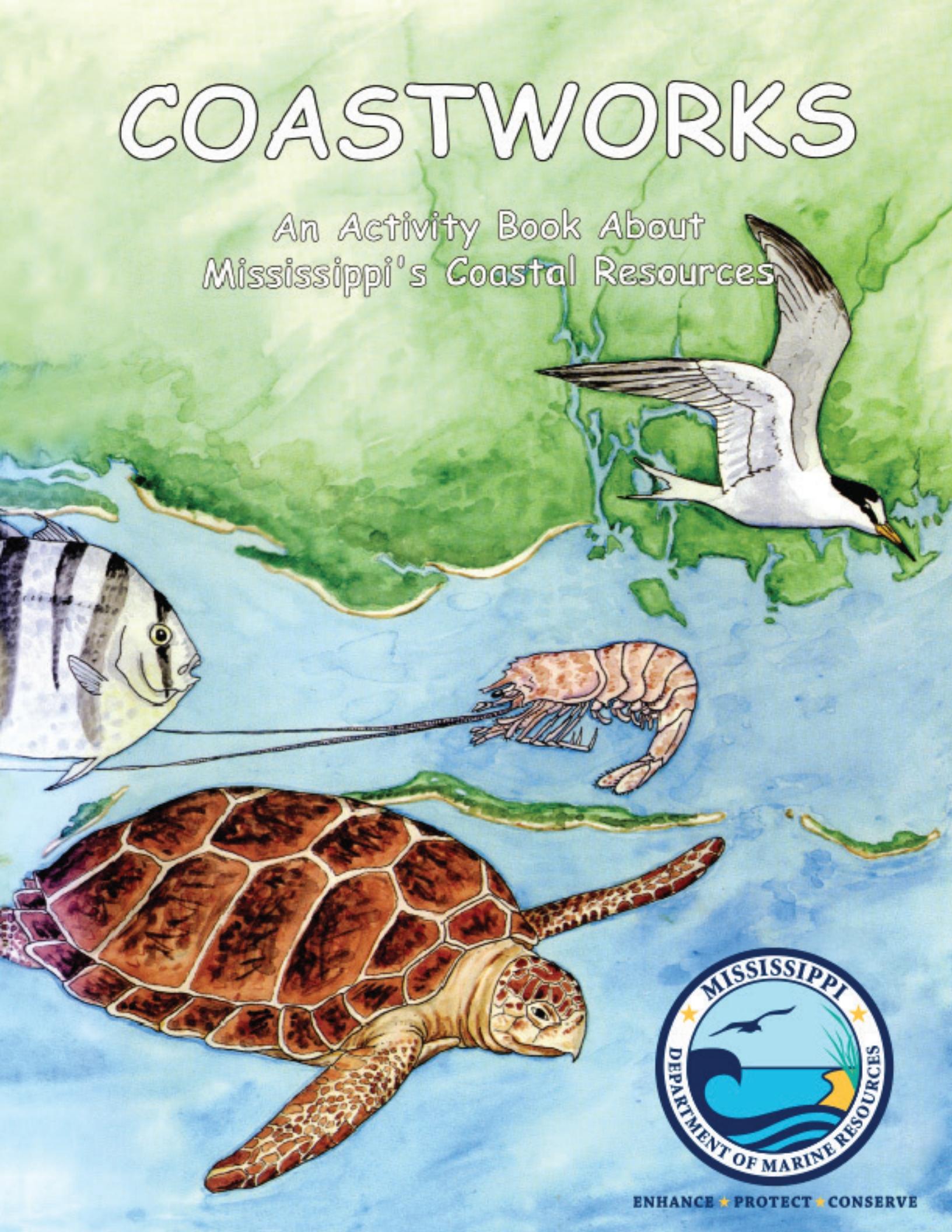
COASTWORKS

An Activity Book About Mississippi's Coastal Resources



MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

ENHANCE ★ PROTECT ★ CONSERVE

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This book belongs to _____.

EXPLORING MISSISSIPPI'S COASTAL ENVIRONMENT

An Activity Book About Mississippi's Coastal Resources

Contributors: Dr. Fred Deegen, Jennifer Buchanan and Kevin M. Howe

Illustrated by: Michelle Davis and Rex Bridges

Produced by: Mississippi Department of Marine Resources
1141 Bayview Avenue
Biloxi, MS 39530
(228) 374-5000
dmr.ms.gov

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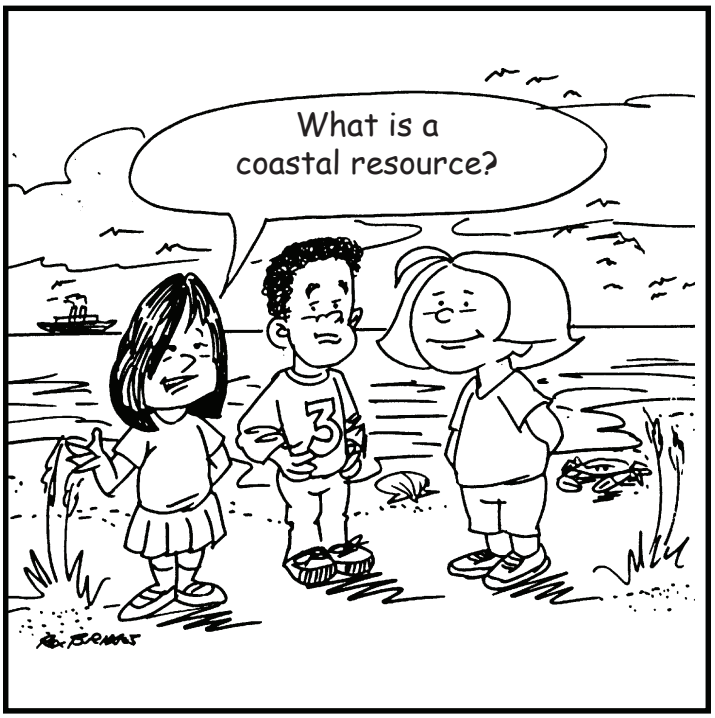
ENHANCE ★ PROTECT ★ CONSERVE

COASTAL RESOURCES

This activity book is about COASTAL RESOURCES.



COASTAL RESOURCES

COASTAL refers to something that is located on or near the shoreline of a large body of water, such as an ocean, gulf, or Great Lake. Mississippi's Coastal Zone includes the state's southernmost counties of Hancock, Harrison and Jackson.

A RESOURCE is anything that can be used to support life, to make money, or for recreation.

Therefore, a COASTAL RESOURCE refers to almost any naturally occurring item found on or near a coastline. Examples of Mississippi's coastal resources include fish, birds, recreational beaches, water and wetlands.

Complete the definition of Coastal Resource:

A Coastal Resource is _____ found on or near the _____ of a large body of water.

Mississippi's coastal resources are found in _____, _____ and _____ ____ Counties.

IDENTIFY THESE IMPORTANT COASTAL RESOURCES

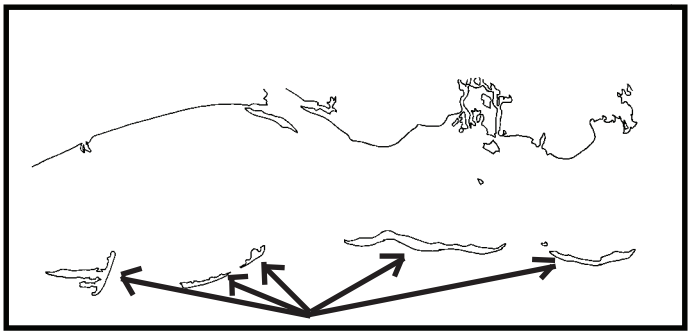
NAME THE RESOURCES — Each resource listed matches one of the pictures shown below. Write the correct word(s) under each picture. We did one for you.

a. Mississippi Sound
b. Marine Animals
c. Tides
d. Plankton
e. Wetlands
f. Barrier Islands

Resources are many things. Here are some examples of COASTAL RESOURCES:

1. Mississippi Sound

4. _____

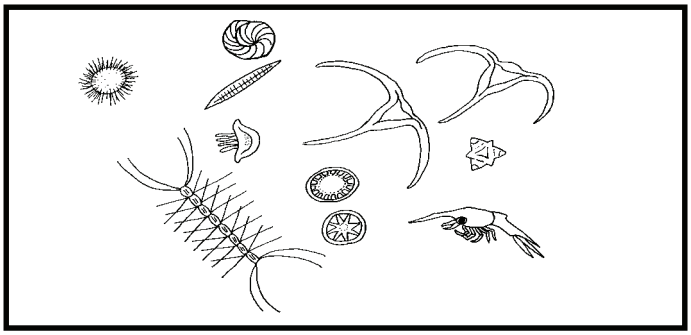


2. _____

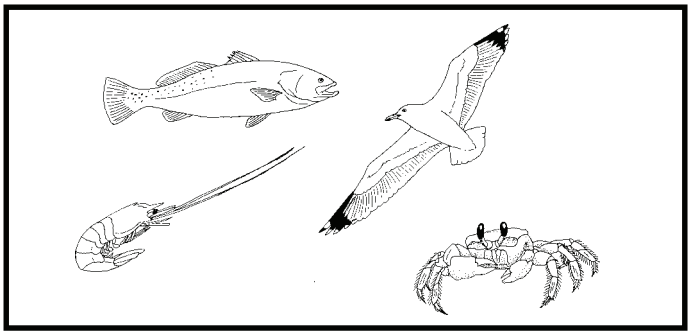
TIDE TABLE

High Tide	Ht.	Low Tide	Ht.
7:58 A.M.	1.7	6:53 P.M.	0.1
8:17 A.M.	1.9	7:25 P.M.	0.0
8:48 A.M.	2.0	8:03 P.M.	-0.2
9:30 A.M.	2.2	8:45 P.M.	-0.3
10:10 A.M.	2.3	9:31 P.M.	-0.4

5. _____

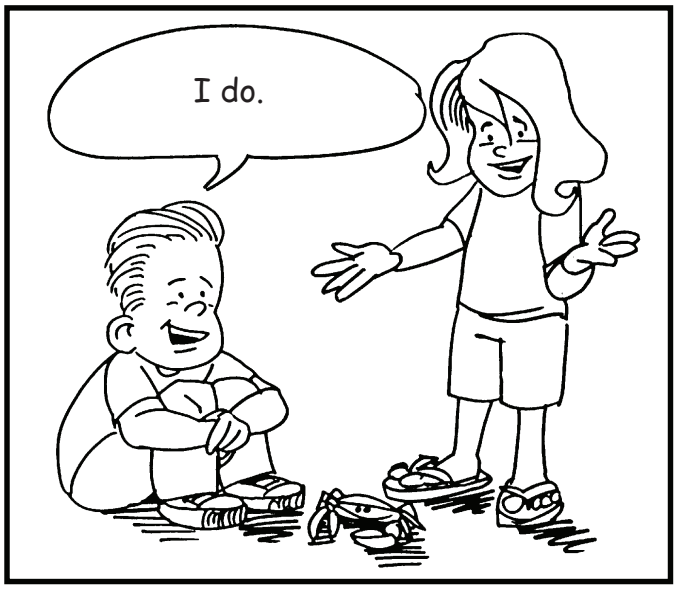


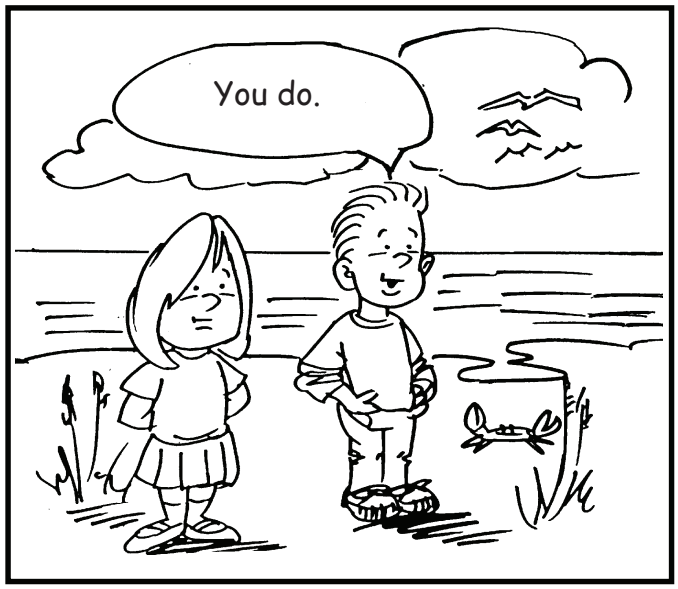
3. _____



6. _____

WHO OWNS COASTAL RESOURCES?





