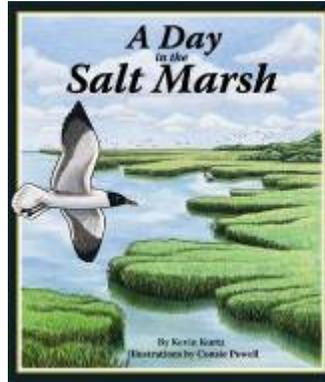


Teaching Activities

for



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Teaching Activities are intended for use at home, in the classroom, and during story-times.

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Questions to ask children before reading the book

- What do you think the book is about by looking at the cover? (or one or two of the inside illustrations) *Sometimes it is easy to tell from the cover, other times it is not.*
- What plants and animals do you see on the cover
- Does the title tell you what the book is about?

What do children already know?

- Young children are naturally inquisitive and are sponges for information. The whole purpose of this activity is to help children verify the information they know (or think they know) and to get them thinking “beyond the box” about salt marshes and wetlands in general.
- The children should write down their “concepts” (or adults for them if the children are not yet writing) on the provided chart found on the next page.
- Use the questions to get children thinking about what they already know. Feel free to add more questions or thoughts according to the child(ren) involved.

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What do children already know—activity chart

Ask children to write down what they think they know before reading the book. If the information is verified while reading the book, check “yes.” If the information is wrong, mark “no” and cross it off. Write the correct information in another section, below. Make a note of how you verify the information.

<u>What do I think I know?</u>	<u>Yes</u>	<u>No</u>	<u>Verified</u>
What is a salt marsh and where are they found?			Text Illustration Info in FCM Other
Where does the salt water come from?			Text Illustration Info in FCM Other
List some animals that live in a salt marsh			Text Illustration Info in FCM Other
What are some plants that grow in a salt marsh?			Text Illustration Info in FCM Other
Why is a salt marsh a harsh environment in which to live?			Text Illustration Info in FCM Other
Why are salt marshes important?			Text Illustration Info in FCM Other

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<u>What do I think I know?</u>	<u>Yes</u>	<u>No</u>	<u>Verified</u>
How is a salt marsh like a nursery?			Text Illustration Info in FCM Other
What are some types of seafood that we eat that rely on salt marshes during their lives?			Text Illustration Info in FCM Other
What makes the tides rise & fall?			Text Illustration Info in FCM Other
Is the high tide at the same time everyday?			Text Illustration Info in FCM Other
What are two special adaptations that spartina (cordgrass) has to survive living in the salt environment. 1. 2.			Text Illustration Info in FCM Other
Why are salt marshes important to some migrating birds?			Text Illustration Info in FCM Other
How does a heron catch its food?			Text Illustration Info in FCM Other
Do you find the same animals in the salt marsh at high tide and low tide? Why or why not?			Text Illustration Info in FCM Other

Use this chart for any other thoughts the children might have.

<u>What do I think I know?</u>	<u>Yes</u>	<u>No</u>	<u>Verified</u>
			Text Illustration Info in FCM Other

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After reading the book – writing prompts & thinking it through

- Did the cover “tell” you what the book was about?
- If not, how does the illustration on the front relate to the story?
- Does the cover illustration show the marsh at low or high tide?
- Draw your own cover
- Can you think of another title for the book?

Re-read the book looking for more information

Go back and re-read the book studying each page carefully.

- What, if any, facts are mentioned in the text?
- What can be seen or inferred from the illustrations that is not or are not mentioned in the text?
- What, if anything, can be inferred from the text?
- Author Kevin Kurtz has written an [interpretive guide](#) to the book that explains each page just as a naturalist would if you were sitting in the salt marsh. Using his guide, go through the book again, looking carefully at each illustration and finding all the items he points out.

Fun things to look for

Consie Powell, the illustrator, drew and hid all kinds of plants, animals, and signs of animals found in the salt marsh, even if they weren't specifically mentioned in the text.

- Use the list of plants and animals on the next page to find and identify items while looking at book.
- Print [line drawings](#) of the art and have children find and color the animals.
- Check [answers](#) when finished.

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Plant and Animal Identification List
A Day in the Salt Marsh

Use the following list to find and identify the various plants and animals in the book.
Black and white line drawings are available.

(title page)

Ladybug
Swamp damer dragonfly
Mosquitoes
Periwinkle snails
Great blue heron
Laughing gulls
Plants other than Spartina
(cordgrass):
Sea lavender
Saltmarsh aster
Saltmarsh bullrush

(Dedication, CPIP, and Introduction)

Laughing gulls
Raccoon
Plants other than Spartina:
Seaside goldenrod
Marsh elder

(Fiddler Crabs)

Raccoon tracks
Raccoon eaten crab bits
More fiddler crabs

(Diamondback Terrapin)

Fiddler crabs
Periwinkle snails
Mud snails
Muskrat swimming
Plants other than Spartina:
Glasswort
Sea lavender

(Periwinkle Snails)

Marsh rice rat
Clapper rail
Plants other than Spartina:
Glasswort

(Blue Crab)

Periwinkle snails
Fiddler crab
Clamworm
Purple marsh crab
Lesser yellowlegs
Marsh rabbit
Plants other than Spartina:
Glasswort
Sea lettuce
Eelgrass

(Bottlenose dolphin)

Laughing gulls
Striped mullet
Big-eyed scad (school)

(Cordgrass)

Grasshopper
Swamp damer dragonfly
Horsefly
Mosquitoes
Duke's skipper
Periwinkle snails
Bayou killifish
Oysters
Ribbed mussels
Black skimmer
Laughing gulls
Plants other than Spartina:
Eelgrass

(Juvenile Red Snapper)

Long-billed dowitcher
Sheepshead minnow
Bayou killifish
Seahorse
Winter flounder
Shrimps
Amphipods
Ribbed mussels
Osprey
Plants other than Spartina:
Eelgrass
Sea lettuce

(Otters)

Redwinged blackbird
Fiddler crabs
Periwinkle snails
Blue crab
Great blue heron
Great blue heron tracks

(Great blue heron)

Green heron
Black-crowned night heron
Fiddler crabs
Bayou killifish
Snowy egret

(Horseshoe crab)

Seaside sparrow
Willetts
Short-billed dowitcher
Flying willets
Fiddler crab

(Oysters)

Oystercatchers
Pea crab (inside oyster)

(Conclusion)

Flock with willets and
dowitchers
Black-crowned night heron
Great blue heron
Fiddler crabs
Mink
Ribbed mussels
Osprey
Plants other than Spartina:
Seaside goldenrod

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What do children already know activity conclusion

- Do the children have any more questions about salt marshes or the plants and animals found there? If so, write them down on the chart and then look them up.
- Identify whether the information was verified and how.
- If the concept is correct, make a note of how the information was confirmed (illustration, in text, in fun fact notes)
- If the concept was not correct, what IS the correct information – with above confirmation notes as above.
- If the concept was neither confirmed nor denied, look the information up in a reliable source and note where it was confirmed.
- Wrap it all up by adding notes with new information that they learned either through the reading or the research while looking up something else.

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Language Arts

Developing a vocabulary “word wall”

If using the book as a way to introduce a topic or subject, this is also a great way to introduce subject-related vocabulary words. If you don't have the time (or the inclination) to develop the word wall by playing the Vocabulary Game (below), we have provided a vocabulary list for you.

Vocabulary words for the “word wall” may be written on index cards, on a poster board, or on a chalk board. If writing on poster board or chalk board, you might want to sort into noun, verbs, etc. right away to save a step later. Leaving the words posted (even on a refrigerator at home) allows the children to see and think about them frequently.

Vocabulary game

This activity is designed to get children thinking of vocabulary words which will then be used as the beginning vocabulary list for a science lesson.

Select an illustration and give children a specific length of time (five minutes?) to write down all the words the children can think of about the particular subject. *If you do not have classroom sets of the book, it is helpful to project an illustration on a white board. Check our website (www.ArbordalePublishing.com) for book “previews” that may be used for this purpose.*

Their word list should include anything and everything that comes to mind, including nouns, verbs and adjectives. At the end of the time period, have each child take turns reading a word from his/her list. If anyone else has the word, they do nothing. If however, they are the only one with the word, they should circle it. While reading the list, one person should write the word on a flashcard or large index card and post it on a bulletin board or wall.

At the end, the child with the most words circled “wins.” And you have a start to your science vocabulary list. *Note if children use an incorrect word, this is a good time to explain the proper word or the proper usage.*

Putting it all together

The following activities may be done all together or over a period of several days.

- Continue to add words to the vocabulary list as children think of them.
- Sort vocabulary words into nouns, verbs, adjectives, etc. and write what it is on the back of the card. When the cards are turned over, all you will see is “noun,” etc. *(These can then be used to create silly sentences, below)*
- Now sort the vocabulary words into more specific categories. For example, nouns can be divided into plants, animals, rocks, minerals, etc. They can be divided into living/non-living, or into habitat-related words.
- Have children create sentences using their vocabulary words. Each sentence could be written on a separate slip of paper.
- Have children (individually or in small groups) sort and put sentences into informative paragraphs or a story.
- Edit and re-write paragraphs into one informative paper or a story.

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A Day in the *Salt Marsh*

Suggested vocabulary list

<u>Nouns</u>	<u>animals (nouns)</u>	<u>plants (nouns)</u>	<u>verbs</u>	<u>adjectives</u>
adaptation	amphipods	eelgrass	adapt	ebb
algae	bayou killifish	glasswort	blow	endangered
amphibian	big-eyed scad	marsh elder	camouflage	falling
bank	swamp darter dragonfly	saltmarsh aster	change	flood
biodiversity	winter flounder	saltmarsh bullrush	climb	intertidal
bird	blue crab	sea lavender	consume	invasive
camouflage	bottlenose dolphin	sea lettuce	decay	native
carnivore	clamworm	seaside goldenrod	decompose	predatory
chlorophyll	Clapper rail	Spartina	die	rising
claw	diamondback terrapin	cordgrass	drink	salt
competition	dowitchers		eat	symbiotic
consumer	duke's skipper		ebb	tidal
crustacean	diddler crab		endanger	
decomposer	flying willets		erode	
detritus	grasshopper		fall	
ecosystem	great blue heron		flood	
extinct	green heron		grow	
flood	horsefly		hibernate	
food chain	horseshoe crab		hide	
food web	juvenile Red Snapper		migrate	
habitat	ladybug		pollute	
herbivore	Laughing gulls		prey	
hibernation	lesser yellowlegs		produce	
mammal	long-billed dowitcher		rest	
marsh	marsh rabbit		rise	
migration	marsh rice rat		scavenge	
mollusk	mosquitoes		stands	
niche	mud snails		swim	
nursery	muskrat		wave	
omnivore	osprey			
photosynthesis	oyster			
pollution	oystercatchers			
predator	pea crab			
prey	periwinkle snails			
producer	purple marsh crab			
reptile	raccoon			
scavenger	redwinged blackbird			
species	ribbed mussels			
symbiosis	river otters			
tide	seahorse			
wetland	seaside sparrow			
bay	sheepshead minnow			
estuary	short-billed dowitcher			
roots	shrimps			
blades	snowy egret			
wrack	striped mullet			

A Day in the Salt Marsh

Silly sentence structure activity

This is a fun activity that develops both an understanding of sentence structure and the science subject. Use words from the “word wall” to fill in the blanks. After completing silly sentences for fun, have children try to fill in the proper words by looking for the information in the book or the [interpretive guide](#).

Male _____s have one very large _____ that
noun (2 words) noun
they wave around to attract a mate.

_____s are the only turtles that live in
noun (2 words)
the salt marsh.

She uses her back _____s to _____ a _____.
noun verb noun

_____s climb a blade of grass when the
noun (2 words)
tide _____ and climb back down again when the tide
verb
_____.

If we were to loose _____ marshes, we would not
adjective
have most of the seafood that we eat.

