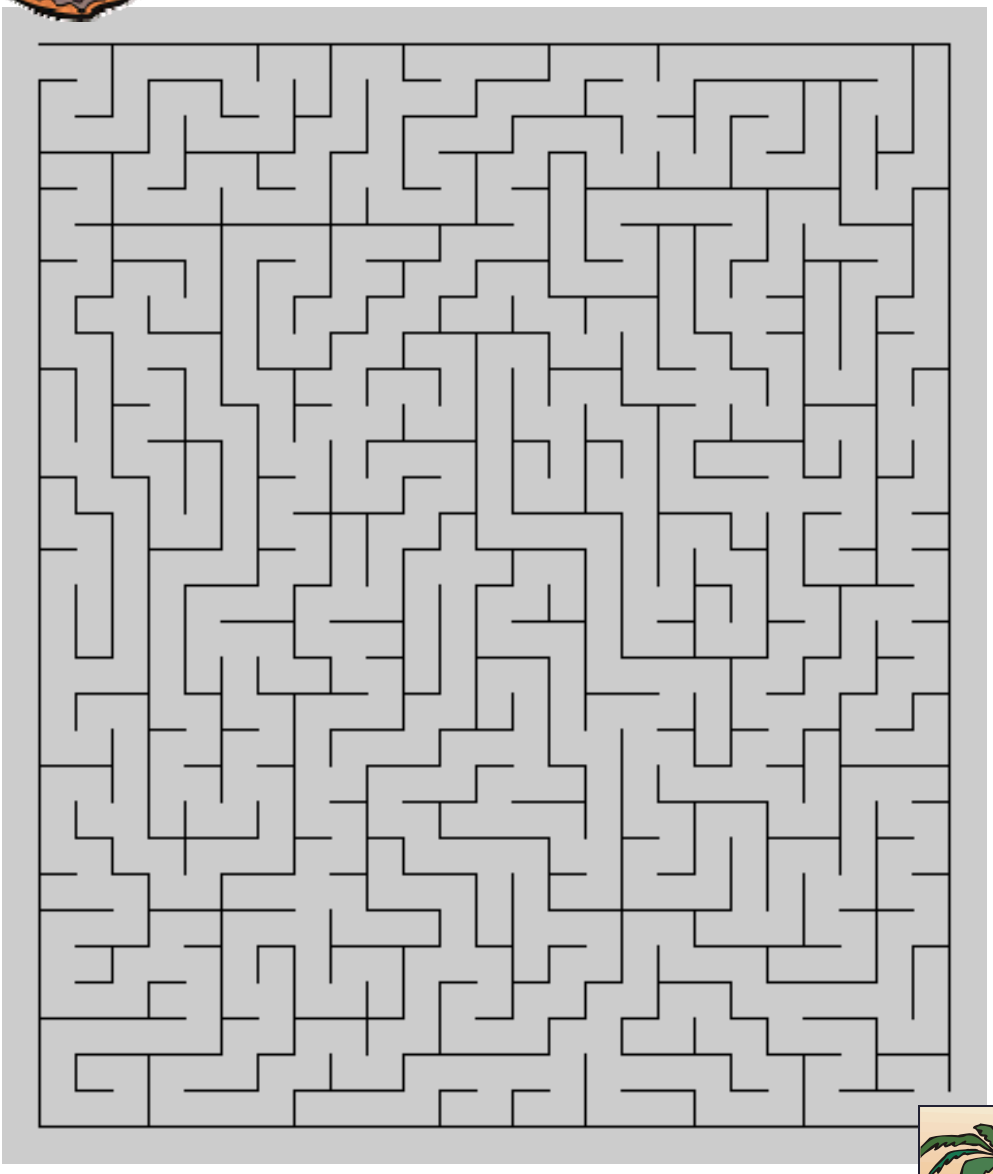
Find the vocabulary words listed below. They can be found backwards, forward, diagonal, vertical and horizontally.