Many COASTAL RESOURCES are PUBLIC RESOURCES, that are owned by EVERYONE. Here are the important things we get from PUBLIC RESOURCES:

LIFE FOOD TRANSPORTATION RECREATION JOBS

Because these PUBLIC RESOURCES are so important, we have to be very careful that we do not lose them, abuse them or waste them. We have to use them wisely for the benefit of all the public. We call this CONSERVATION.

COASTAL RESOURCE CONSERVATION

CONSERVATION is the controlled use and protection of our natural resources. If proper conservation practices are followed, there should always be enough COASTAL RESOURCES for everyone (including your children and your children's children) to enjoy.

How can You help conserve/protect our natural resources?

*** Put all your trash in a proper trash container.**

*** Know your limits! When you fish, gently return undersized (or oversized) fish to the water.**

*** Don't pour oil, gas or other pollutants into storm drains.**

*** Reduce, Reuse or Recycle as many items as possible.**

*** Protect our coastal wetlands.**

*** Plant a tree or bright-colored wildflowers to attract wildlife.**

*** Keep your pet cats inside or make them wear a bell around their neck so that they do not kill our wild birds.**

*** Encourage your parents to buy "Earth-friendly" products.**

COASTAL CONSERVATOR'S PLEDGE

I, _____, promise to protect Mississippi's coastal resources. I vow not to pollute, damage or destroy our protected coastal habitats. I promise not to harass or kill any coastal species of wildlife witout the appropriate fishing or hunting licenses or other required permits. I also promise to enjoy and appreciate our coastal resources as often as I possibly can.

_____

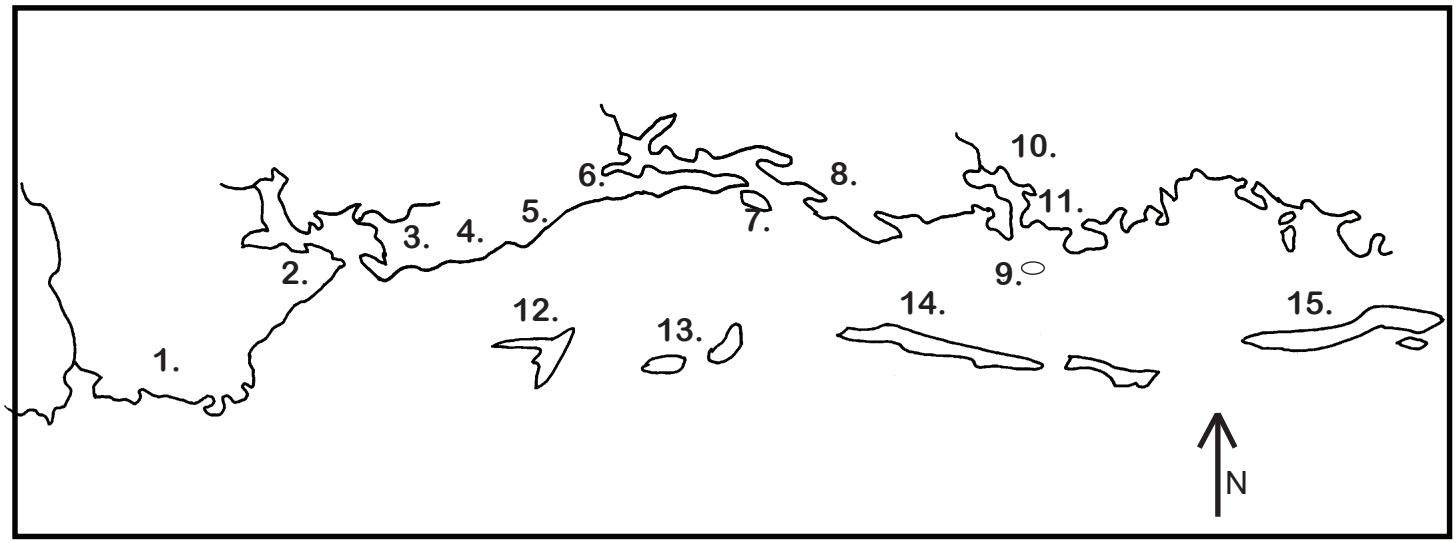
Coastal Conservator's Signature

_____

Date

MISSISSIPPI SOUND

The MISSISSIPPI SOUND is an important coastal resource that extends from Louisiana into Alabama between the barrier islands and the mainland. The Mississippi Sound and its adjacent coastal waters are all part of a large, shallow estuarine basin. An ESTUARY is a partially enclosed body of moderately salty, or BRACKISH, water that is formed where freshwater flows into the ocean. In other words, an ESTUARY forms where the "rivers meet the sea." Estuarine waters EBB (fall) and FLOW (rise) during each tidal cycle.



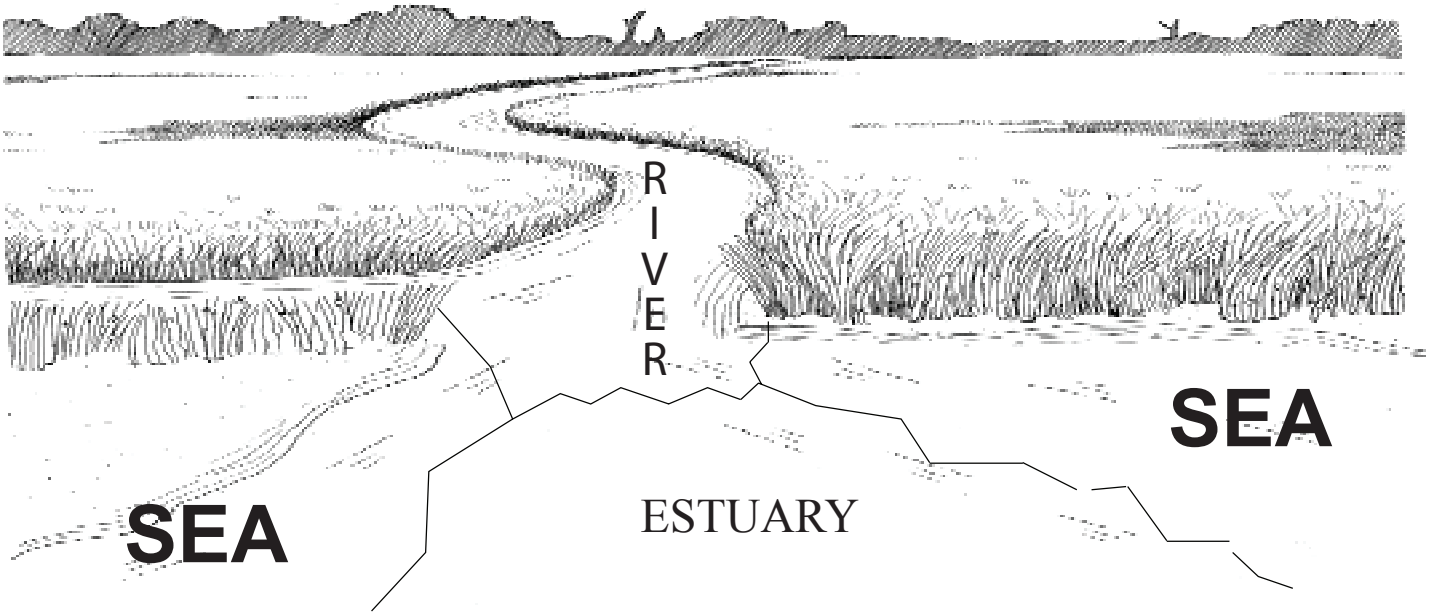
NAME THE PLACES ON THE MAP — Listed below are the names of some places along the Mississippi coast. Match the correct numbers on the map above with the corresponding names of the places the numbers represent. Write the number next to each name.
The first four blanks have been completed for you.

a. 5 Gulfport
b. 14 Horn Island
c. 10 Moss Point
d. 2 Bay St. Louis
e. _____ Pass Christian
f. _____ Cat Island
g. _____ Ocean Springs
h. _____ Deer Island
i. _____ Round Island
j. _____ Waveland
k. _____ Long Beach
l. _____ Biloxi
m. _____ Pascagoula
n. _____ Petit Bois Island
o. _____ Ship Island

ESTUARIES—Where Rivers Meet the Sea

Color the river water YELLOW. **Color the seawater BLUE.**

Color the estuary water GREEN.



What color results in the area where the Yellow (FRESH WATER) mixes together with the blue (VERY SALTY WATER)? Green! Green represents the BRACKISH WATER (MODERATELY SALTY WATER) of the ESTUARY.

Estuary water is not really green, however. In Mississippi, our estuarine waters are usually quite brown because they are full of nutrients and sediments that have been washed down from the rivers that feed into them. Estuaries are said to be some of the most productive habitats on Earth!

An ESTUARY:

* **PROVIDES FOOD for both humans and other animals,**
* **PROVIDES PROTECTION from predators for small and juvenile animals,**
* **PROVIDES RECREATION opportunities,**
* **PROTECTS the mainland from storms,**
* **and FILTERS POLLUTANTS from our waters.**

BARRIER ISLANDS

WHAT ARE BARRIER ISLANDS?

They are islands made of sand or shell that lie parallel to the coast. They may be a few hundred feet to several miles from the mainland. Mississippi's BARRIER ISLANDS are made of sand with dunes created by the wind. They really are barriers that separate the Sound to the north from the Gulf to the south and protect the Mississippi Sound and the coast from strong waves, storms and currents of the Gulf of Mexico. The islands are important and beautiful COASTAL RESOURCES. Mississippi's BARRIER ISLANDS are: Horn Island (the largest), Petit Bois Island and Ship Island (which was split by hurricanes into East and West Ship Islands). These islands are part of the Gulf Islands National Seashore—a grouping of 11 separate units stretching eastward 150 miles from West Ship Island, Mississippi, to the eastern tip of Santa Rosa Island, Florida.

The Gulf Islands National Seashore was established by Congress in 1971 to provide recreation for visitors and to protect the wildlife, barrier islands, salt marshes, historic structures, and archeological sites along the shores of the Gulf of Mexico.

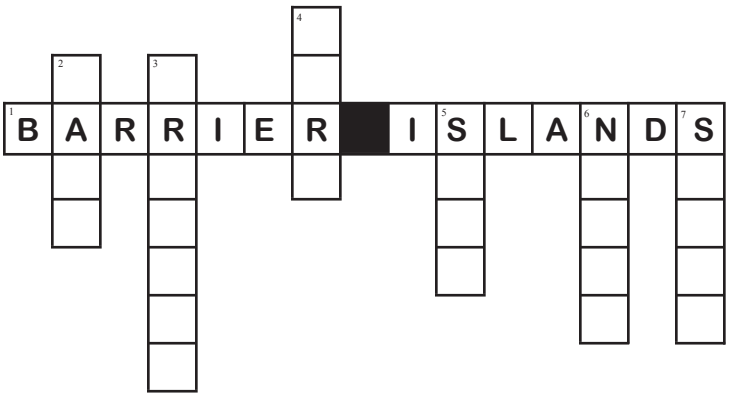
COMPLETE THE CROSSWORD PUZZLE about the Mississippi Sound and the barrier islands. The first answer has been completed for you.

ACROSS

1. BARRIER ISLANDS are important resources.

DOWN

2. Mississippi's barrier islands are made of _____ with dunes created by the wind.
3. The islands help _____ the Sound from the strong waves and storms of the Gulf.
4. _____ Island is a park and a wilderness island that is Mississippi's largest barrier island.
5. Hurricanes in 1947 and 1969 caused _____ Island to be split into two parts.
6. If you swim on the _____ side of Ship Island, you are in the Mississippi Sound.
7. If you swim on the _____ side of Ship Island, you are in the Gulf of Mexico.