Spartina, also called _____, has special _____s
noun noun
to help it live in the salt marsh’s harsh environment. Special
glands _____ the salty water but spit the _____ out.
verb noun

Deep _____s help hold the plant in place.
noun

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A Day in the Salt Marsh
Sequence sentence strips

Preparation: Cut into sentence strips, laminate if desired, and place in a "center." Have children put the events in order. Children may work alone or in small groups. Cards are in order but should be mixed up when cut apart.

-----✂-----

The tide is low. Fiddler crabs are waving their claws.

-----✂-----

Snails climb blades of grass to escape the rising (flooding) tide.

-----✂-----

Dolphins chase fish during high tide.

-----✂-----

Hérons quietly wait for fish during a falling (ebbing) tide.

-----✂-----

Oysters are uncovered during low tide.

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A Day
in the
Salt Marsh
Write about it!

Select a type of bird that you could find in or around a salt marsh.
Using fun facts about the bird, write your own four-line ending to the
following:

It's one o'clock in the salt marsh;
the tide is very high.
The birds above the water
fly high into the sky.

A Day in the Salt Marsh

Word search

Find the hidden words. Even non-reading children can try to match letters to letters to find the words! Easy – words go up to down or left to right.

For older children, identify the coordinates of the first letter in each word (number, letter).

	A	B	C	D	E	F	G	H	I	J
1	T	I	D	A	L	C	R	E	E	K
2	E	A	T	S	S	N	A	I	L	H
3	R	I	S	I	N	G	T	I	D	E
4	R	A	F	L	O	U	N	D	E	R
5	A	O	Y	S	T	E	R	S	H	O
6	P	E	A	D	O	L	P	H	I	N
7	I	D	E	A	T	I	D	O	Y	S
8	N	I	E	W	T	C	R	I	E	D
9	O	B	L	U	E	C	R	A	B	S
10	H	I	M	A	R	S	H	K	B	Y

___, ___ DOLPHIN	___, ___ HERON	___, ___ FLOUNDER
___, ___ TERRAPIN	___, ___ OTTER	___, ___ BLUE CRABS
___, ___ MARSH	___, ___ RISING TIDE	___, ___ EBB
___, ___ TIDAL CREEK	___, ___ SNAIL	___, ___ OYSTERS

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Happy Earth Day!



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

Can you find these words from your Earth Day visit? Good luck!

BLUE CRAB	TERRAPIN	SNAIL	OYSTERS
FISH	DOLPHIN	TIDE	SPARTINA
OCEAN	HERON	EARTH DAY	
SALT MARSH	OTTER	LOWCOUNTRY	

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Science
A Day
in the
Salt Marsh
Animal Classification activities

- Ask students to observe the animals pictured in each activity card and look for things they have in common. Tell them to divide the cards into two groups based on characteristics each group shares. Have them explain why they divided the animals in this manner. Have them subdivide their two groups into two smaller groups based on characteristics each group share. Use this to introduce students to how scientists look for shared characteristics to classify organisms.

- Give students the characteristics of mammals, birds, reptiles, mollusks and arthropods. Have students use the characteristics to classify each of the animals pictured in the activity cards in their correct taxonomic group. Have students follow this up by classifying other animals in *A Day in the Salt Marsh*. How many of each taxonomic group do they find?
 - Mammals (class)
 - breathe oxygen from air with lungs
 - warm-blooded
 - body covered with fur or hair at some point in life
 - most young develop inside mother's body (some are born from eggs)
 - produce milk to feed their young
 - Birds (class)
 - breathe oxygen from air with lungs
 - warm-blooded
 - only animals with feathers
 - have hollow, lightweight bones
 - lay hard-shelled eggs
 - Reptiles (class)
 - breathe oxygen from air with lungs
 - cold-blooded
 - body covered with hard plates or scales
 - most lay soft-shelled eggs (some have live birth)
 - Mollusks
 - soft bodies
 - many have shells
 - Arthropods (phylum)
 - have jointed legs
 - have hard outer covering
 - have segmented bodies
 - some have wings

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Food web activity

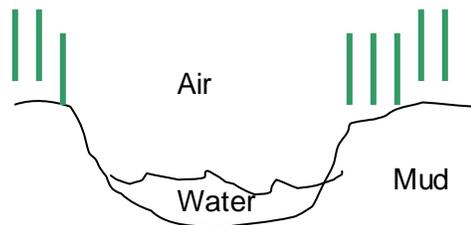
- Using the activity cards, have students create a salt marsh food web that shows predator/prey relationships. Have students place the cards on a large piece of paper with an arrow that points from prey to predators. Write in or use photos of any missing plants or animals in the web. Discuss the variety of relationships and what would happen to the food web if organisms such as algae are removed from the environment.

Adaptations activity

- Have students observe each of the organisms pictured in the activity cards and infer what adaptations each organism has that allows it to find food in the salt marsh. What adaptations does each organism have that allows it to avoid predators in the salt marsh?

Tidal habitat activity

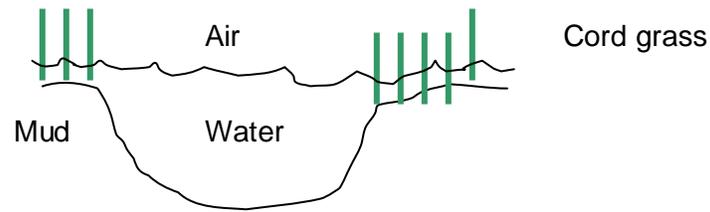
- After students have read *A Day in the Salt Marsh*, have them list the nonliving things that are found in the salt marsh (air, salt water and mud). Once this list is complete, draw a cross-section of a tidal creek on the board with air, salt water and mud labeled. Tell students this represents a salt marsh at low tide, when water is only in the tidal creeks. Ask students where the cord grass would be found and draw it on the diagram.



- Have students observe the animals on their activity cards and determine where they would most likely be found in a salt marsh at low tide. Have them place their card on the diagram using tape or magnets to show where they would be found.
 - Bottlenose Dolphin: not usually in the salt marsh at low tide
 - Oyster: on the banks out of the water at low tide
 - Fiddler Crab: on the banks out of the water at low tide
 - Blue Crab: in the water at low tide
 - River Otter: not usually in the salt marsh at low tide
 - Great Blue Heron: standing in the water at low tide
 - Diamondback Terrapins: on the banks or in the water at low tide
 - Periwinkle Snails: On the grass

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- Discuss with students how the marsh changes as the tide rises and draw another diagram.



- Have students observe the animals on their activity cards and determine where they would most likely be found in a salt marsh at high tide. Have them place their card on the diagram using tape or magnets to show where they would be found.
 - Bottlenose Dolphin: found in tidal creeks in the salt marsh at high tide
 - Oyster: on the banks under water at high tide
 - Fiddler Crab: in holes in mud in the banks at high tide
 - Blue Crab: in the water at high tide
 - River Otter: found in tidal creeks in the salt marsh at high tide
 - Great Blue Heron: flying in the air or out of the salt marsh at high tide
 - Diamondback Terrapins: found in tidal creeks in the salt marsh at high tide
 - Periwinkle Snails: On the grass above the water at high tide
- Discuss with students how as the tides change it changes the salt marsh environment, and because of this the animals that can be seen change.

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Activity or sorting cards

Oysters

Crassostrea virginica
Kingdom: Animal
Phylum: Mollusk
Class: Bivalve

Prey:
plankton
bacteria

Predators:
sea stars
moon snails
stingrays
oystercatchers
people

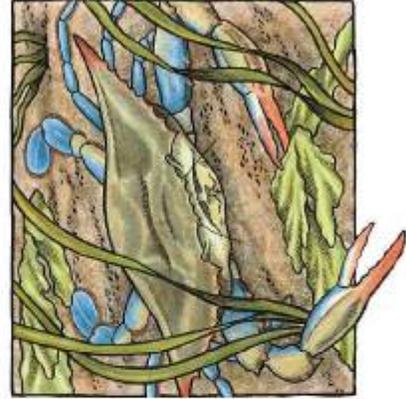


Blue Crab

Callinectes sapidus
Kingdom: Animal
Phylum: Arthropod
Class: Crustacean

Prey:
dead animals

Predators:
seagulls
herons
river otters



Bottlenose Dolphin

Tursiops truncatus
Kingdom: Animal
Phylum: Chordata
Class: Mammal

Prey:
fish
squid

Predators:
none



Fiddler Crab

Uca pugnax
Kingdom: Animal
Phylum: Arthropod
Class: Crustacean

Prey:
algae
organic items in mud

Predators:
diamondback terrapins
raccoons
various shorebirds
fish
larger crabs

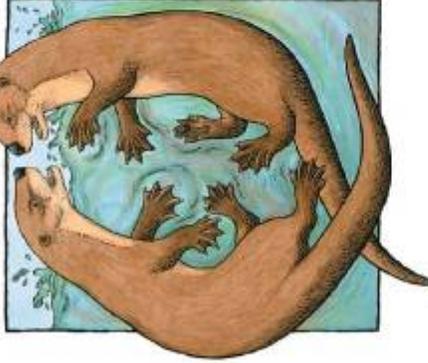


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River Otter

Lutra canadensis
Kingdom: Animal
Phylum: Chordata
Class: Mammal

Prey:
various fish
crabs
turtles
bird eggs
Predators:
none



Great Blue Heron

Ardea Herodias
Kingdom: Animal
Phylum: Chordata
Class: Aves (birds)

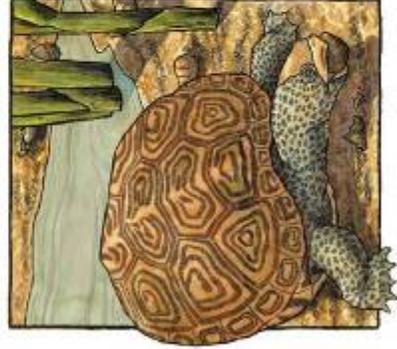
Prey:
fish
crabs
insects
Predators:
none



Diamondback Terrapin

Malaclemys terrapin
Kingdom: Animal
Phylum: Chordata
Class: Reptiles

Prey:
periwinkle snails
fiddler crabs
small fish
insects
Predators:
river otters
sharks



Periwinkle Snail

Littoraria irrorata
Kingdom: Animal
Phylum: Mollusk
Class: Gastropod

Prey:
algae
Predators:
diamondback terrapins
various shorebirds



Animal card games

Memory Card Game Make two copies of each of the sorting card pages and cut out the cards. Mix them up and place them face down on a table. Taking turns, each player should turn over two cards so that everyone can see. If the cards match, he or she keeps the pair and takes another turn. If they do not match, the player should turn the cards back over and it is another player's turn. The player with the most pairs at the end of the game wins.

Who Am I? Copy or download the cards. Poke a hole through the card and tie onto a piece of yarn. Each child should put on a "card necklace" so that the card is on their back. Each child should ask "yes/no" questions to guess what animal they are.

A day in the life of . . .

Pick an animal from the book and pretend that you are that animal.

- Describe the salt marsh from your perspective.
- What do you eat?
- What animals might eat you?
- How do you protect yourself from those animals?
- Where do you sleep or rest?
- What do you do during high tide and low tide?
- Write a paragraph about what do you do during the day (or night if nocturnal)?

Life cycles

Many of the animals that we eat as seafood spend all or part of their lives in the salt marsh. Pick an animal from the book and research that animal's life cycle.

- Does the animal live in the salt marsh for its entire life or part of it?
- Describe how and when it moves into other habitats.

Adaptations

Adaptations help animals to live in their habitat: to get food and water, to protect themselves from predators, to survive weather, and even to help them make their homes. Pick an animal or plant, research and describe the adaptations that help it to live in the salt marsh.

- Physical Adaptations include body shape. (teeth, feet, body covering, hair, blubber, ability to move, climb, etc. or for plants roots and shape of leaves or blades)
- Camouflage: color of skin or pattern to blend into background.
- Mimicry: Pretending to be something else to fool predators and prey
- Behavior: moving away from rising tides, filling in holes to protect from water

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Science journal

Have children draw a picture to define the vocabulary word or concept

Low tide

High tide

Inter tidal zone

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Salt marsh nursery

Why salt marshes are important

Invasive species

Why salt marshes are important to migrating birds

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Venn diagram

A Day in the Salt Marsh

Select another type of wetland and compare and contrast it to a salt marsh.