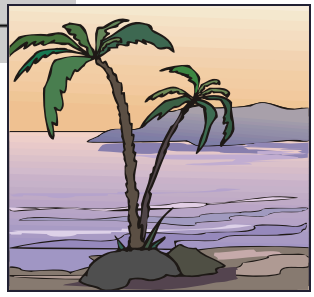
															N	O	R	T	S	A	L	P		
																			A			A		
			A	R	R	I	B	A	D	A									T			P		
					S														E			I		
				B										F					L		S	L		
			A									C		L					L		P	L		
S		R						M	I	G	R	A	T	I	O	N			I		M	A		
	C											R		P			S		T		E	E		
		U										A		P			R		E		K			
			T						A			P		E			A		T				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

Words to Find:

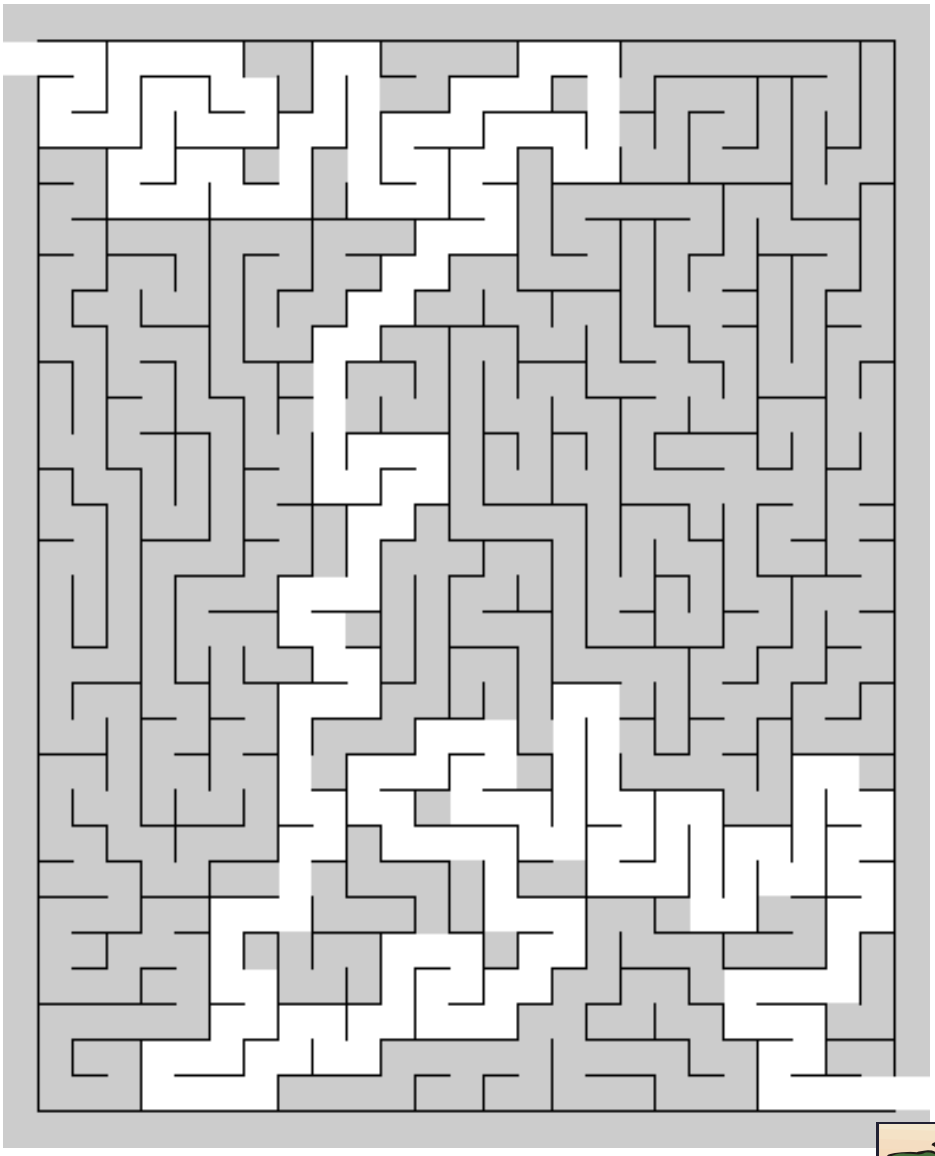
Tunicates	Calipee	Fibropapillomas	Scutes	Kemps
Headstarted	Tail	Salt Tears	Crabs	Arribada
Rancho Nuevo	Plastron	Satellite Telemetry	Migration	Papillae
Natal Beach	Carapace	Florida	Flipper	Sea Turtle

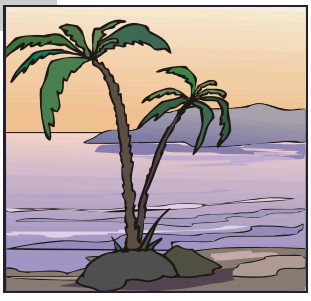
Help this turtle find her way to the nesting beaches.