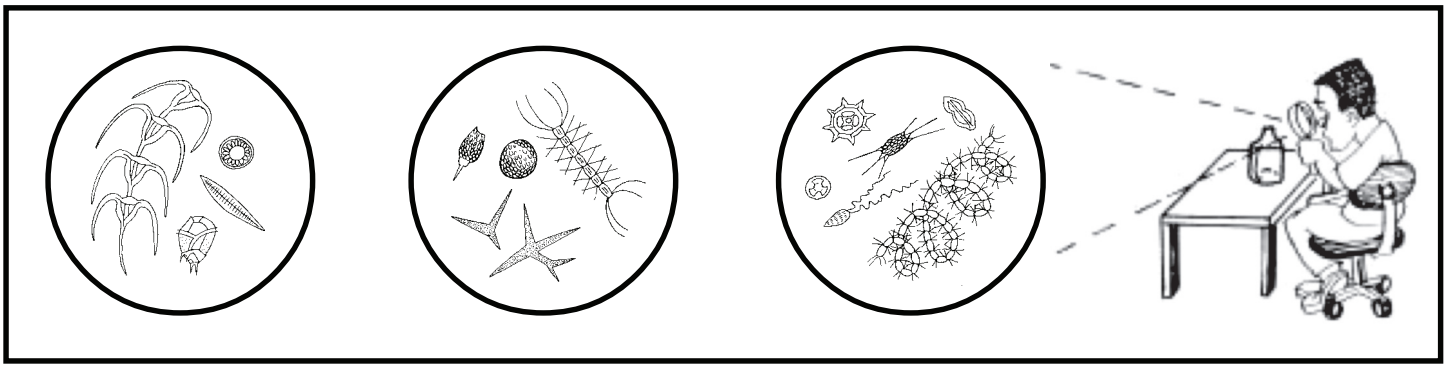
PLANKTON

The word PLANKTON, which means "wanderer" in Latin, is a name for all the microscopic plants and animals that live in water and drift or wander with the currents and tides. PLANKTON is found in all bodies of water—lakes, ponds, ditches, rivers, streams and oceans. Plankton is a RESOURCE too, mostly as food for other animals.

There are two types of PLANKTON: PHYTOPLANKTON and ZOOPLANKTON.

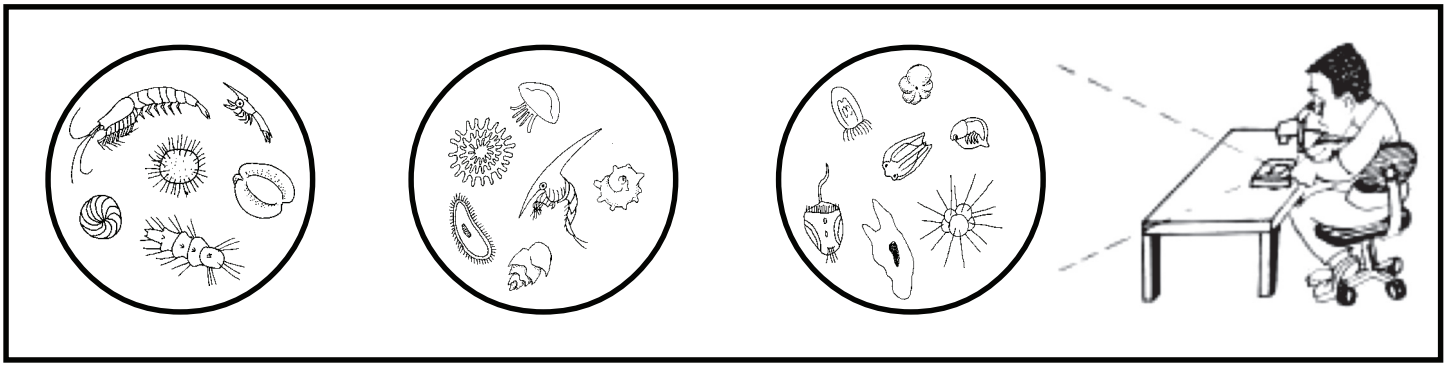
PHYTOPLANKTON (fi - to - plank - ton) — microscopic, free-floating aquatic plants.

There are thousands of different kinds of PHYTOPLANKTON. Most are tiny and can only be seen under a microscope, such as algae. They are not attached to anything and just drift or wander in the water. PHYTOPLANKTON live near the water surface where there is light. Using light and nutrients, PHYTOPLANKTON make their own food, and they make oxygen too! Much of the oxygen in the air comes from PHYTOPLANKTON.



ZOOPLANKTON (zo - plank - ton) — free-floating, often microscopic aquatic animals.

There are thousands of different kinds of ZOOPLANKTON, too. Most are tiny, like phytoplankton, but some are larger. Some animals, like the copepods, are plankton for their entire lives. Others, like crabs or shrimp, are planktonic for a part of their lives. Like other animals, ZOOPLANKTON cannot make their own food—some eat plants; others eat animals.



PLANKTON IS VERY IMPORTANT BECAUSE IT IS A CRITICAL LINK IN MOST MARINE FOOD CHAINS!

PLANKTON PUZZLE

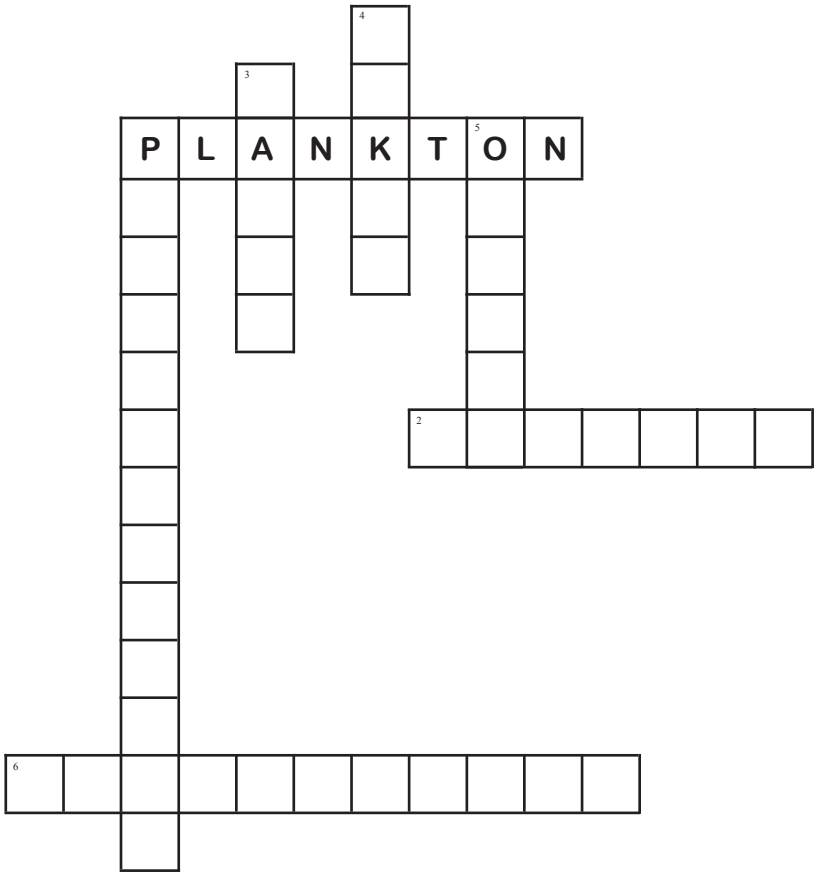
COMPLETE THE CROSSWORD PUZZLE BELOW — All the answers are on the page to the left. We did one for you.

ACROSS

1. **PLANKTON is a name for microscopic plants and animals that drift with the tides or currents.**
2. **_____ must eat their food. They cannot make their food like plants.**
6. **Some _____ are planktonic for only a portion of their lives.**

DOWN

1. **_____ can make their own food.**
3. **All plankton live in _____.**
4. **Plankton live in the ocean and in _____.**
5. **All plants make their own food and produce _____.**



COASTAL WETLANDS

What is a WETLAND? Simply put, a wetland is just as it sounds—wet land. A good rule of thumb to remember is: "A wetland is any land that is submerged, soggy, muddy, mushy, mucky, sticky, spongy, soaked, waterlogged, saturated, sodden, flooded, squishy-squashy or pretty much just wet clear through for a good part of the year."
A COASTAL WETLAND is any land that is flooded or submerged during an average high tide. Therefore, it is said to be TIDALLY INFLUENCED. Some coastal wetlands are public resources owned by everyone. Examples include tidal saltwater and freshwater marshes, bayous, oyster reefs, mudflats and the Mississippi Sound.

As the tides rise and fall, nutrients are exchanged between the different types of coastal wetlands. Small, broken pieces of nutrient-rich plant and animal material, called DETRITIS, are washed out of the marshes into the nearby waterways and vice versa. These bits of food are eaten by bacteria and small animals which are, in turn, eaten by larger animals.

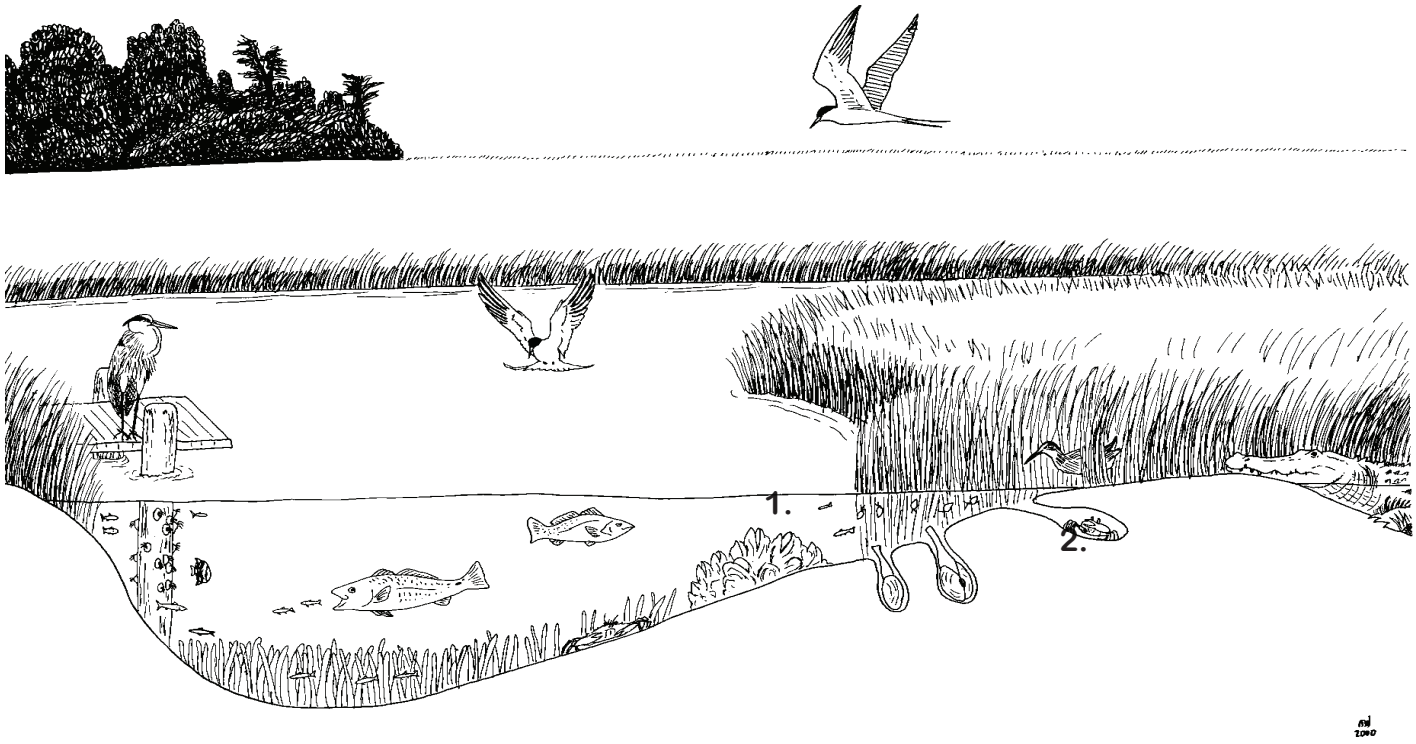
OBSERVING THE TIDAL MARSH
HIGH TIDE

Tides affect the activities of plants and animals in a TIDAL MARSH. Some animals feed only during a HIGH TIDE and rest during a low tide. Other animals do just the opposite. And many larger animals come into the marsh only during HIGH TIDE. During low tide, the larger animals are in deeper water.

<u>ACTIVITY</u> — The picture shows animals in a marsh at HIGH TIDE. Some animals are FEEDING and some are HIDING. Below is a list of all the animals shown in the picture. Find each animal in the picture and write its number next to it. Some animals are pictured more than once. The first two have been completed.