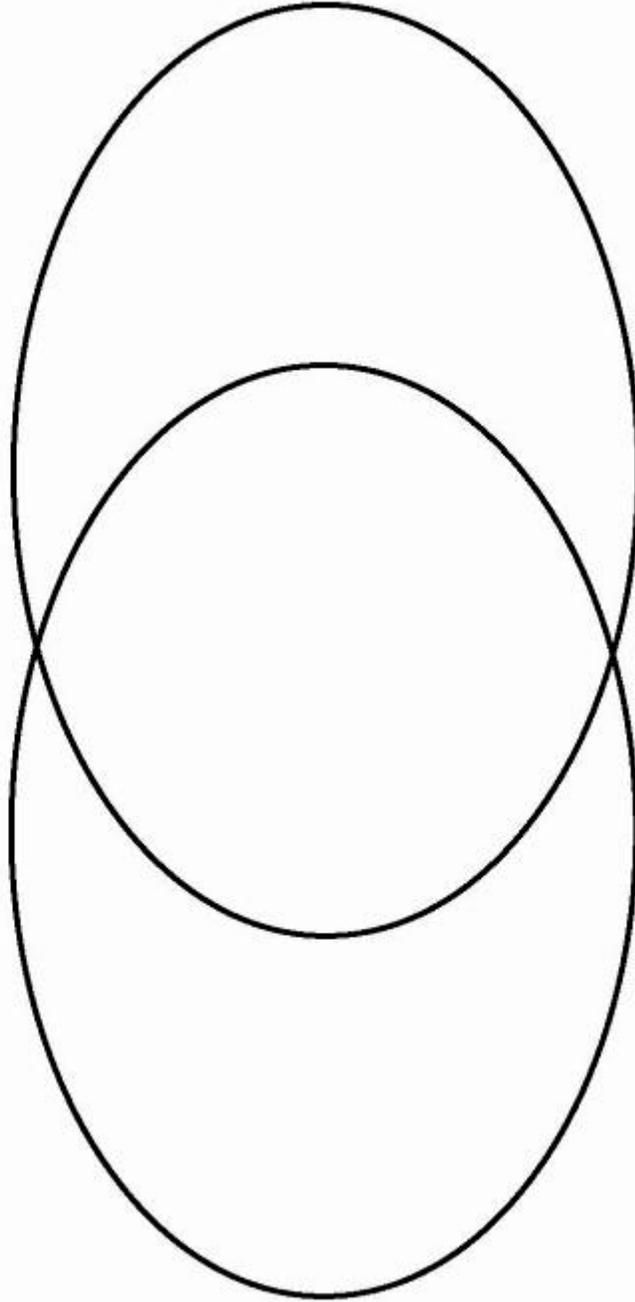
Where are the wetlands found?

Is the land covered with fresh, brackish, or salt water?

How often and when is the land underwater?

What types of plants grow there?

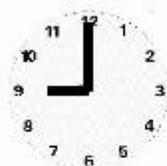
What types of animals are found in the wetlands?



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Math-telling time by the hour

Draw a line to match the clock to the time mentioned in the text:



It's eight o'clock in the salt marsh;
the tide is really low.



It's nine o'clock in the salt marsh;
the tide is coming back.



It's ten o'clock in the salt marsh;
the tide's now in the grass.



It's eleven o'clock in the salt marsh;
the tide is getting high.



It's twelve o'clock in the salt marsh;
the tide is rising fast.



It's one o'clock in the salt marsh;
the tide is very high.



It's two o'clock in the salt marsh.
A fish, oh so tiny,



It's three o'clock in the salt marsh,
and on and off all day



It's four o'clock in the salt marsh,
and by the tidal creek



It's five o'clock in the salt marsh,
and the water's going down.



It's six o'clock in the salt marsh;
the oysters no longer hide.

Circle the answer

Since the title of the book is *A Day in the Salt Marsh*, does the twelve o'clock refer to noon or midnight?

Is it am or pm at ten o'clock (10:00) when the tide is now in the grass?

What meal would you be having at the end of the book, breakfast or dinner?

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Research and geography

Salt Marshes

Where in the US would you find salt marshes?



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An interpretive guide to

A Day in the Salt Marsh

By Kevin Kurtz

In *A Day in the Salt Marsh*, Consie Powell's richly detailed illustrations of the salt marsh and its inhabitants provide a wealth of learning opportunities for children. While reading the text, parents and educators can use the illustrations to take children on a "nature walk" through this unique habitat, pointing out the plants and animals in the background and sharing some of the interesting facts about them. Below are interpretive points for each page's illustrations that can allow any educator to use *A Day in the Salt Marsh* as a naturalist might.

Introductory Illustration

Salt marshes are habitats found near the ocean, usually along estuaries or behind barrier islands where they are protected from the eroding action of waves. They are found along coastlines throughout the United States, but are in particular abundance along the non-rocky coastline of the Atlantic and Gulf of Mexico coasts. Salt marshes are twice a day covered by salt water when the tides come in and out and can be easily identified because of the cord grass which is adapted to salt water and dominates the environment. Children who have visited a beach may remember passing a salt marsh if they remember going by an area right near the beach with lots of tall grass and water.

Areas in the salt marsh of high enough elevation not to be covered by salt water during high tide will have trees and shrubs growing on them (as seen in the illustration) and are known as hammock islands.

During low tide, land animals such as raccoons (pictured) and deer will sometimes venture into the salt marsh looking for food. Because of its proximity to the ocean, sea gulls such as the pictured laughing gulls are often commonly sighted above the salt marsh.

Eight O'clock Illustrations

During low tide in a salt marsh, fiddler crabs can be seen in abundance on the salt marsh banks and between the blades of grass. A research project estimated that there are typically about one million fiddler crabs per acre of salt marsh. Fiddler crabs dig holes in the salt marsh mud (mud is the characteristic soil of the salt marsh and in some parts of the country, salt marsh mud is known as pluff mud). Fiddler crabs need to keep their gills wet to breathe, but they do not live under water because they would drown. When high tide comes in, the fiddler crabs enter their holes and plug the entrance with mud to seal it from the incoming water.

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Fiddler crabs received their common name because the one oversized claw of male fiddler crabs reminded someone of a man playing a violin. Only the males have the one large claw, which can be on either the left or the right; females have two small claws. The sole purpose of the males' oversized claw is to attract a mate. During mating season, each male will stand by the hole it has dug and wave its large claw back and forth like a disco dancer. Many males do this at once, and the females observe them to determine who would be the most suitable mate. If one male approaches another one during this time, they will wrestle until one of them leaves the male's territory.

The males' large claw is actually not effective for feeding. Fiddler crabs use their small claws to scoop up their food, which is mud. In their mouths, they can separate the organic bits in the mud, which they eat, from the rocky bits, which they spit out and which can often be seen near the holes of the fiddler crabs in the form of pellets.

Nine O'clock Illustrations

Diamondback terrapins are the only turtle found in the salt marsh as well as the only reptile (with the exception of adult alligators, which are occasionally observed in salt marshes, but prefer freshwater habitats). Freshwater turtles, such as snapping turtles, cannot tolerate the salt water of the salt marsh, and sea turtles, such as loggerhead sea turtles, are too large for the shallow creeks of a salt marsh at low tide. The webbed feet of a diamondback terrapin allow it to swim effectively, but they also can crawl on land to feed on a periwinkle snail (such as the pictured terrapin is feeding on) or to bask on the bank and absorb heat from the sun. Diamondback terrapins are a protected species because they used to be popular for soup and were hunted almost to extinction. Today, they are making a comeback.

Ten O'clock Illustrations

Periwinkle snails are one of the few animals found in the salt marsh both at high and low tides. Like all snails, periwinkles make the shells they live in, growing out of the snail's body the way our fingernails grow out of our fingers. The periwinkle snails live on cord grass, sometimes spending their entire lives on one blade of grass. Since they can drown, a periwinkle climbs the cord grass as the tide comes in to avoid the water. As the tide goes out, the snails climb back down the grass and feed on the algae and detritus left on the grass by the receding tide. Periwinkles are close relatives of the snails used for escargot in France.

Marsh rats (pictured) are a species of rat that are good swimmers and are adapted to salt marshes. Clapper rails (pictured) are one of the wading birds that depend on salt marshes as habitat. They will hide in the grass standing "thin as a rail," but will venture out when they feel safe from potential predators.

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Eleven O'clock Illustrations

Blue crabs are common residents in the tidal creeks of salt marshes. Their back legs are shaped like paddles, making them effective swimmers. They are scavengers that feed on a variety of dead animals and occasionally live animals, if they can catch them. Their claws allow them to tear food as well as protect themselves. If a predator grabs a blue crab by its claw, the claw will easily break off allowing the blue crab to escape. In a few months the claw will grow back.

Sea lettuce (pictured) is a type of algae that grows in thin sheets (only one cell thick, thin enough to see through) in salt marshes and other coastal waters. Sea pickles (pictured; they are the plants with the segmented stem) are another plant in the salt marsh. They hold onto salt water in their stem, giving them a salty taste. Both salt lettuce and sea pickles are available for sale as food items in some grocery stores.

Marsh hares (pictured) are another species of mammal that are good swimmers and are adapted to salt marshes. They are also the species that once made the news for attacking President Jimmy Carter while on a fishing trip.

Twelve O'clock Illustrations

Bottlenose dolphins are the largest predator found in salt marshes (though sharks and alligators are occasionally found in salt marshes at high tide). Dolphins are easily visible, because, as mammals, they have to rise to the surface periodically to breathe oxygen from the atmosphere. Dolphins are most common in salt marshes at high tide when there is more space for them to move, but they have also been observed in marshes at low tide, dragging themselves along the bottom in just a few inches of water with most of their body exposed to the air. Dolphins feed primarily on fish, and groups of them can be seen chasing a school of fish, such as the pictured mullet. In the salt marshes of the southeastern United States, bottlenose dolphins have also been observed chasing a fish to the bank, knocking the fish out of the water and then dragging themselves on the bank to feed on the fish. This behavior is known as strand feeding.

One O'clock Illustrations

Cord grass (*Spartina alterniflora*) is the dominant plant of the salt marsh because few other plants can survive being covered by salt water twice a day. Cord grass is well adapted to the salt marsh environment. Its long roots provide it stability in the mud. As these roots absorb salt water, the stem of the grass has special glands that can remove the salt from the water allowing them to survive in a habitat that would kill other plants. This salt is secreted on the blades of grass and during low tide, visitors to the salt marsh can see the salt crystals, and the more venturesome can taste them.

Cord grass grows in such abundance in the salt marsh that salt marshes are the second most productive habitat (in terms of the mass of plant life that grows there) in the world after tropical rain forests. This abundant cord grass is important as a source of shelter for animals such as periwinkle snails or the insects pictured, and as a source of food.

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Though no animals eat live cord grass, when the grass dies and begins to decompose, it is carried out into the ocean and is a very important source of nutrients for the phytoplankton (plant plankton) that supports the food chains in the ocean.

The pictured black skimmer is a bird that can be seen during high tide flying just above the surface of the tidal creeks with their long, lower beak in the water. When the lower beak touches a small fish or shrimp, the upper beak snaps shut and the skimmer feeds upon it.

Two O'clock Illustrations

One of the reasons the salt marsh is such an important habitat is because it serves as a nursery for the majority of animals that live in the ocean. When fish and other marine animals spawn, the currents and tides carry their microscopic young towards shore. The lucky ones end up in the salt marsh. The salt marsh is a good place for a small fish or other small organisms because they are protected from larger predators that cannot enter the tidal creeks during low tide and that cannot swim between the cord grass at high tide. While juvenile fish hide out in these areas, the tide brings them plankton to feed on, such as amphipods, the small shrimp-like organisms that are pictured. Other fish that are found in the salt marsh are the bottom dwelling flounder that is pictured, and the pictured sea horse that uses its prehensile tail fin to grasp algae or other thin objects in the water. It is estimated that over 80% of the marine animals we eat as seafood use the salt marsh for at least part of their life cycle.