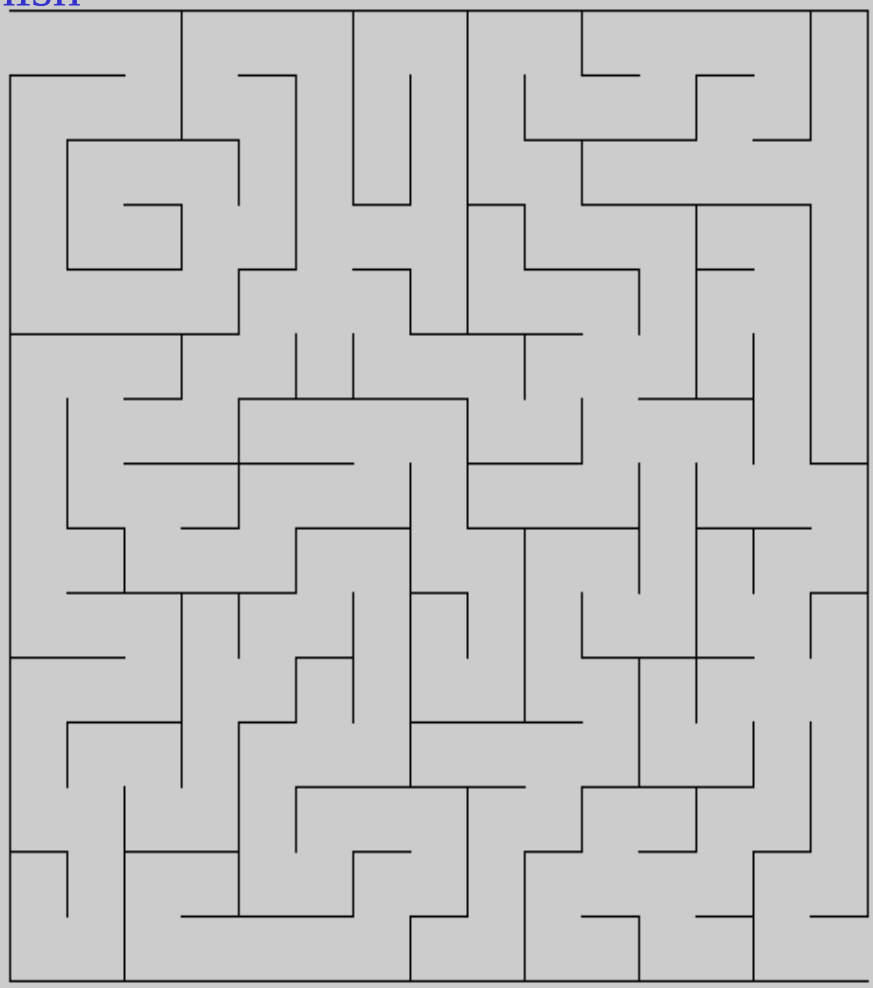
Help this turtle find her way to the nesting beaches.





Dash for the Water!!!