1. OYSTERS
2. FIDDLER CRAB
3. BARNACLES
4. SPECKLED TROUT
5. CLAMS
6. SMALL (YOUNG) FISHES
7. GREAT BLUE HERON
8. ALLIGATOR
9. BLUE CRAB
10. CLAPPER RAIL (bird)
11. DRUM (large fish)
12. TERN

Marsh at HIGH TIDE

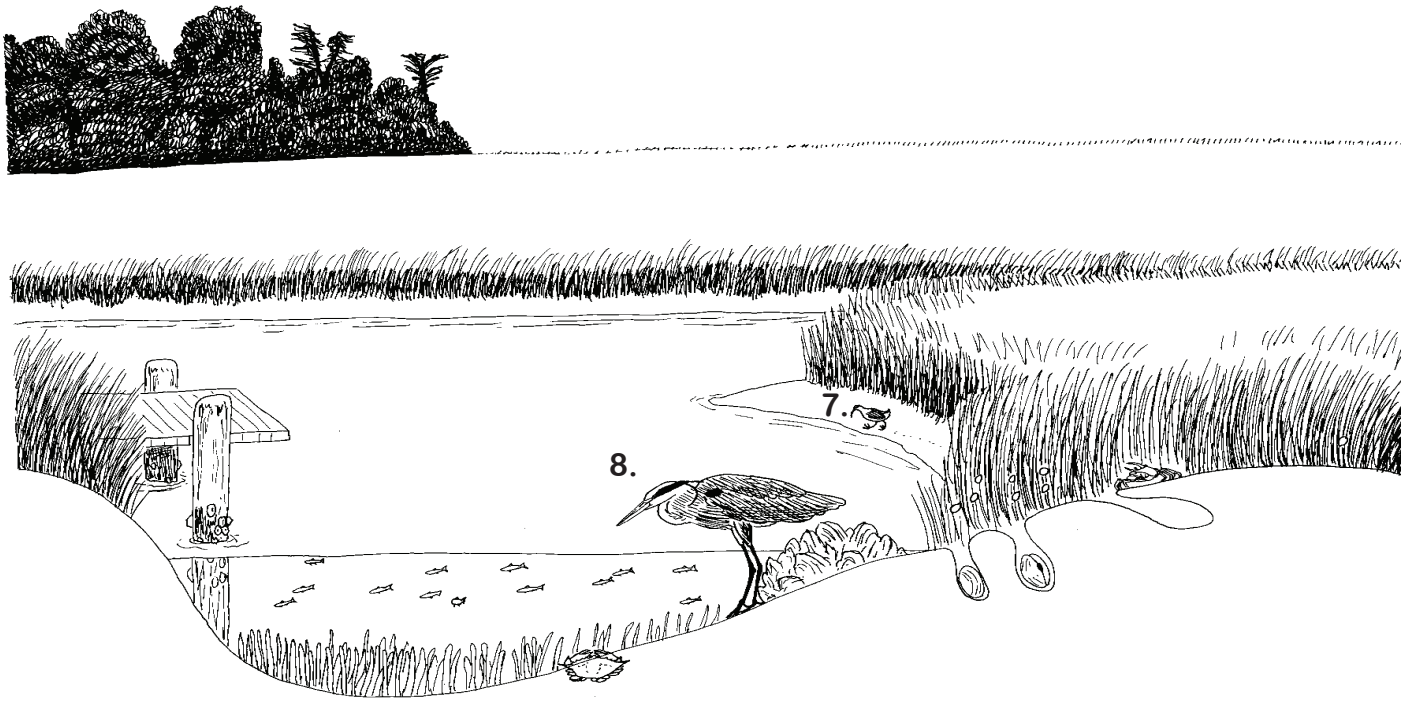


OBSERVING THE TIDAL MARSH
LOW TIDE

ACTIVITY — The picture below is similar to the picture on the last page, but it shows a marsh at LOW TIDE. Some animals are FEEDING and some are HIDING. Above the picture is a list of all the animals shown. Find each animal and write its number next to it. Some animals are pictured more than once. The last two are completed.

1. OYSTERS
2. FIDDLER CRAB
3. BARNACLES
4. CLAMS
5. SMALL (YOUNG) FISHES
6. BLUE CRAB
7. CLAPPER RAIL (bird)
8. GREAT BLUE HERON

Marsh at LOW TIDE



MARSH OBSERVATION

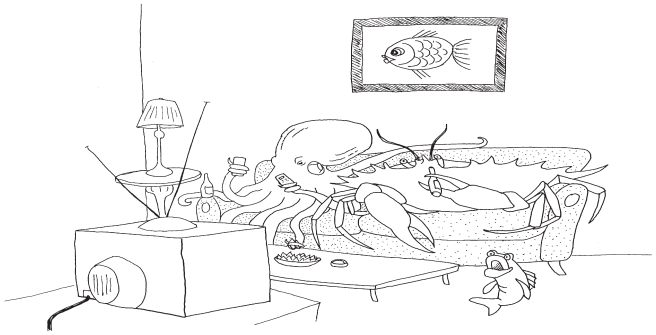
On a separate piece of paper, make a list of all the animals in the marsh at low tide and at high tide. For each animal, write a sentence that describes what it is doing (hiding or feeding) during each tide.

Also, make a list of the animals that you can find in the marsh only during high tide and another list of the animals found only during low tide. Where do you think the missing animals went?

MARSHES ARE MORE!!!

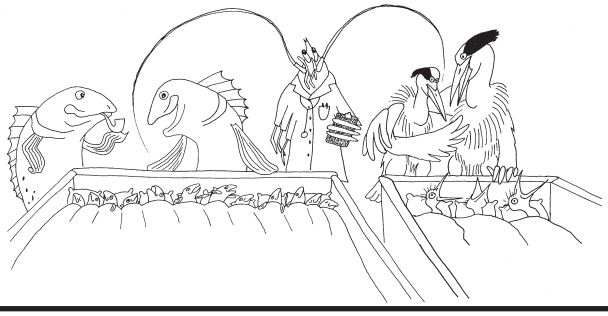
<u>MARSH MATCHING</u> — Match the picture and phrase on the left with the phrase on the right that describes the way plants and animals use a tidal marsh. Draw a line from the phrase on the left to the correct letter.

1. Marshes are HOMES



2. Marshes are RESTAURANTS

3. Marshes are NURSERIES



a. Many YOUNG animals are RAISED in the marsh (like shrimp and crabs and many fishes).

b. Many plants and many animals LIVE part or all of their lives IN the shelter of the marsh (like snails and fiddler crabs).

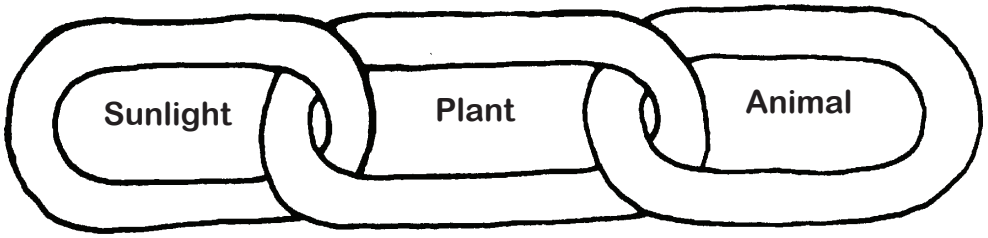
c. Many animals go to the marsh to FEED (like big fishes, birds and raccoons) but live in other habitats.

Tidal marshes are NATURE'S SEAFOOD FACTORIES. If we pollute or destroy the marshes, we would lose most plants and animals that live there. We must conserve coastal marshes.

FOOD CHAINS

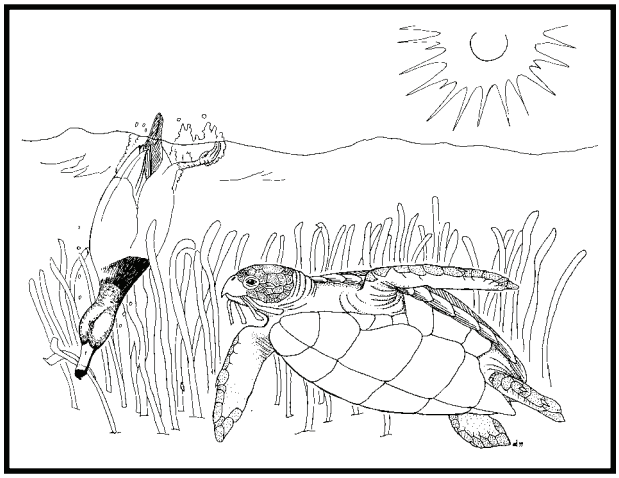
Plants depend on sunlight to make their food. Animals eat either plants or other animals or both. Without light, there would be no plants. Without plants, there would be no animals. Light and plants and animals are linked together into something called a FOOD CHAIN.

A simple FOOD CHAIN would have three links such as:



Here is a real food chain:

Sunlight
↓
Seagrasses
↓
Sea Turtles
&
Waterfowl



<u>MAKE A FOOD CHAIN</u> — Using the five words listed below, make a food chain like we did for the sunlight, seagrasses and sea turtles. First, put the words in the correct order and write them on the lines below. Then draw a picture of the food chain in the box provided.

PLANKTON SHARK SHRIMP SUNLIGHT FISH

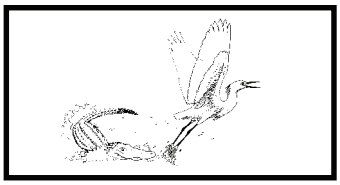
1. <u>SUNLIGHT</u>
2. _____
3. _____
4. _____
5. _____

ANIMAL PROTECTION

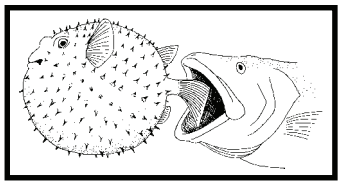
Many animals are eaten by other animals.

All ANIMALS have ways to PROTECT themselves from being eaten.

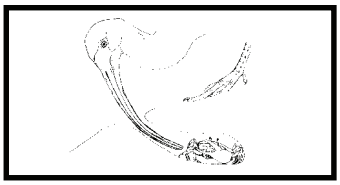
BEHAVIOR: Some animals protect themselves by their behavior.



Birds can fly away.

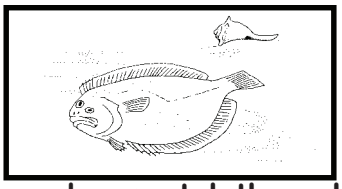


Puffer fish swallow air or water to puff up and make themselves too big to swallow.

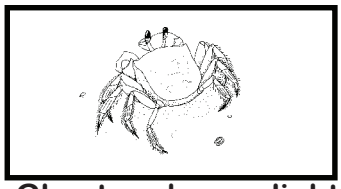


Fiddler crabs burrow to hide.

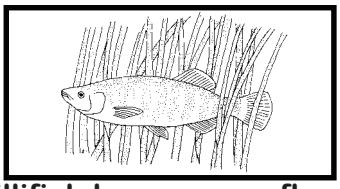
COLOR: Some animals protect themselves by their color (camouflage). Camouflage can help some animals catch food.



Flounders match the color of the bottom they live on.

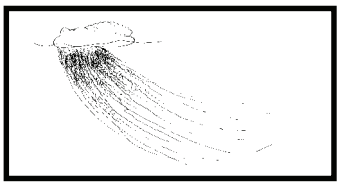


Ghost crabs are light in color like the sand they live on.

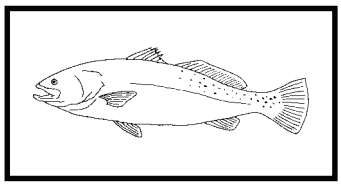


Killifish have camouflage stripes and live among plants.

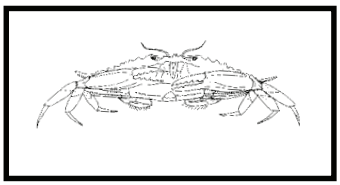
SPECIAL BODY PARTS: Some animals protect themselves by using special body parts.



Jellyfish use their stinging tentacles.



Fish use their fin spines and teeth.



Crabs use their claws.

FASCINATING FACTS

WHAT CAUSES TIDES?