Birds are also predators that small fish have to be wary of. The American bittern (pictured above) is one of many wading birds found in the salt marsh that walk through shallow water looking for food. The pictured osprey is a raptor that can capture fish from deeper waters. They will fly high above the water looking for fish. When they spot one near the surface, they swoop down to capture it with their sharp talons and carry the fish to a perch where they can begin to eat.

The shelled mussels pictured are one of many bivalve mollusks that make the salt marsh their home. Mussels attach themselves to a hard surface and stay in the same place pretty much their entire lives. Like clams and oysters, they partially open up their shells at high tide and suck in water to filter out tiny bits of food.

Three O'clock Illustrations

River otters are found in freshwater habitats across the United States, but they are also found in salt marshes, particularly at high tide. River otters eat a variety of food items, but primarily fish. They have many adaptations, such as webbed feet, that make them good swimmers. Besides hunting in water, river otters can also often be observed playing in water. Play helps otters to learn and practice skills they can use when hunting. A mother river otter will stay with her young for one to two years to protect and teach them.

Red-winged blackbirds (pictured) are one of the most visible songbirds in the salt marsh. They often use marsh grass to build their nests.

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Four O'clock Illustrations

Great blue herons are one of many wading birds found in the salt marsh. Their long legs allow them to stand in shallow water, usually without moving, and wait for an unsuspecting fish to swim by. When they see a fish, their snake-like neck is flexible enough for them to snap their beak down quickly in the water and catch the fish. Since they spend a lot of time in the salt marsh mud, in which a human can easily sink to their waist, they have also evolved long toes that distribute their low body weight evenly, like a snowshoe, and allow them to walk on the mud without sinking.

The pictured green heron and black-crowned night heron are two other wading birds that inhabit the marsh.

Five O'clock Illustrations

Horseshoe crabs are found in coastal waters across the east coast of the United States. They are not true crabs, but they are members of the phylum Arthropoda that includes crabs, insects and spiders. They are bottom-dwellers that feed on shrimp, worms, mollusks and other small, bottom-dwelling organisms. Like other arthropods, they molt, shedding their exoskeleton (their "shell") periodically as they continue to grow larger. These molted shells look just like the living horseshoe crabs and are often washed up in the salt marshes, along with dead horseshoe crabs. How do you tell the difference between the two? The molted shell will be thinner and much lighter weight than the dead horseshoe crab, and a dead horseshoe crab will have a much fouler smell.

The pictured willets are shorebirds that can be found in the tidal mud flats of salt marshes digging for invertebrates buried in the mud.

Six O'clock Illustrations

Oysters are bivalve mollusks that live underwater, but in some parts of the country live in the area between high and low tide (the intertidal zone) in salt marshes. Young oyster attach to a hard surface, usually another oyster, and do not move from that spot their entire lives. During high tide when the oysters are under water, they open their shells and suck in water and filter out algae, bacteria and detritus for food. As the tide recedes, the oysters close their shells while trapping some water to allow the oyster to breathe and keep it from drying out when they are exposed to the air and sun. Oysters are often found attached to the banks of salt marshes. Their presence keeps the mud of the bank from eroding, which allows cord grass to grow on the bank.

The pictured American oystercatchers are birds that are adapted to feeding on oysters. During low tide they use their chisel-like beak to pry open oyster shells and feed on the animal inside.

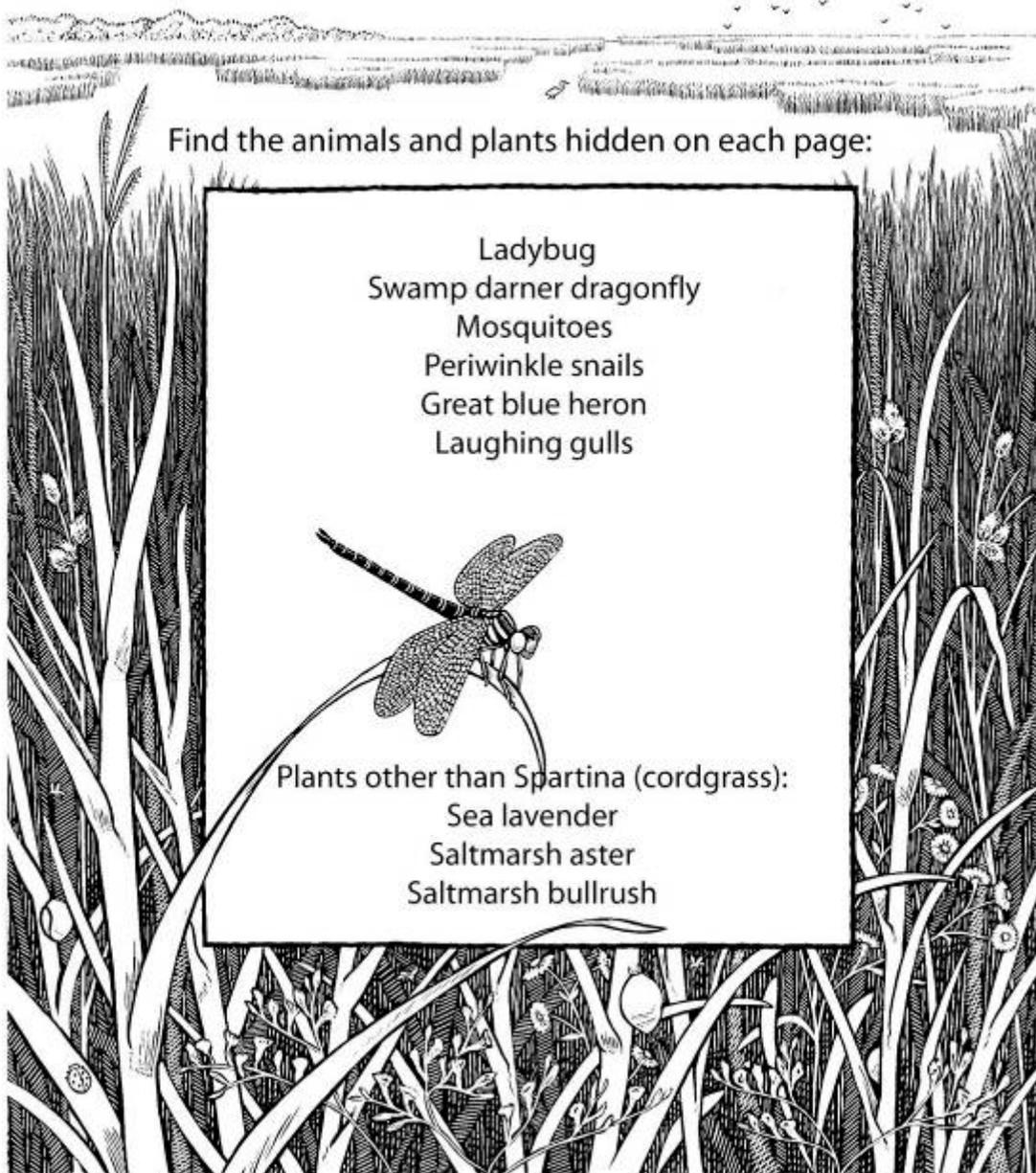
End Illustration

The time from low tide to high tide back to low tide takes about 12 hours and 31 minutes. Because of this, if high tide is at 1:00 pm one day, the next day high tide will fall at 1:52 pm. So not only the animals change regularly, but the tide times do as well. This is one of things that make salt marshes such an exciting habitat. Any time you visit it, you are likely to have a brand new experience.

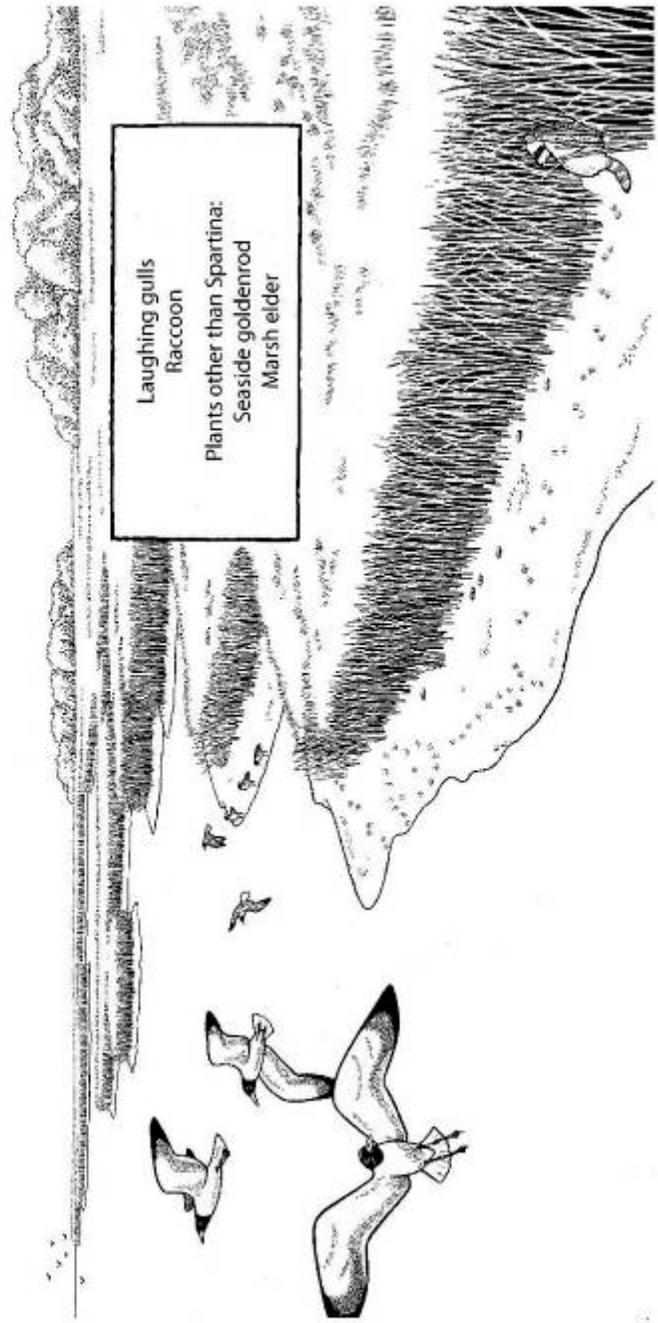
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A Day in the Salt Marsh