Finish



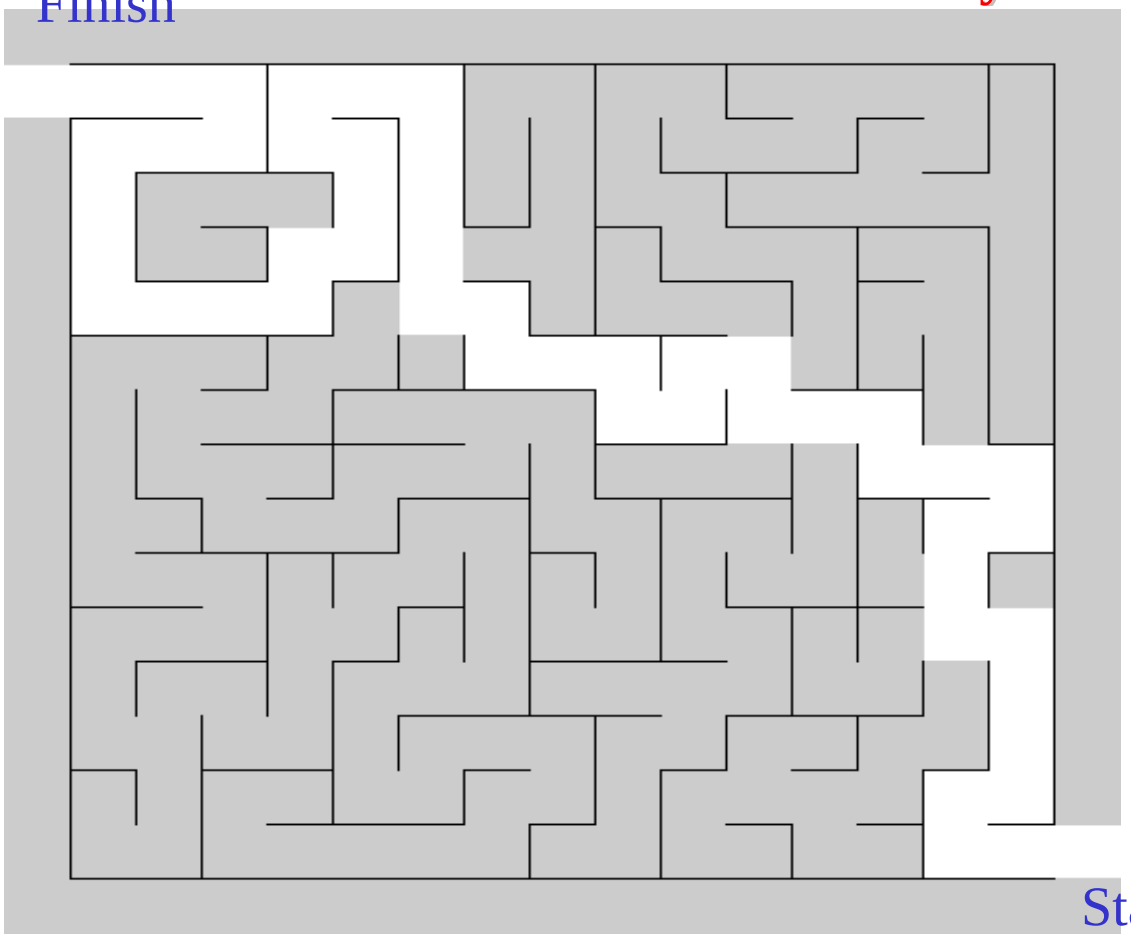
Start

Get the hatchling to the water!

Dash for the Water!!!

Answer Key

Finish



Start

Get the hatchling to the water!

Sea Turtle Solutions

Unscramble the words below and place them in the correct column based on whether they are a species, threat to survival or a conservation effort.

1. EKCLBAAERTH _____
2. HACIYSORHERSNCLO (2 words) _____ _____
3. NIGITSESNHF (2 words) _____ _____
4. ENEGR _____
5. UCEDOANIT _____
6. OHOILTGILULNTP (2 words) _____ _____
7. VIRIEDOELYL (2 words) _____ _____
8. APCIGNHO _____
9. EETDRRXEVCELUDEUICLT (3 words)_____ _____ _____
10. NOORSEI _____
11. LAEHGGEDOR _____
12. ELETTIYEMRASTLELTE (2 words) _____ _____
13. UCAELNOSASPACLT (2 words) _____ _____
14. TLILONUPO _____
15. SKIHALWBL _____
16. LIK'EMPRDYSE (2 words) _____ _____
17. LLOPFIMARIBPOAS _____
18. ANSDHGIAERTT _____
19. TOPELRTSUU (2 words) _____ _____
20. CTKFLBAA _____
21. TEHAOLBEVCEPENMD (2 words) _____ _____