There are tides along all the coasts of the world. Tides are caused by the gravitational pull of the moon. The sun also has some effect on the tides; but the moon is closer to the Earth, so it has a greater effect. Most coasts have two high tides and two low tides every 24 hours. Generally, there is only one high and one low tide every 24 hours along the Mississippi Gulf Coast (and most areas in the Gulf of Mexico). In some places in the world, the difference between a low and a high tide is only one foot, but in other places, it is as great as 50 feet! Along Mississippi's coast, the tidal influence is small—only a few feet. During a storm or hurricane, strong winds push the water and make the tide higher or lower.

WHAT IS A RED TIDE?

A red tide is caused when certain species of microscopic plants called algae undergo rapid population explosions, called blooms. Nutrient-rich pollution is thought to play a role in these sometimes-harmful algal blooms. These blooms give the water a reddish, brownish, or other color appearance. These species of algae may contain toxins that are released into the water. Animals such as fish, birds, marine mammals and humans may be affected by these toxins, although the fish also die when a large amount of this algae begins to die and decay. The decay process removes the oxygen from the water, so the fish eventually suffocate if they cannot escape. Algal blooms are most common in the hotter summer months.

WHAT IS A COASTAL PRESERVE?

A Coastal Preserve is a state-designated nature preserve that is protected because it contains tidally influenced wetland habitats. These preserves provide habitat for coastal wildlife including many endangered, or threatened, species of plants and animals; help filter pollution and sediment out of the water; and provide us with many fun recreational opportunities. Mississippi's Coastal Preserves are carefully managed to protect their natural functions for future generations.

FASCINATING FACTS

WHAT IS MISSISSIPPI'S STATE WATER MAMMAL?

The bottlenose dolphin is Mississippi's state water mammal. Often referred to as a porpoise in south Mississippi, the bottlenose dolphin is the most common species of marine mammal found in our state's waters. Family groups of the playful marine mammal (called pods) are found in the Mississippi Sound and its adjacent rivers and bays throughout the warm-water months. When the water temperature drops, many of the dolphins return to the warmer, deeper waters south of the barrier islands.

WHAT IS A SOFT-SHELL CRAB?

To grow larger, a crab must periodically shed its old, hard shell. The new, larger shell takes a few hours to harden. During this time, the crab is soft; so it's called a soft-shell crab. All crabs get soft when they shed. It is the blue crab that people fry and eat whole when it has a soft shell.

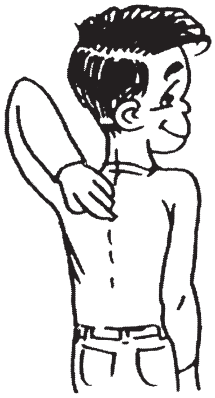
WHAT ARE ENDANGERED SPECIES?

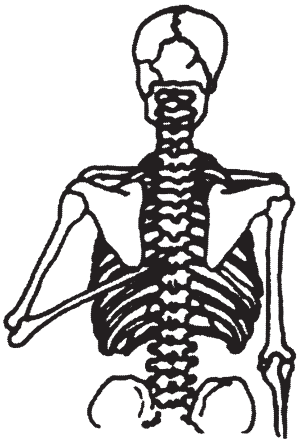
Endangered species are plants or animals that have become very, very rare and that may disappear in a few years unless they are protected. Threatened species are those species that could soon become endangered unless they are protected. Extinct species are those species that no longer exist. Several things can contribute to the decrease in the population of a species, but many of the main contributing factors that have led to these declines can be linked to the activities of humans. In the past, humans have polluted the air and water, built houses and other buildings in critical nesting or feeding areas, and overharvested critical species or their food sources. Although some of these activities are still going on today, laws such as the Endangered Species Act have been made that protect the endangered species and their habitats. Threatened or endangered species in coastal Mississippi include: Kemp's Ridley Sea Turtle, Bald Eagle, Brown Pelican, Peregrine Falcon, Gopher Tortoise and the Mississippi Sandhill Crane. Remember — EXTINCTION IS FOREVER, BUT ENDANGERED MEANS THERE'S STILL HOPE!

ANIMAL TYPES
VERTEBRATES

Animals that live along the Mississippi coast are considered COASTAL RESOURCES. Many of the animals we know have a bone down their back called a BACKBONE. The BACKBONE is really a series of bones, and each bone is called a VERTEBRA. So, we call animals with backbones VERTEBRATES. You are a VERTEBRATE!

Reach around to your back and feel your backbone.





VERTEBRATES are the only animals with bones. There are five classes of vertebrates. They are:

FISHES AMPHIBIANS REPTILES BIRDS MAMMALS

<u>FILL IN</u> — Using these five names, fill in the blanks below.

1. _____ live in water and most have scales and gills.

2. _____ have big eyes and soft skin, which is sometimes wet and sometimes dry. Some live in water and some live on land.

3. _____ have dry skin and scales. Some live in water, but most live on land.

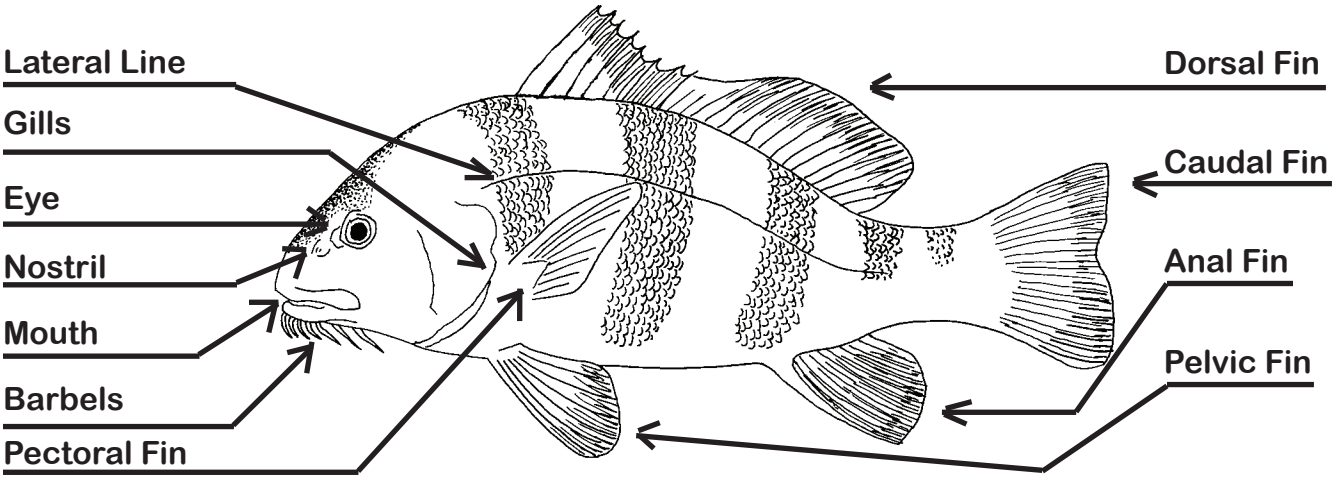
4. _____ have feathers, and almost all of them fly.

5. _____ have fur or hair. Most live on land, but some live in water.

FISHES

Mississippi has more than 500 different kinds of FISHES. Some live only in lakes and rivers, and many live only in the Mississippi Sound or in the Gulf of Mexico. All fish are RESOURCES.

PARTS OF A FISH



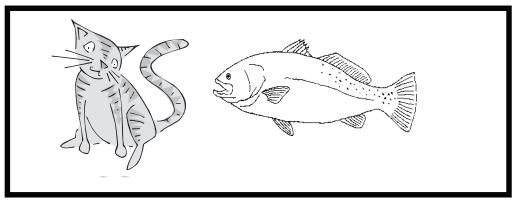
MATCH THE FISH PARTS — Using the picture above, match the word(s) on the left with the phrase on the right that goes best with the word(s). Do this by drawing a line from the word(s) to the correct phrase. We did one for you.

1. Eye	a. the last fin on the body, used for forward swimming
2. Mouth	b. if a fish could walk, these fins would be its legs
3. Barbels	c. the last bottom fin, sometimes has a few sharp spines
4. Anal Fin	d. fish have good vision and can see colors
5. Nostrils	e. used mostly for eating
6. Caudal Fin	f. line on the side that is used for “hearing” vibrations
7. Dorsal Fin	g. called whiskers by some people, these are taste sensors
8. Pelvic Fins	h. the “shoulder” fins, used for turning and stopping
9. Lateral Line	i. used for smelling but not for breathing
10. Pectoral Fins	j. the top fin, often has sharp (ouch!) spines
11. Gills	k. used for breathing, a fish has these instead of lungs.

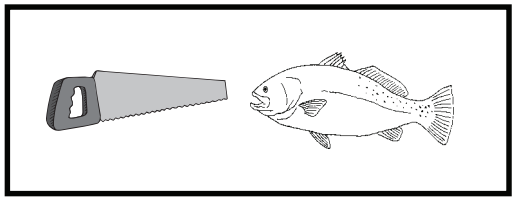
FISHES HAVE FUNNY NAMES

Many FISHES HAVE FUNNY NAMES, but their names are useful because they often help to describe what the fishes look like or what the fishes do. For example, the tonguefish is shaped like a tongue and the drum or croaker is named for the drumming or croaking sound it makes.

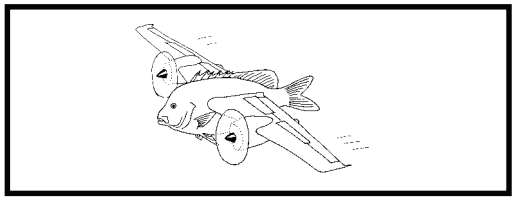
<u>FILL IN THE BLANKS</u> — Using the drawings on the left, guess the name of the fish and write the name on the line provided. Then match the name of the fish with its real picture on the right by drawing a line from the name to the correct picture. We did one for you.



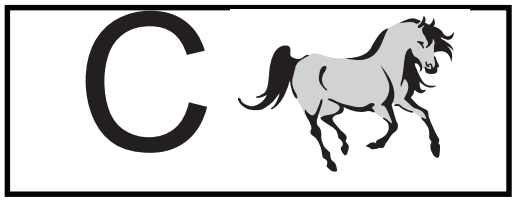
1. catfish



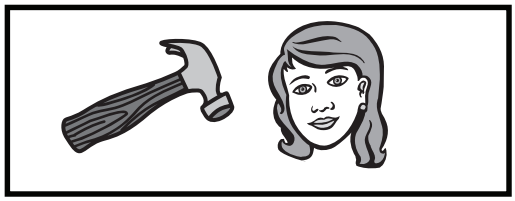
2. _____



3. _____

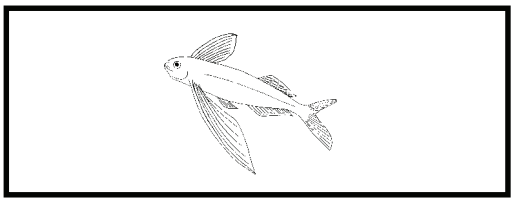


4. _____

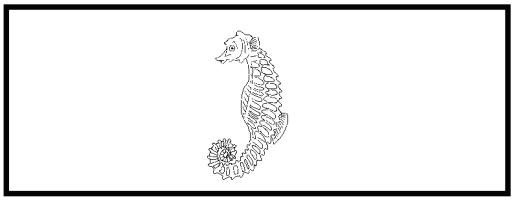


5. _____

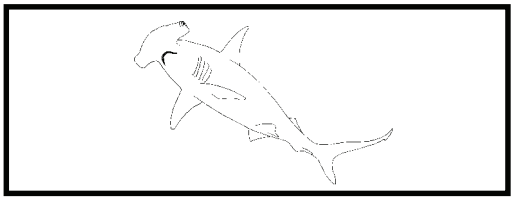
a.



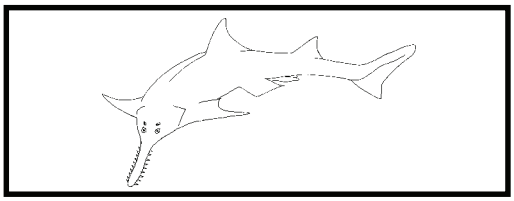
b.



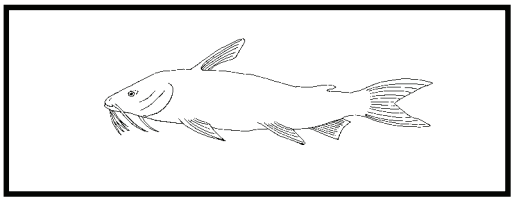
c.



d.



e.