Line Drawings for Coloring



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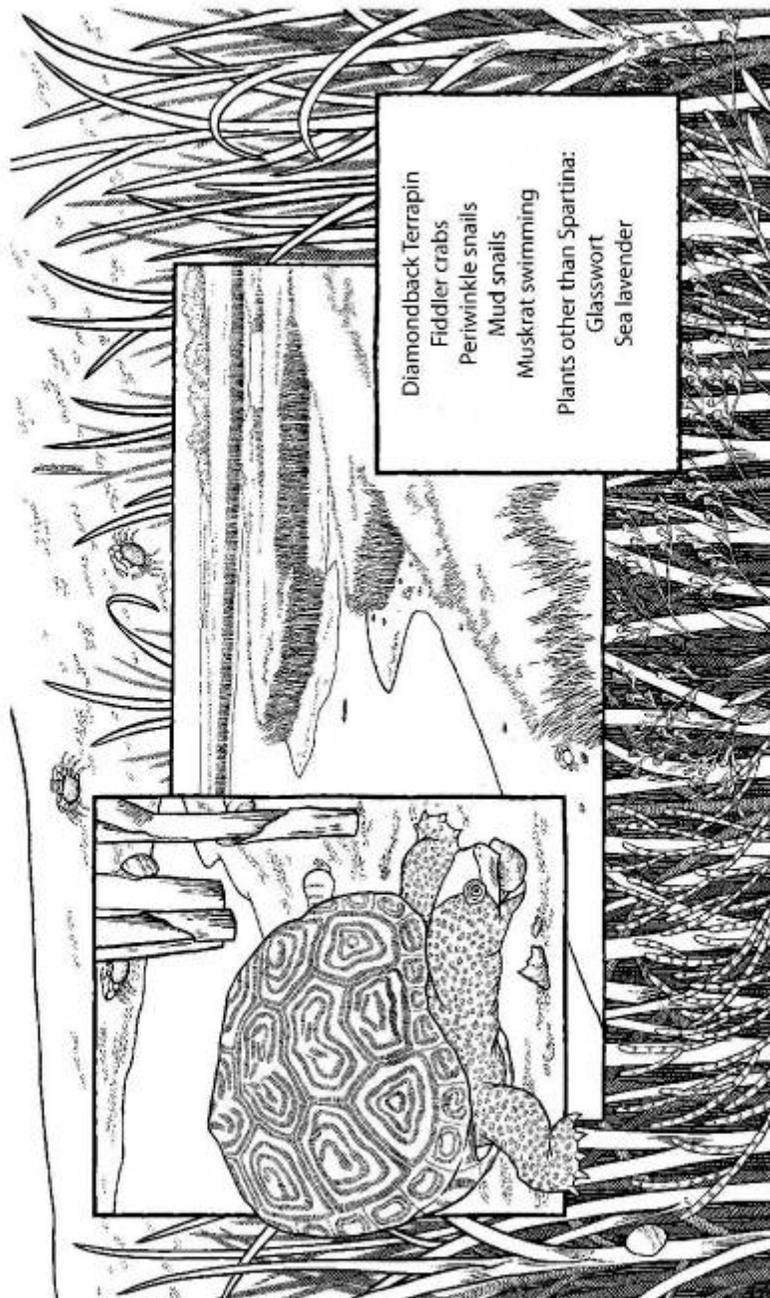


Laughing gulls
Raccoon
Plants other than Spartina:
Seaside goldenrod
Marsh elder

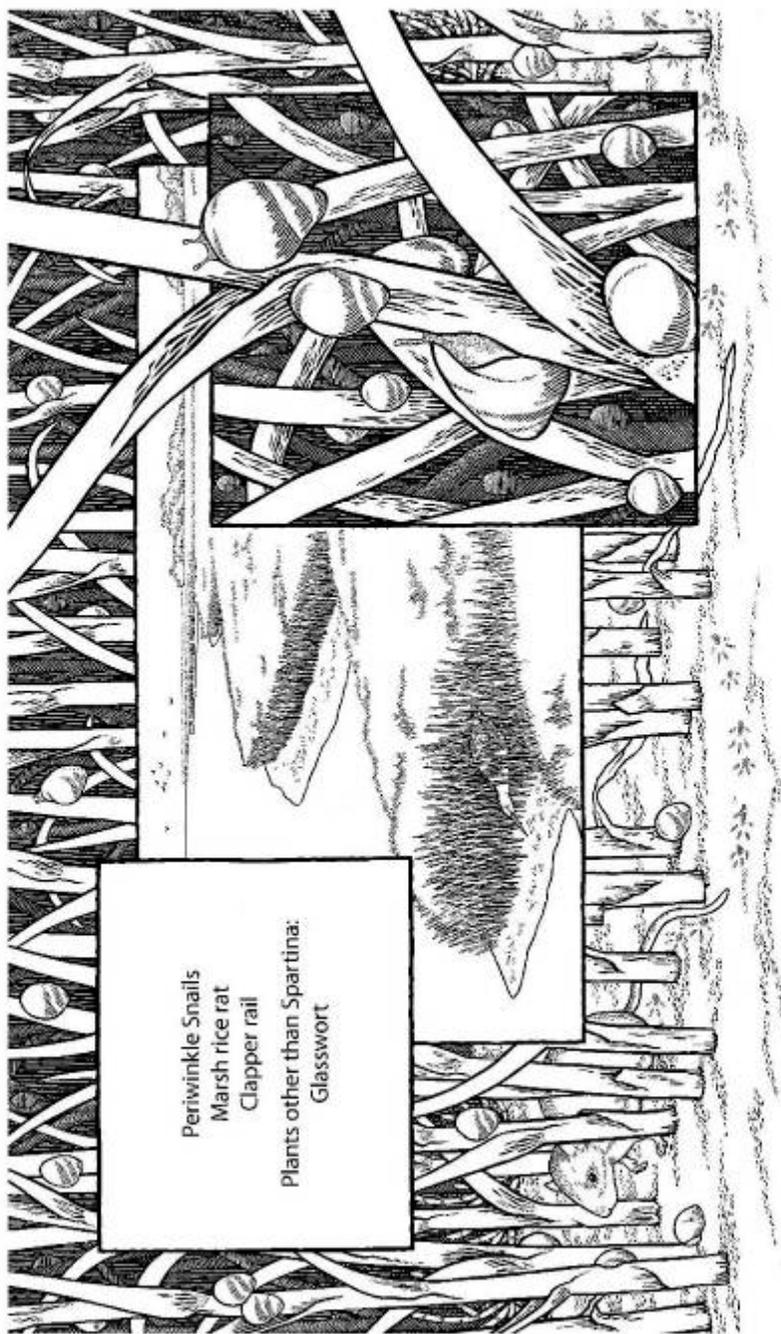
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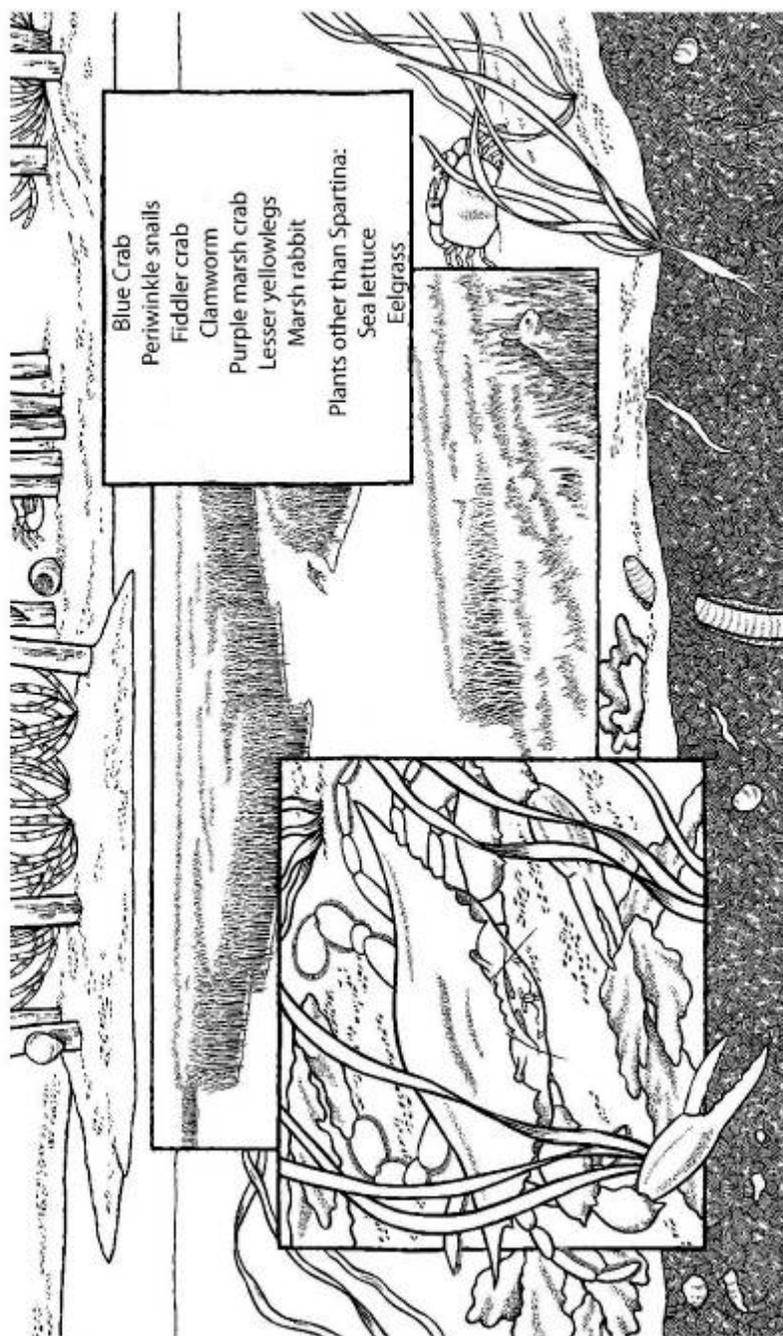


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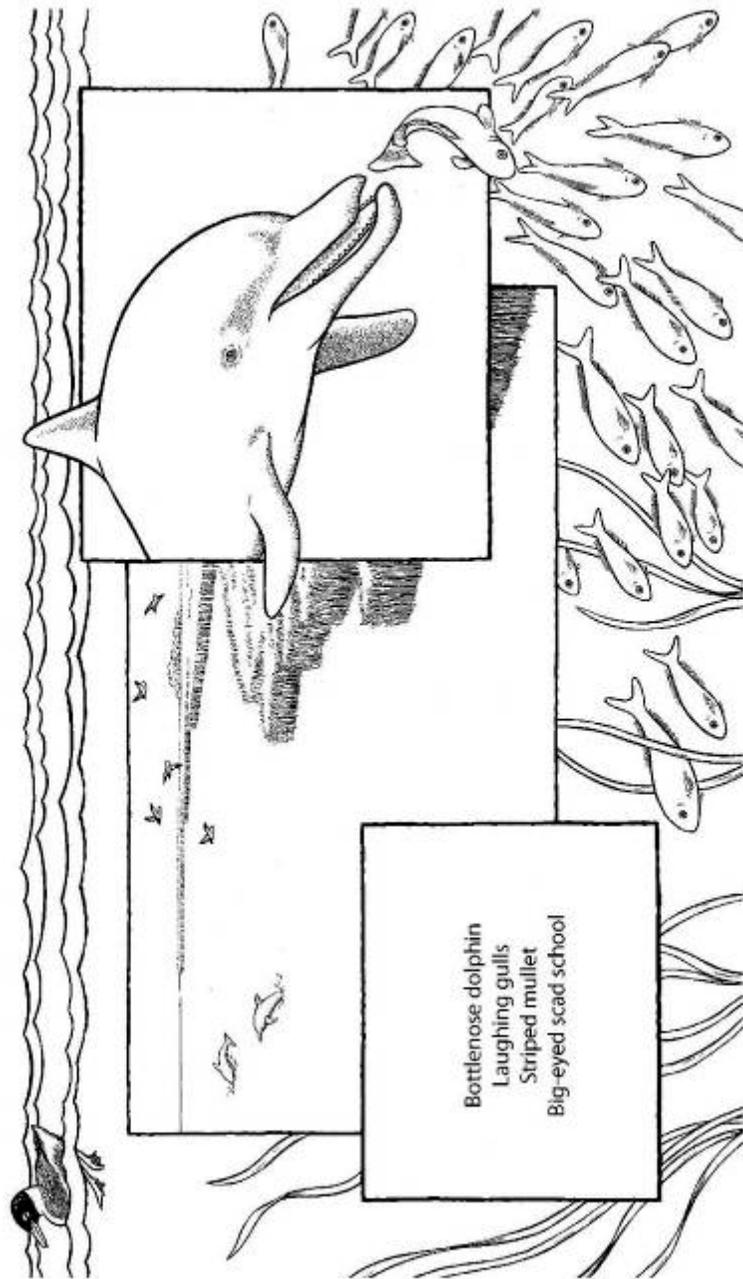


Periwinkle Snails
Marsh rice rat
Clapper rail
Plants other than Spartina:
Glasswort

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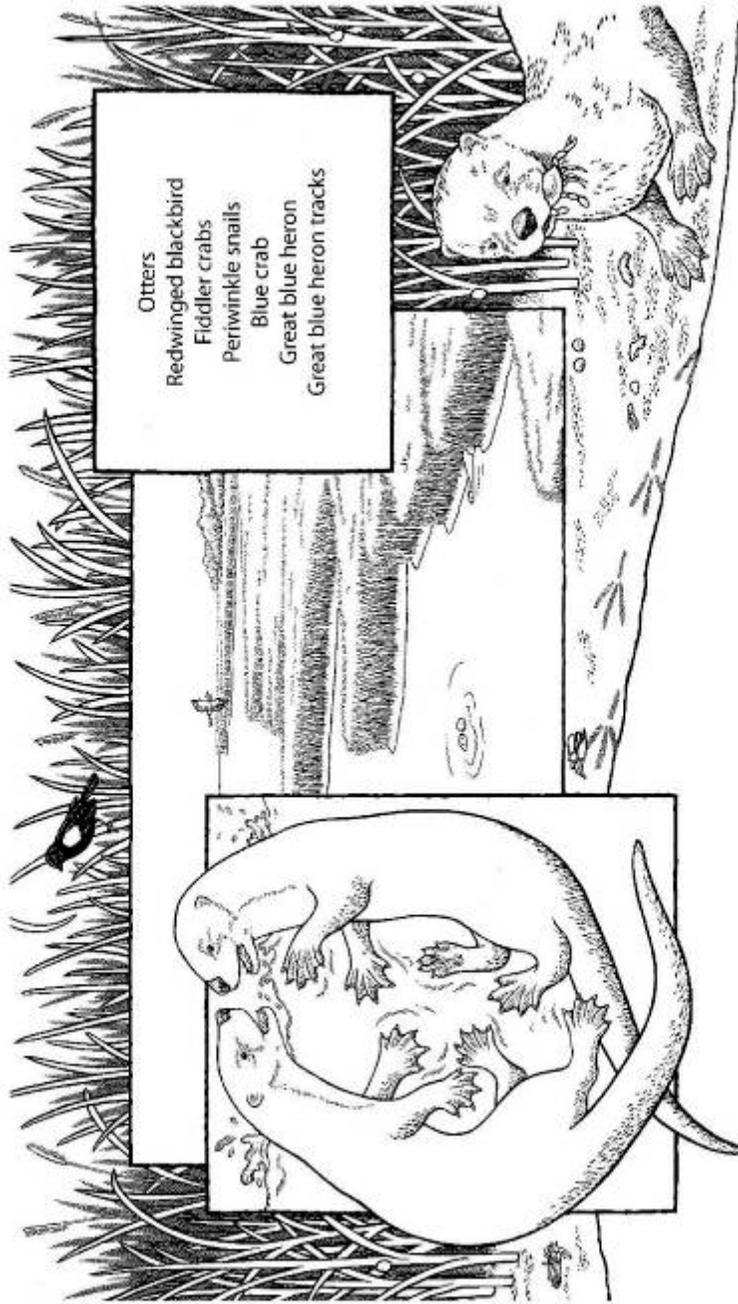


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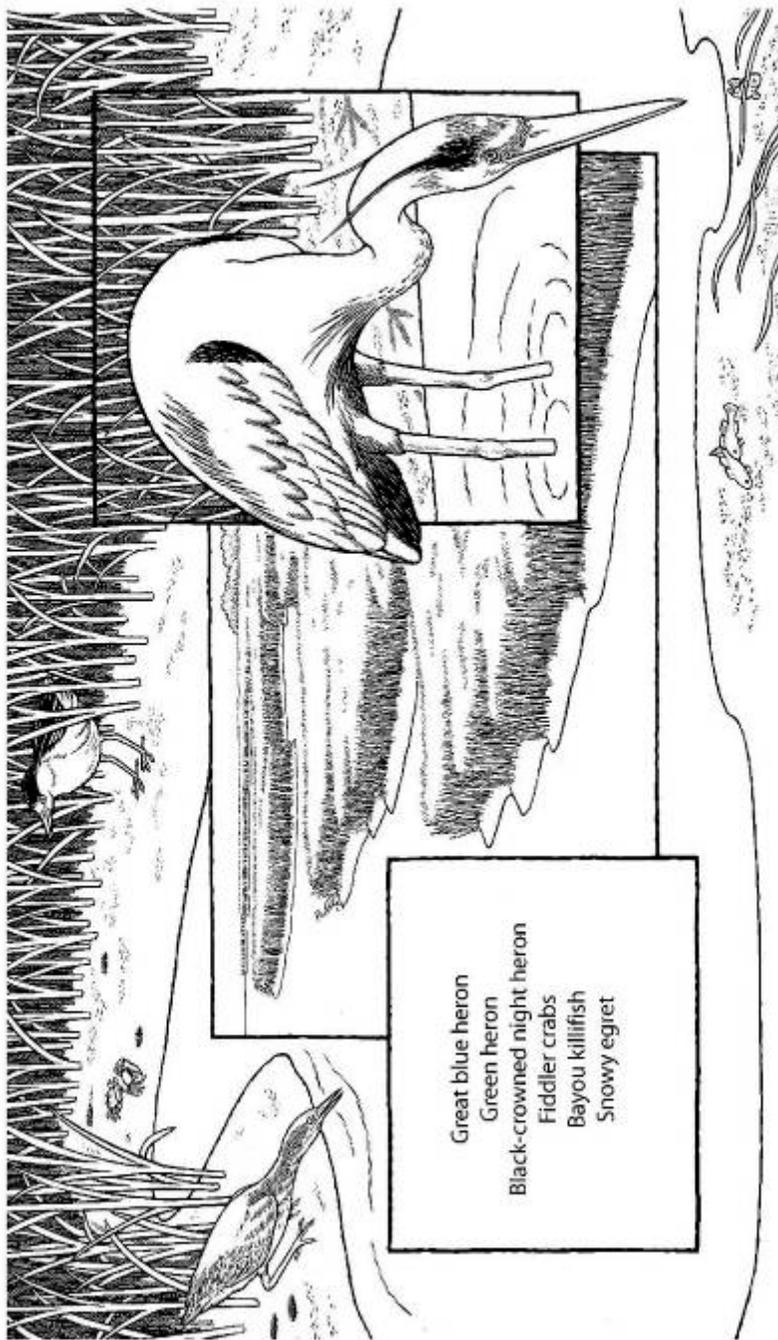
Juvenile Red Snapper
Long-billed dowitcher & Osprey
Sheepshead minnow
Bayou killifish & Seahorse
Winter flounder
Shrimps & Amphipods
Ribbed mussels
Plants other than Spartina:
Eelgrass
Sea lettuce

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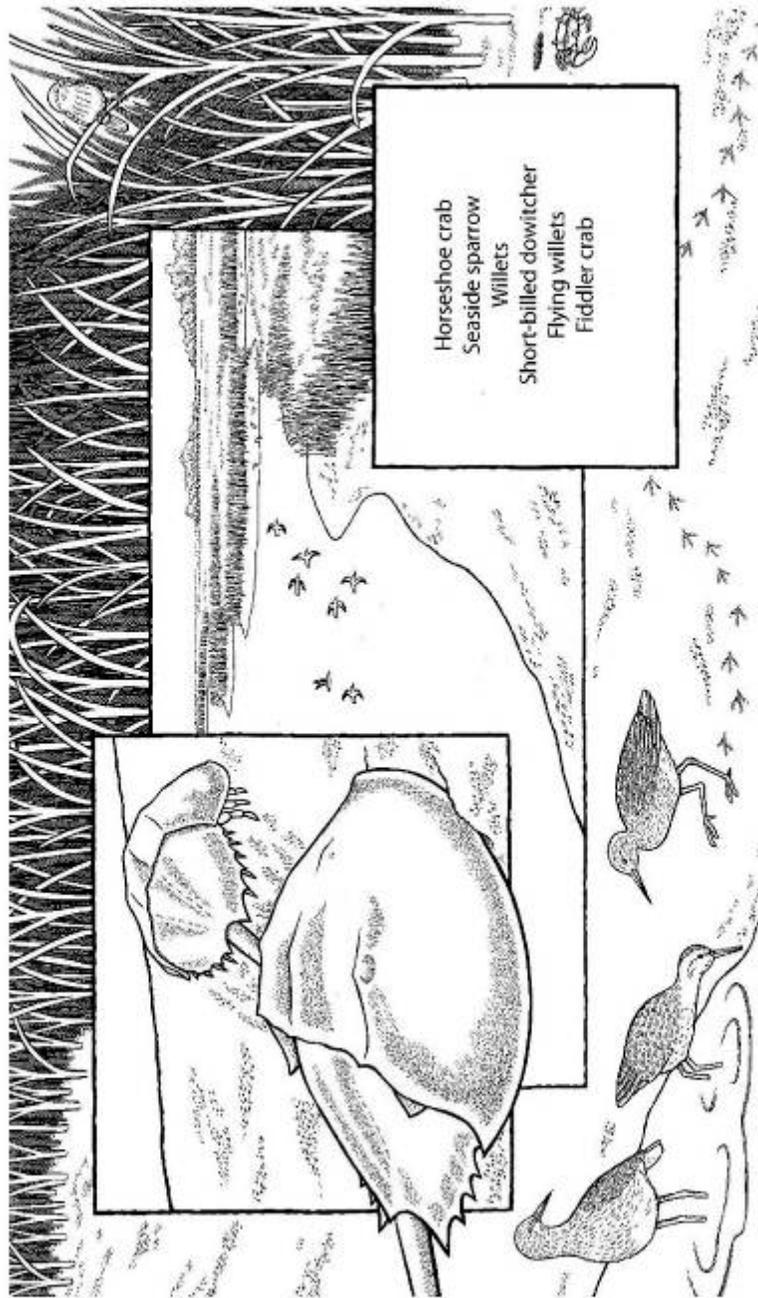


- Otters
- Redwinged blackbird
- Fiddler crabs
- Periwinkle snails
- Blue crab
- Great blue heron
- Great blue heron tracks

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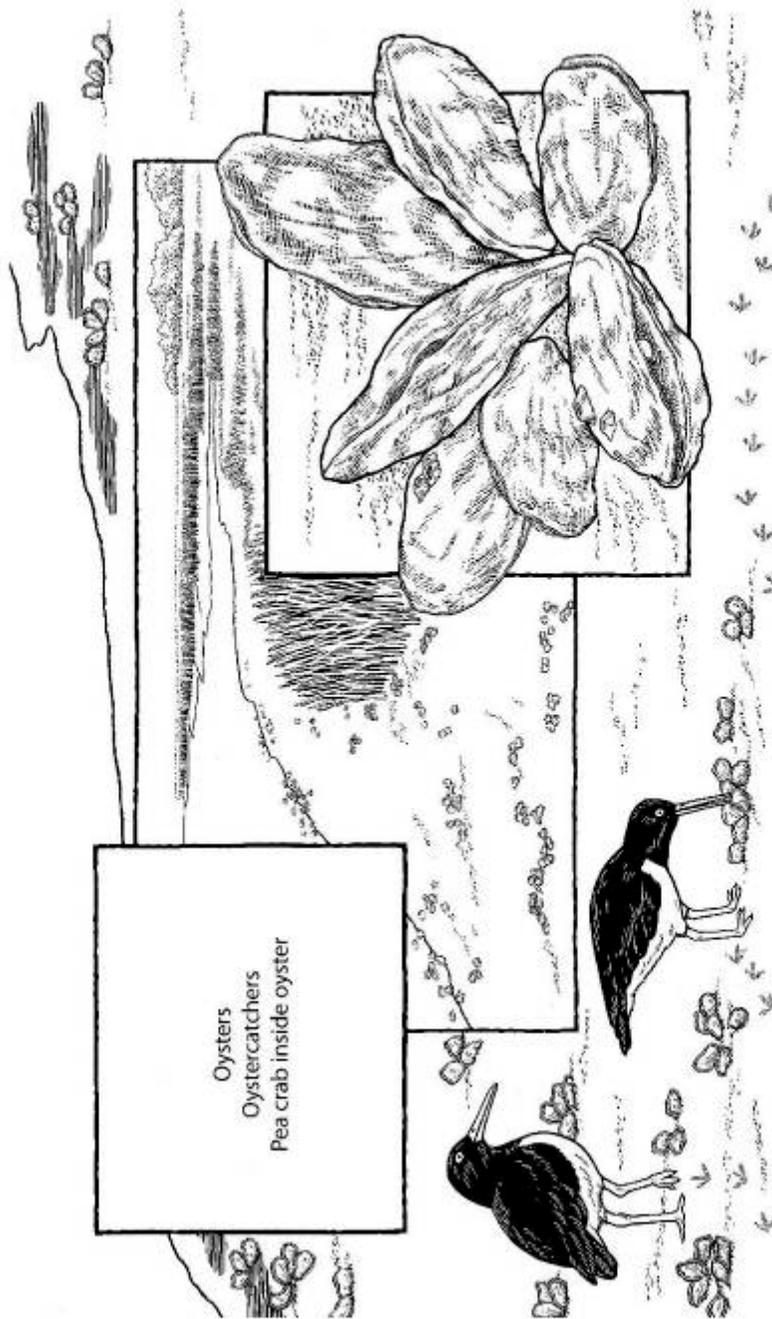