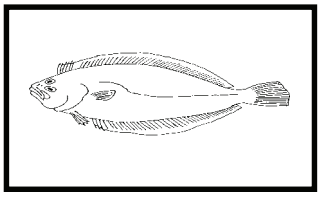


READ A FISH

Reading is using your eyes to get information and to think about things. We read using signals—words, pictures, stop lights and everything else we see. We can READ FISHES too—if we know some signals. Below, we have some fish signals—body shape, mouth position and size. Look at them carefully so that next time you see a fish, you can do a little "reading." You can also "read" other plants and animals if you know their signals.

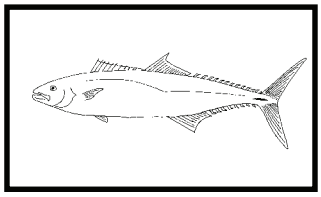
BODY SHAPE — The body shape of a fish tells something about where it lives and how fast it can swim.

Flat body
lives on bottom



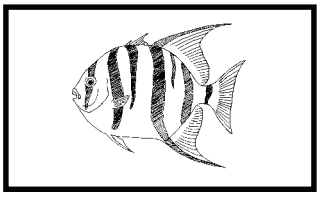
FLOUNDER

Thin body
swims fast



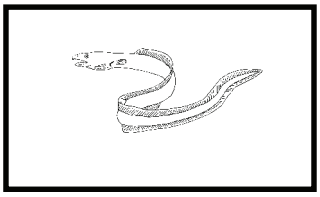
KING MACKEREL

Deep body
swims slow



SPADEFISH

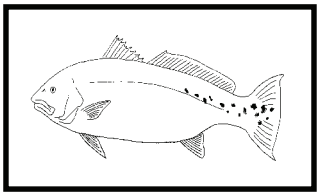
Snake-like body
lives in holes
or among rocks



SHRIMP EEL

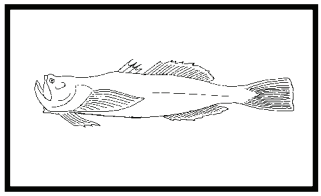
MOUTH POSITION AND SIZE — The position and size of a fish's mouth tells something about where and what it eats.

Mouth faces down
bottom feeder



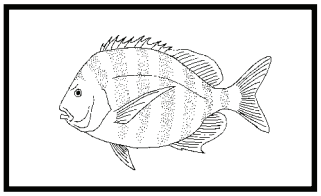
RED DRUM

Mouth faces up
feeds on things
above it



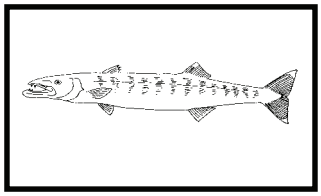
STARGAZER

Small mouth
picks food off
piers and rocks



SHEEPSHEAD

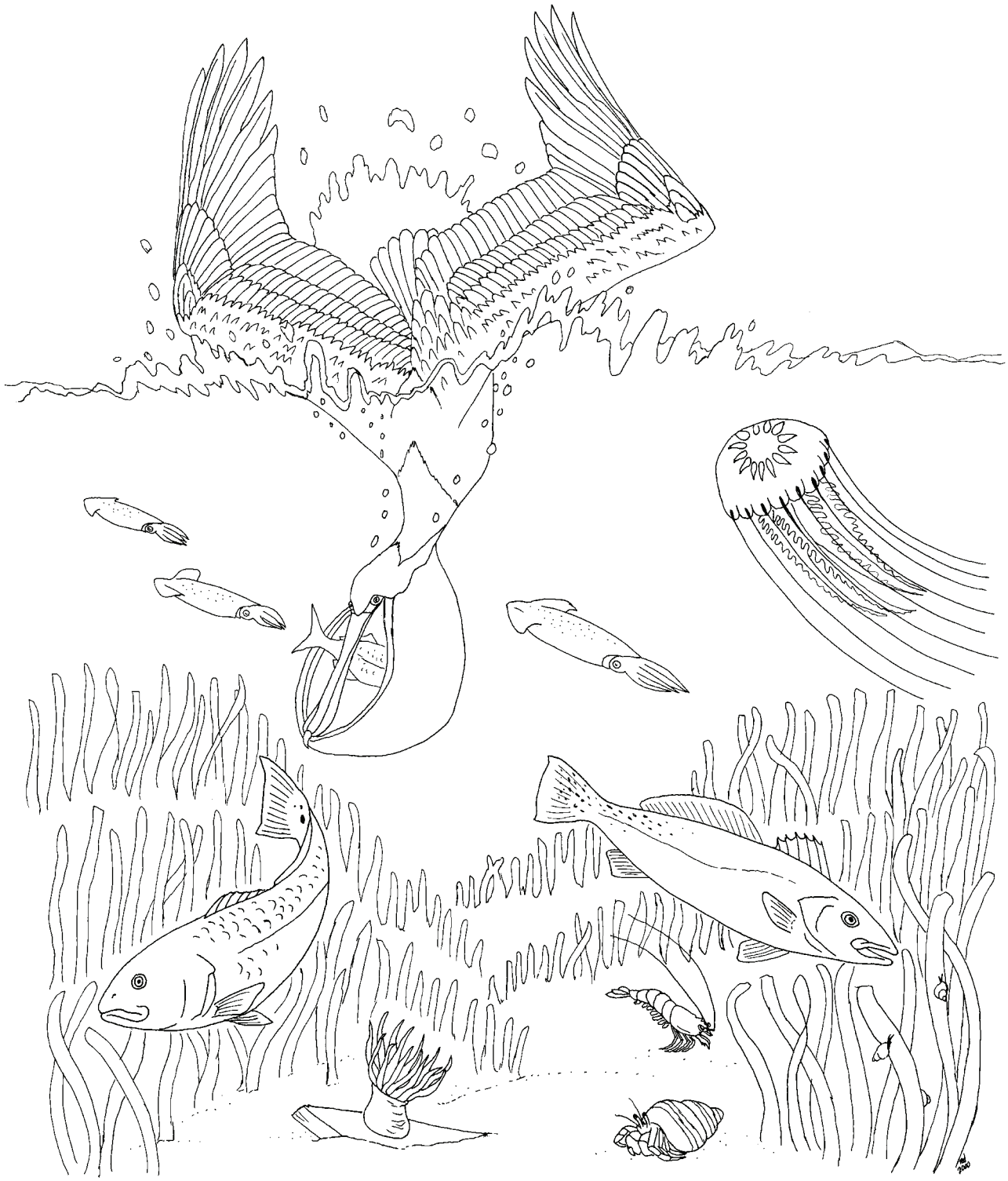
Large mouth
feeds on large
animals



BARRACUDA

COLOR THE PICTURE

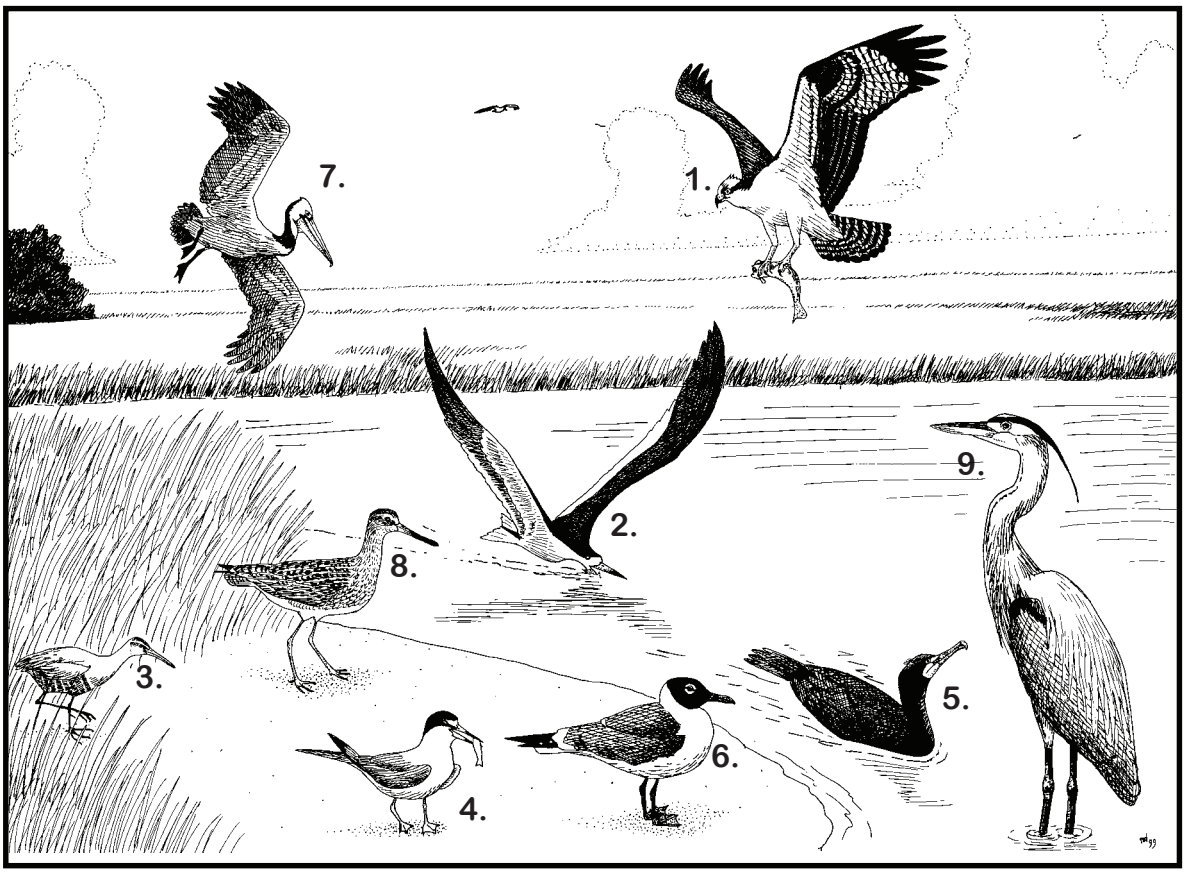
Pictured below are a pelican, jellyfish, squid, speckled trout, red drum, shrimp, anemone and periwinkle snail. Color these animals.



COMMON BIRDS OF THE MISSISSIPPI COAST

Mississippians can see more than 350 different kinds of birds during the year. Most of these can be seen right along the coast. Some birds live on the coast year-round. Other birds live here only in the winter or summer. Many birds just stop here a few days in the spring and fall when they are migrating north or south.

<u>MATCHING</u> — In the picture below are some of the COMMON BIRDS that may be seen during the year along the coast. Below the picture are the names of all the birds in the picture. See how many birds you know by matching a picture with each name—write the number of the bird pictured on the line next to the correct bird name. If you need help, look at the description on the next page. We have done one for you.



_____ a. Black Skimmer	_____ d. Brown Pelican	_____ g. Clapper Rail
_____ b. Cormorant	_____ e. Great Blue Heron	_____ h. Laughing Gull
___4___ c. Least Tern	_____ f. Osprey	_____ i. Willet

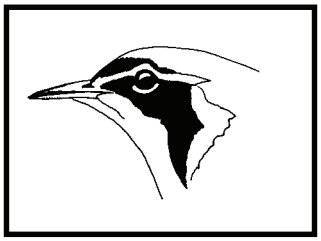
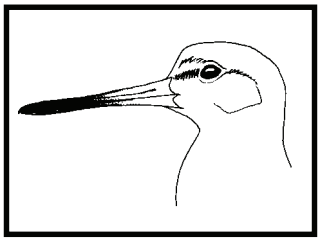
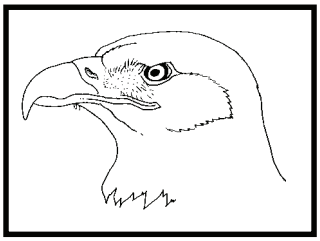
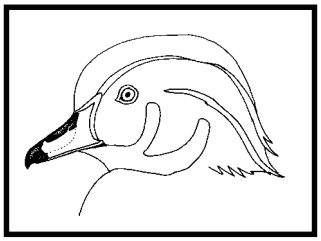
HOW'S YOUR BIRD BRAIN?

Listed below are descriptions of the birds listed on page 25.