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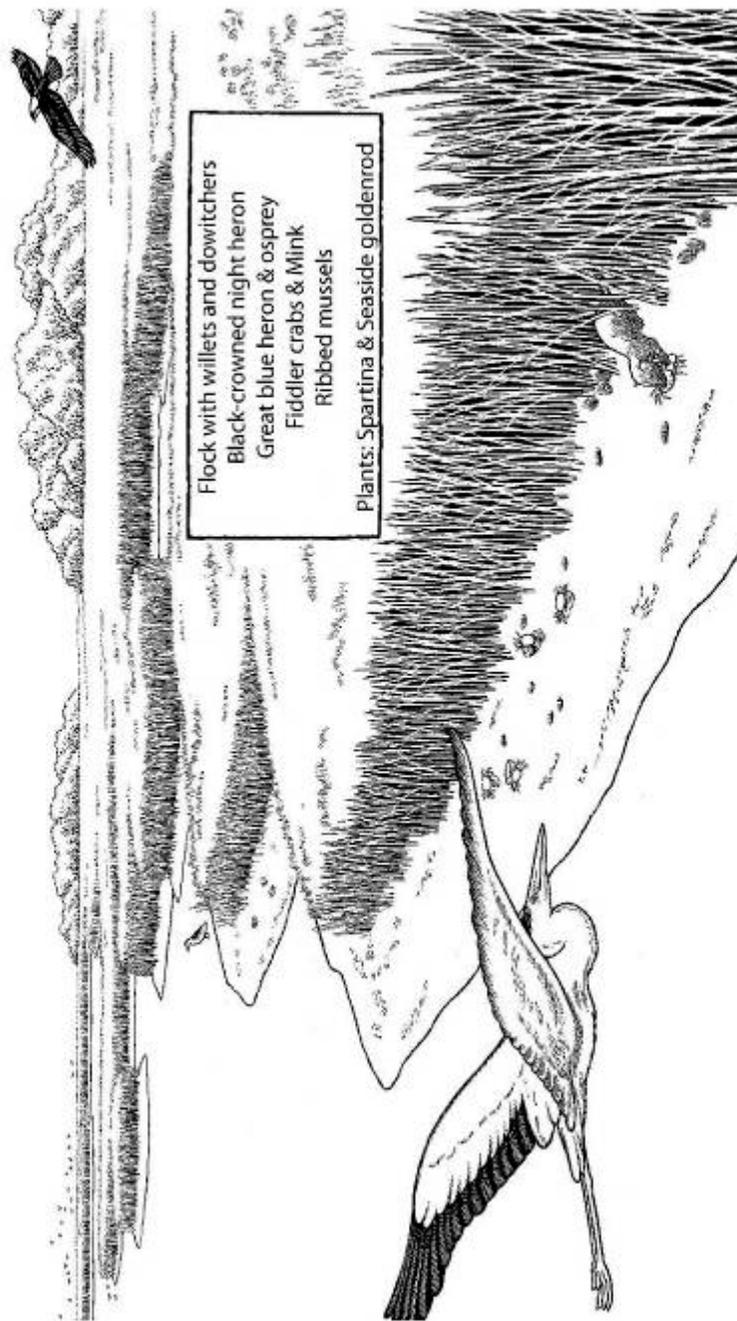


Horseshoe crab
Seaside sparrow
Willets
Short-billed dowitcher
Flying willets
Fiddler crab

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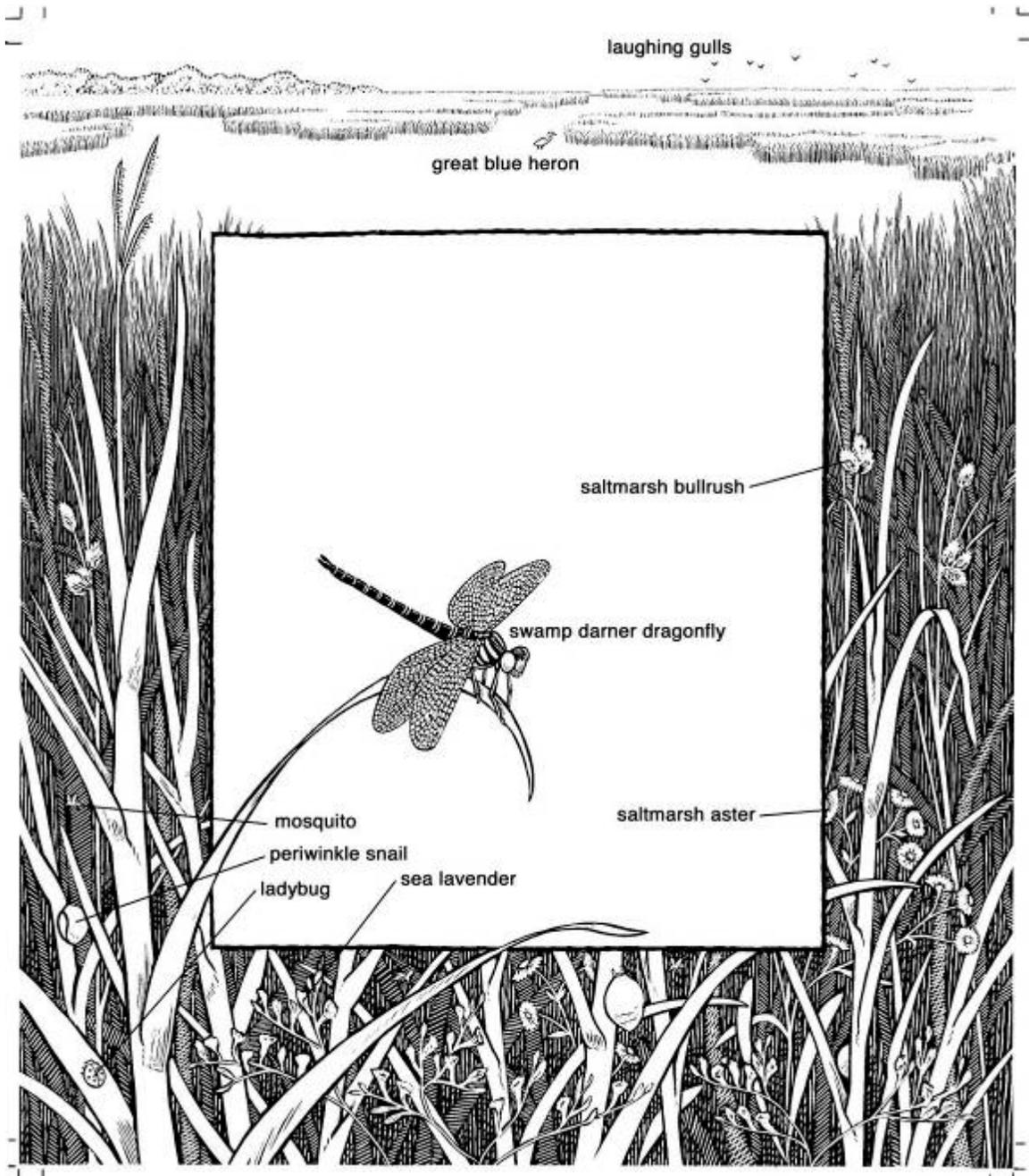


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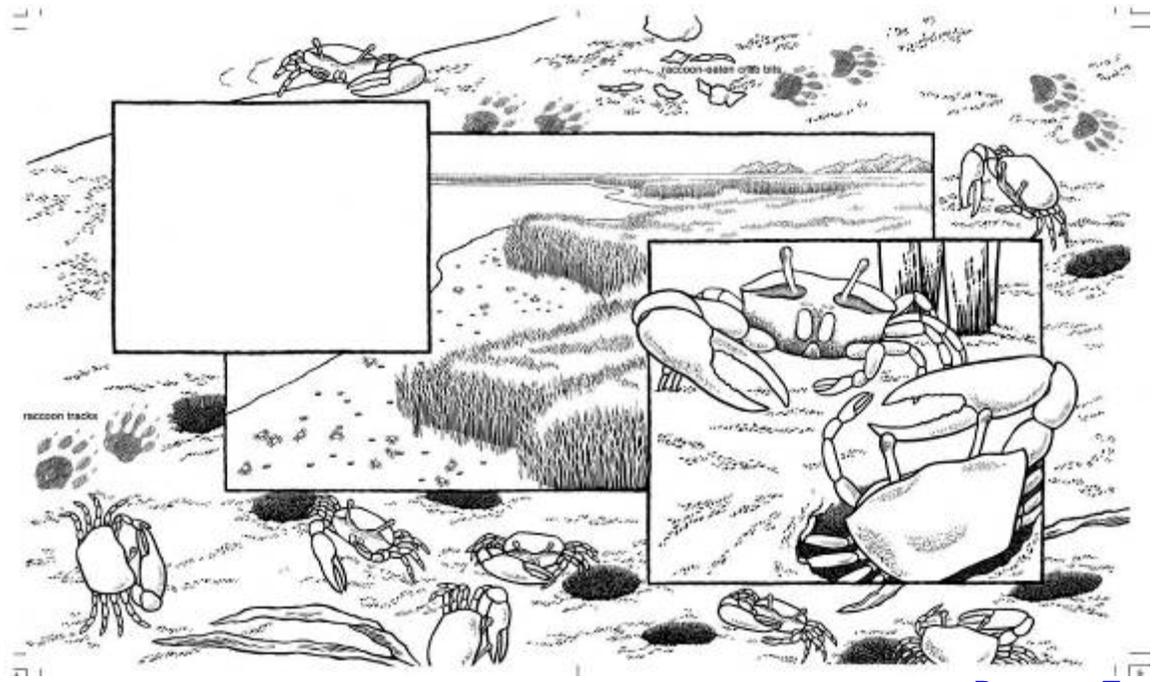
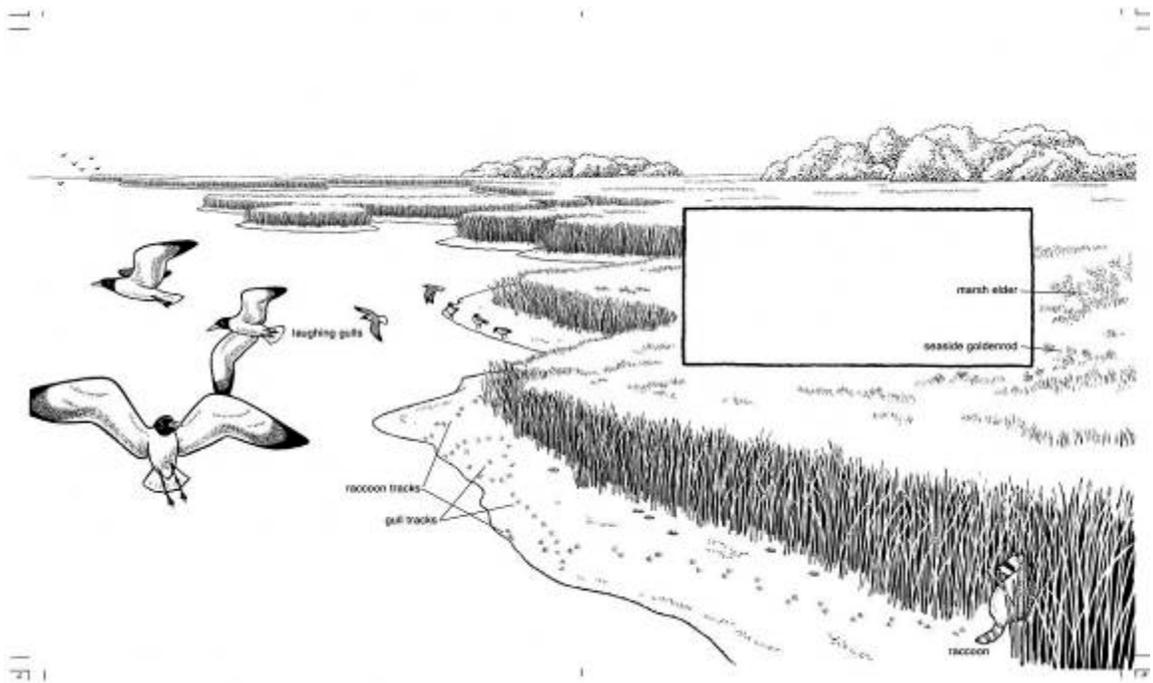