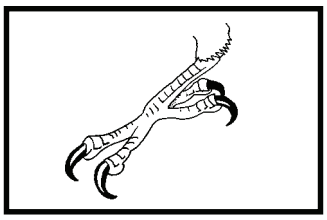
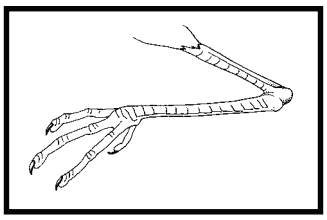
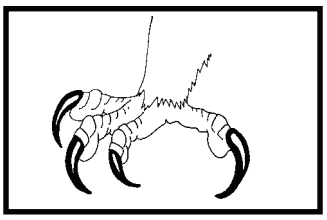
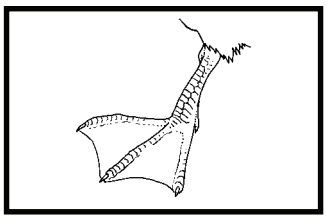
The LAUGHING GULL has a black head and gets its name from its noisy voice (HA-HA).
The BLACK SKIMMER is named for the way it skims the water with its bill when it feeds.
The BROWN PELICAN has a big pouch under its long bill and often perches on pilings.
The GREAT BLUE HERON is a very tall, dark-colored bird with a long, sharp bill for spearing fish.
The CLAPPER RAIL hides in marshes and is often heard before it is seen.
The OSPREY is a large, fish-eating hawk that nests on the barrier islands and along coastal rivers.
The WILLET uses its long bill to probe in sand or mud for food.
The CORMORANT eats fish and can often be seen sitting on a piling holding its wings out.
The LEAST TERN nests along Mississippi coast beaches and feeds on small fish.

READ A BIRD — We can "read" a bird the same way that we can "read" a fish—by using signals. Below, we have some bird signals—bills and feet—that tell us something about how some birds eat and move. Look closely so you can "read" the next bird you see.

BILLS — tell us something about how birds eat.

Short pointed bill catches insects	Long, narrow bill probes in sand and mud	Heavy, sharp, hooked bill tears meat	Flat, wide bill strains water
			
WARBLER	WILLET	EAGLE	DUCK

FEET — tell us something about how birds move or grab things.

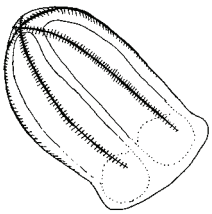
Toes in front and back designed for climbing	Long legs and large feet for wading	Strong curved talons for grasping	Webbed feet for swimming
			
WOODPECKER	HERON	EAGLE	DUCK

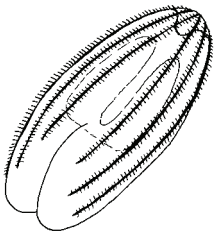
ANIMAL TYPES
INVERTEBRATES

Only about five percent of all animals have backbones. Animals without backbones are called INVERTEBRATES. Most of the marine species of invertebrates can be classified in one of the following six groups:

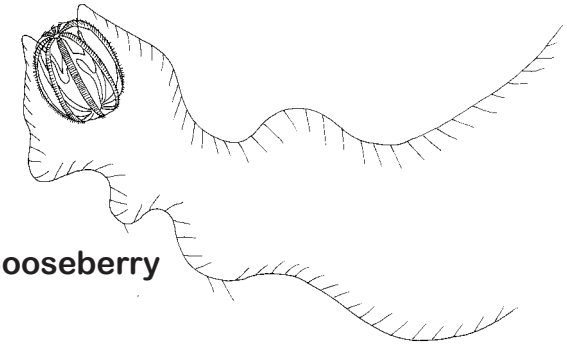
1. CTENOPHORES (TEEN-a-fours)

   This is a small group of marine INVERTEBRATES that are often called comb jellies or sea walnut. These invertebrates are common in our coastal waters. Unlike true jellyfish that have stinging cells, the two most common species of comb jellies in Mississippi do not. CTENOPHORES are noted for their bioluminescence—they glow in the dark!





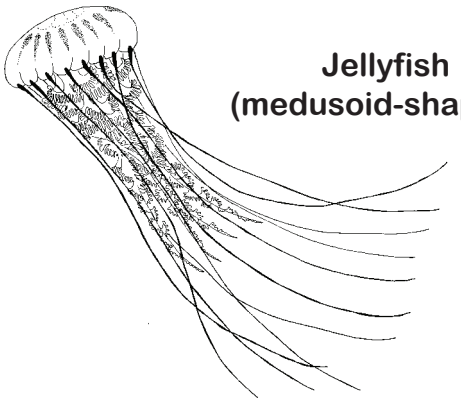
Comb Jellies



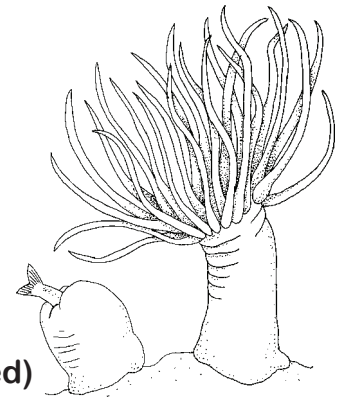
Sea Gooseberry

2. CNIDARIA (ni-DAR-ia)

   Most of these INVERTEBRATES are found in shallow, marine or estuarine waters. There are two different types of body shapes common to the CNIDARIA. The sea anemone is an example of a polyp, which is a sessile (attached, non-traveling), tube-like organism with tentacles. The Portuguese man-of-war is an example of the free-swimming medusoid body shape that looks like an upside-down bowl with tentacles hanging off the rim.



Jellyfish
(medusoid-shaped)

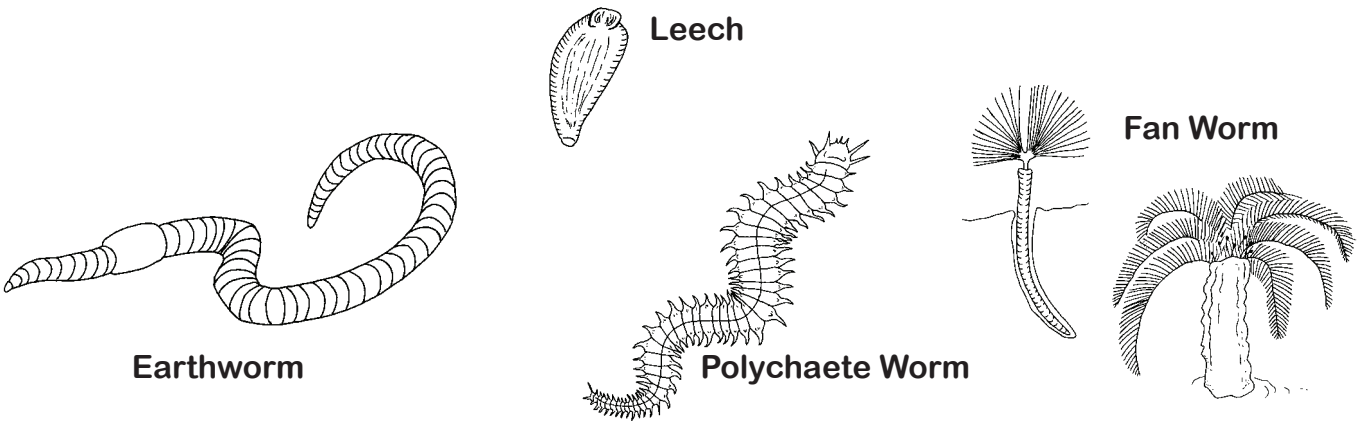


Anemone
(polyp-shaped)

ANIMAL TYPES
INVERTEBRATES

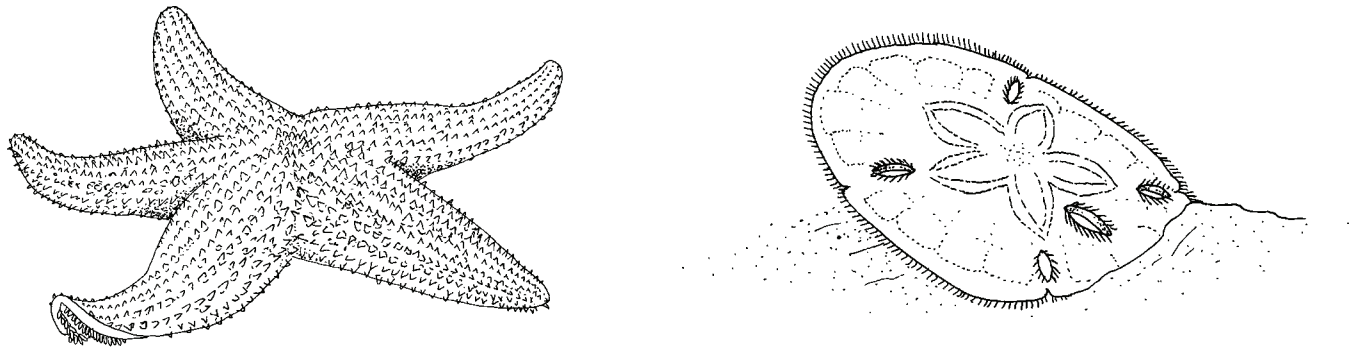
3. ANNELIDS (AN-el-lids)

This group of INVERTEBRATES are the segmented worms. These worms are common on mudflats that are uncovered at low tide. A bucketful of mud gathered at low tide will have a better collection of worms than you can find in your backyard compost pile! A polychaete worm is a very common marine animal.



4. ECHINODERMS (e-KINE-o-derms)

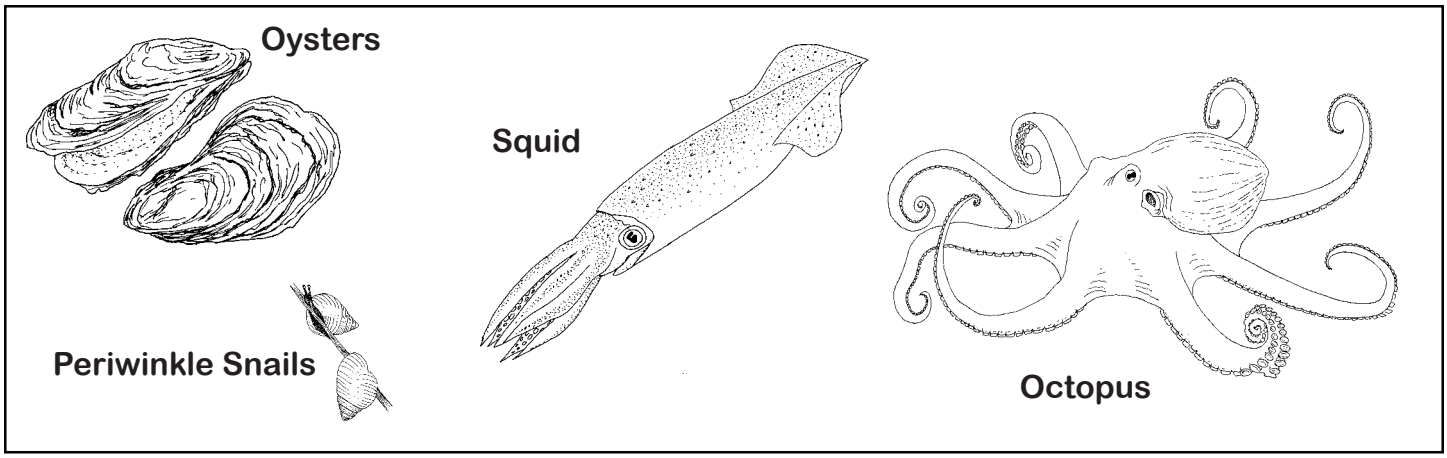
These INVERTEBRATES have a hard, spiny body, but are soft inside. The sand dollar is an ECHINODERM that we often find washed up dead on the beach. Only its hard body shell is left. All ECHINODERMS live in the ocean.



ANIMAL TYPES
INVERTEBRATES

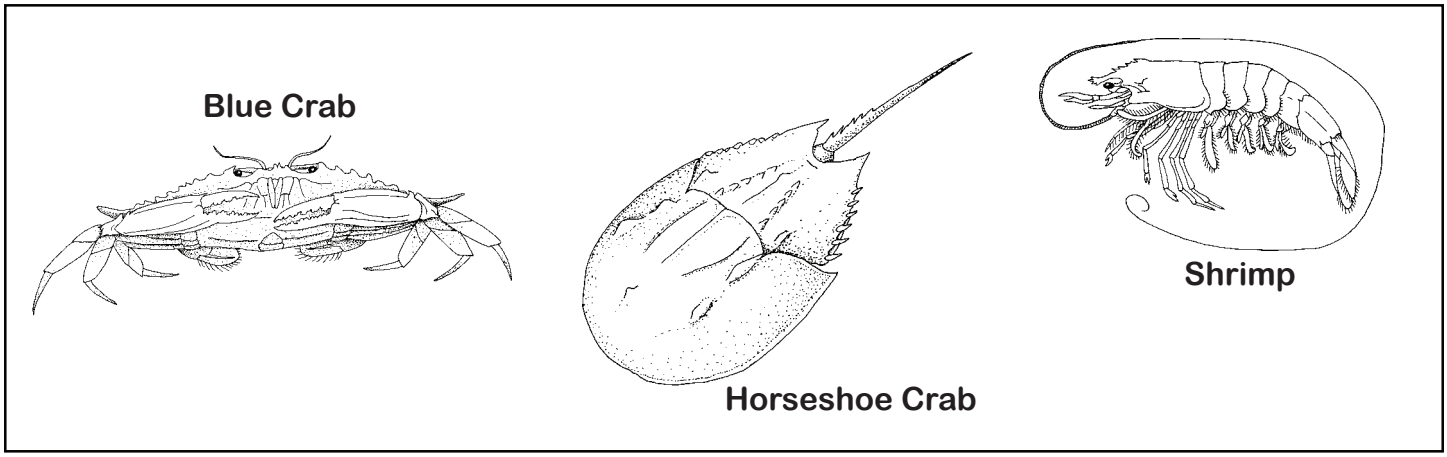
5. MOLLUSKS (MOLL-usks)

Mollusks are some of our most interesting INVERTEBRATES. Most have either an external (outside) or internal (inside) shell(s). Marine snails, such as oyster drills, have one external shell. Oysters and clams have two outer shells and are referred to as bivalves. The squid has an internal shell called a pin. The octopus has no shell at all. Seashells you find on the beach are the remains of marine MOLLUSKS.



6. ARTHROPODS (R-throw-pods)

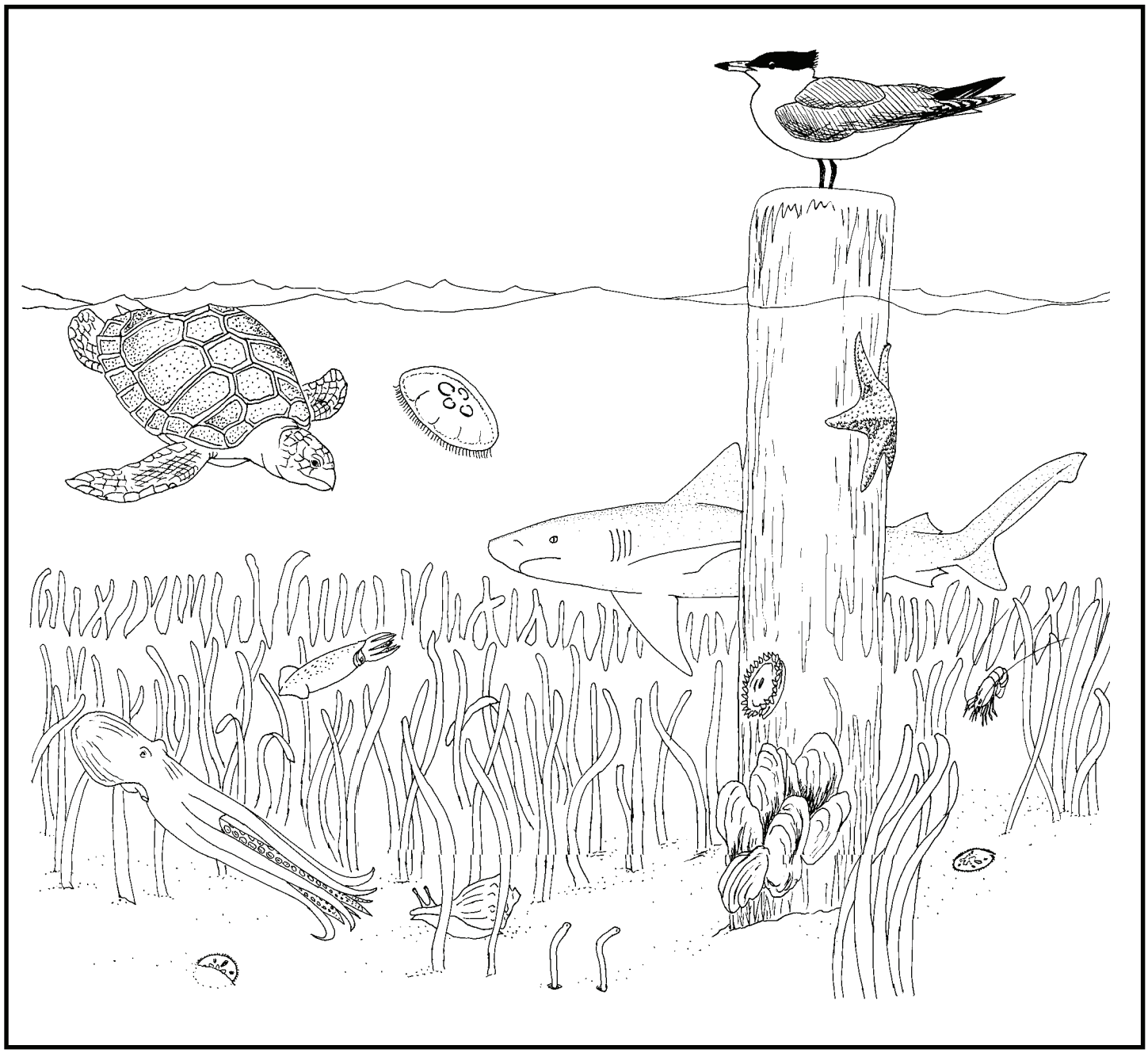
This is the largest animal group. There are more ARTHROPOD species than all other animal species combined! Shrimp, crabs, crawfish and insects all are ARTHROPODS. ARTHROPODS have a hard outer skeleton, referred to as an exoskeleton, and jointed legs. In order to grow, an ARTHROPOD must shed its hard outer skeleton (shell) periodically. This is called MOLTING.



INVERTEBRATE PICTURE GUESS

Animals that are not vertebrates are INVERTEBRATES. They are also a COASTAL RESOURCE.

<u>PICTURE GUESS GAME</u> — Circle all the INVERTEBRATES pictured below. There are 17 INVERTEBRATES in the picture.



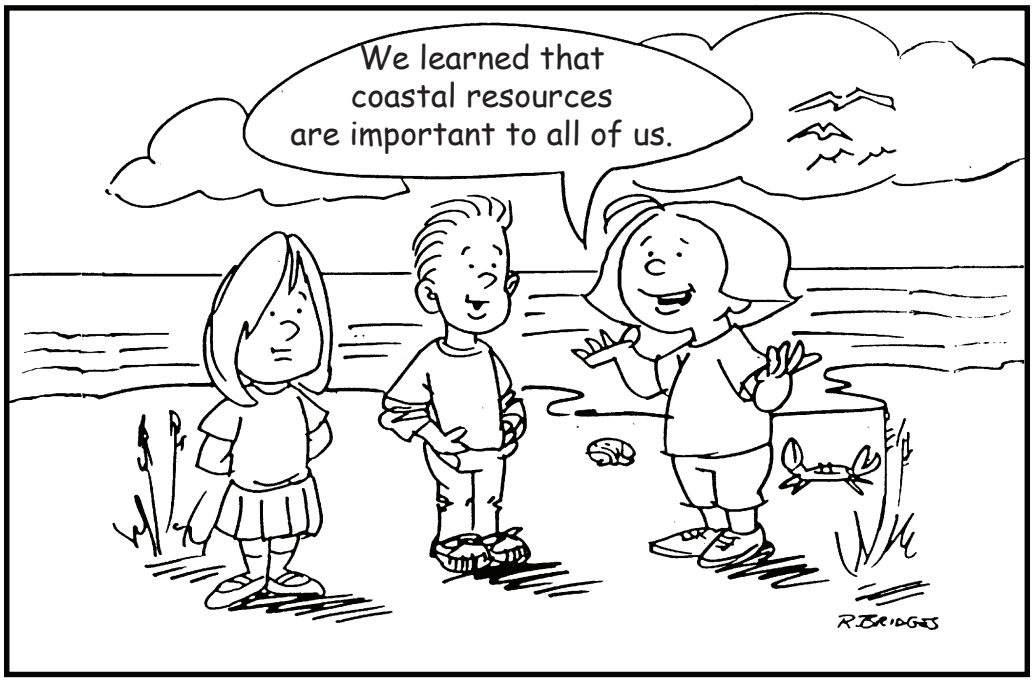
WHAT HAVE YOU LEARNED?

This activity book has been about COASTAL RESOURCES. A resource is something that is available for use again and again whenever it is needed. As long as we conserve our coastal resources, they will continue to provide us with food, recreations, jobs, and other benefits. These resources—the fish, shrimp, wetlands and islands—are the things that make living on Mississippi's Gulf Coast a unique, enjoyable experience. The more you learn about coastal resources, the better you will understand how valuable they are to all of us.

On the next page is a word search game. The words you will seek are words we have used throughout the activity book. This game should help you remember what you have learned—and the fun you had doing it.

To learn more about Mississippi's coastal resources and how they are being managed, please visit the Mississippi Department of Marine Resources' Web site at:

dmr.ms.gov



WORD SEARCH

WORD SEARCH — There are 18 words listed in the word bank. Find those words in the word search puzzle below. One word has been found already.

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

WORD BANK

resource	birds	trout
islands	fish	shrimp
coast	crab	squid
vertebrate	wetlands	invertebrate
tides	water	marsh
nutrients	plankton	map

ANSWER SHEET

PAGE 3

something; shoreline; Hancock; Harrison; Jackson

PAGE 4

1. a.	4. e.
2. f.	5. c.
3. d.	6. b.

PAGE 7

a. 5.	f. 12.	k. 4.
b. 14.	g. 8.	l. 6.
c. 10.	h. 7.	m. 11.
d. 2.	i. 9.	n. 15.
e. 3.	j. 1.	o. 13.

PAGE 9

Across — 1. barrier islands

Down — 2. sand
3. protect
4. Horn
5. Ship
6. north
7. south

PAGE 11

Across — 1. plankton
2. animals
6. zooplankton

Down — 1. phytoplankton
3. water
4. lakes
5. oxygen

PAGE 15

1. b.
2. c.
3. a.

PAGE 16

1. sunlight	4. fish
2. plankton	5. shark
3. shrimp	

PAGE 20

1. fishes
2. amphibians
3. reptiles
4. birds
5. mammals

PAGE 21

1. d.	7. j.
2. e.	8. b.
3. g.	9. f.
4. c.	10. h.
5. i.	11. k.
6. a.	

PAGE 22

1. catfish	e.
2. sawfish	d.
3. flying fish	a.
4. seahorse	b.
5. hammerhead	c.

PAGE 25

a. 2.	d. 7.	g. 3.
b. 5.	e. 9.	h. 6.
c. 4.	f. 1.	i. 8.

PAGE 30

squid	sand dollars
octopus	oysters
jellyfish	starfish
worms	anemones
shrimp	snail

CREDITS

Special and Technical Assistance:

Jennifer Buchanan
Robert Collins
Susan Perkins
Lauren Thompson

For additional information about MISSISSIPPI'S COASTAL RESOURCES, write:

Gulf Coast Research Laboratory
703 East Beach Blvd.
Ocean Springs, MS 39564
(228) 875-2244

NOAA Fisheries Service
3209 Frederic Street
Pascagoula, MS 39567
(228) 762-4591

MS/AL Sea Grant Consortium
P.O. Box 7000
Ocean Springs, MS 39566-7000
(228) 818-8838

Mississippi Department of Marine Resources
1141 Bayview Ave.
Biloxi, MS 39530
(228) 374-5000

Tate Reeves, Governor of Mississippi
Mark H. Havard, II, Chairman, Commission on Marine Resources

Mississippi Department of Marine Resources
Joe Spraggins, Executive Director

NOTES

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