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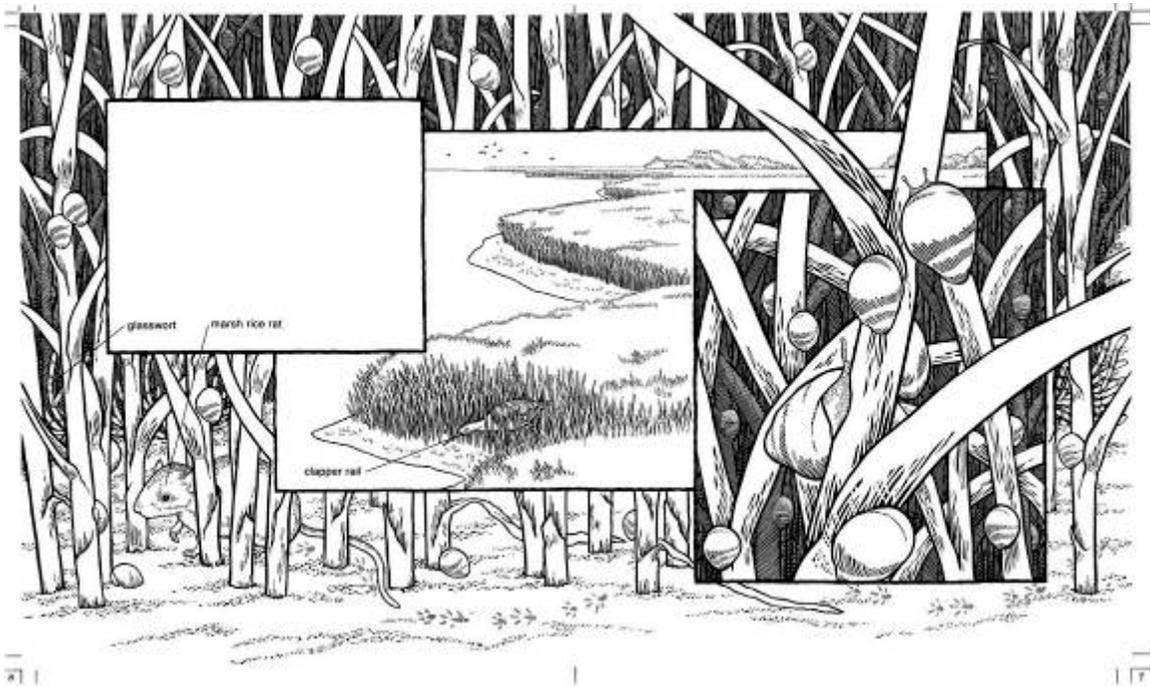
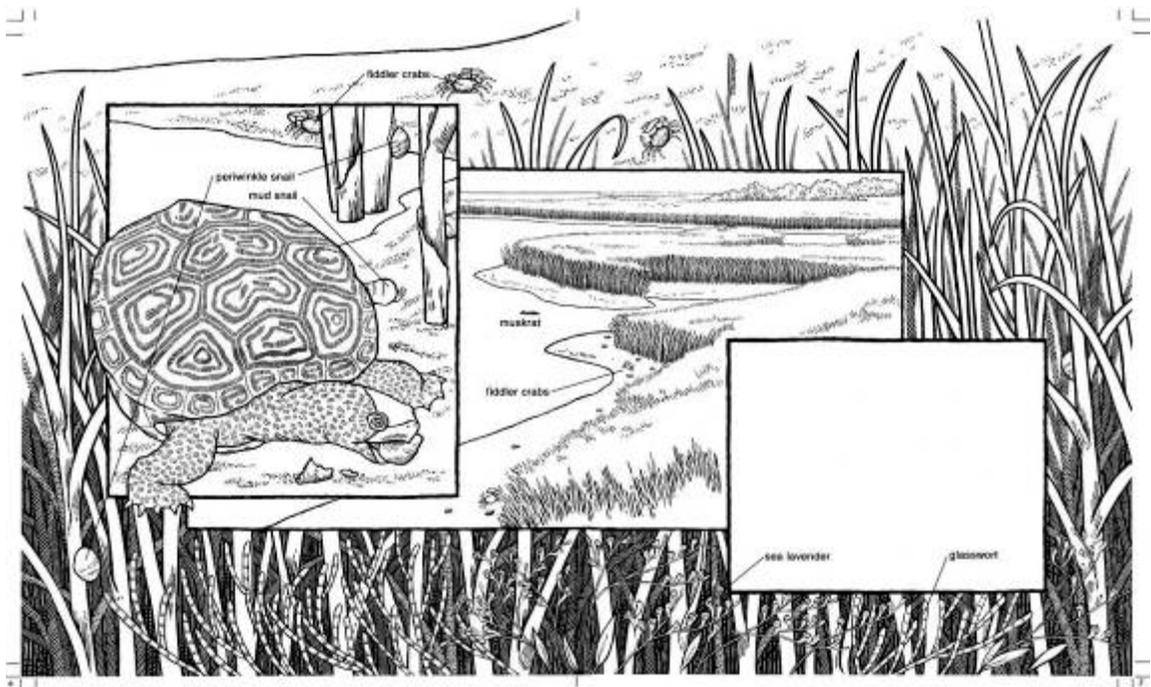
Find the animals and plants answers



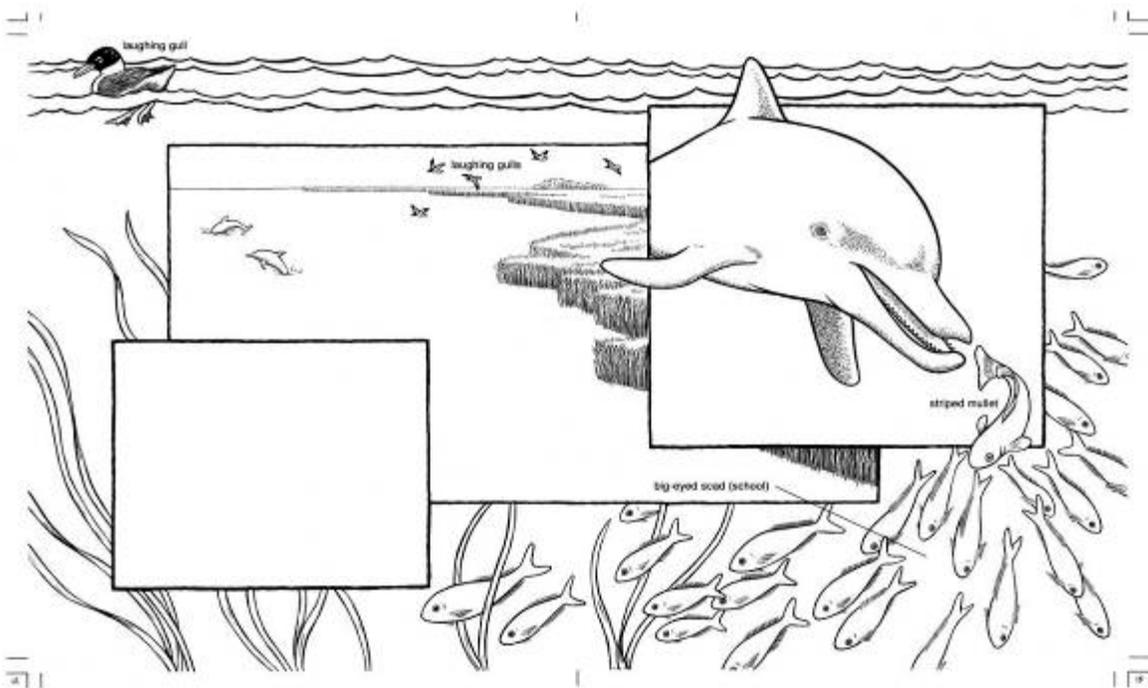
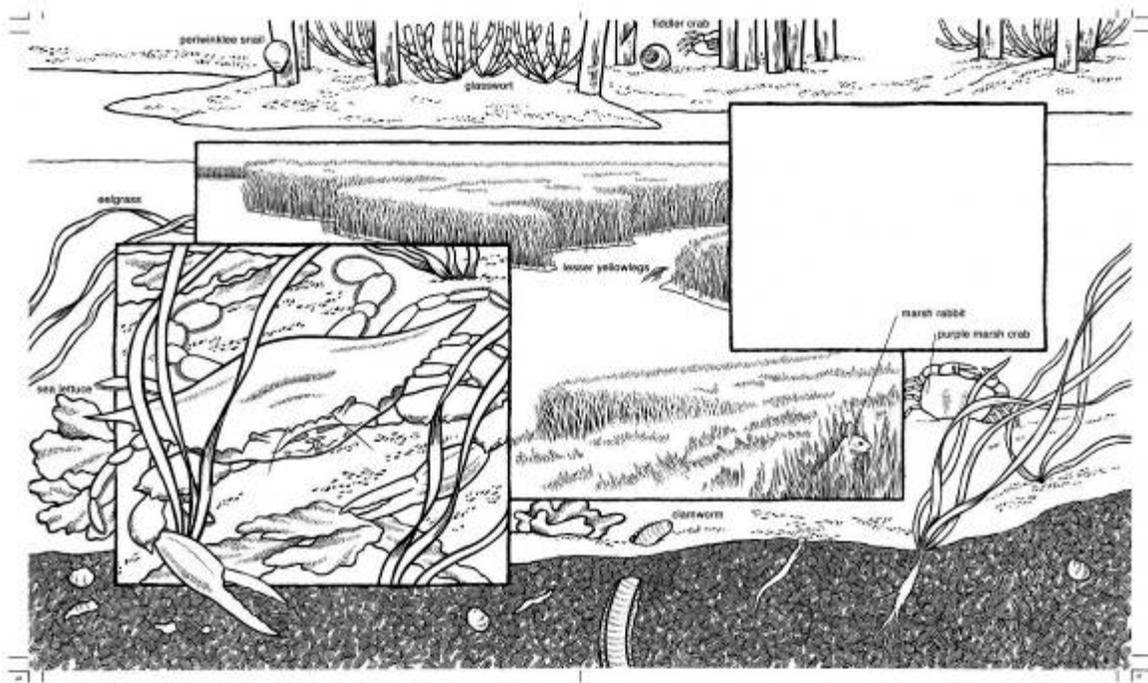
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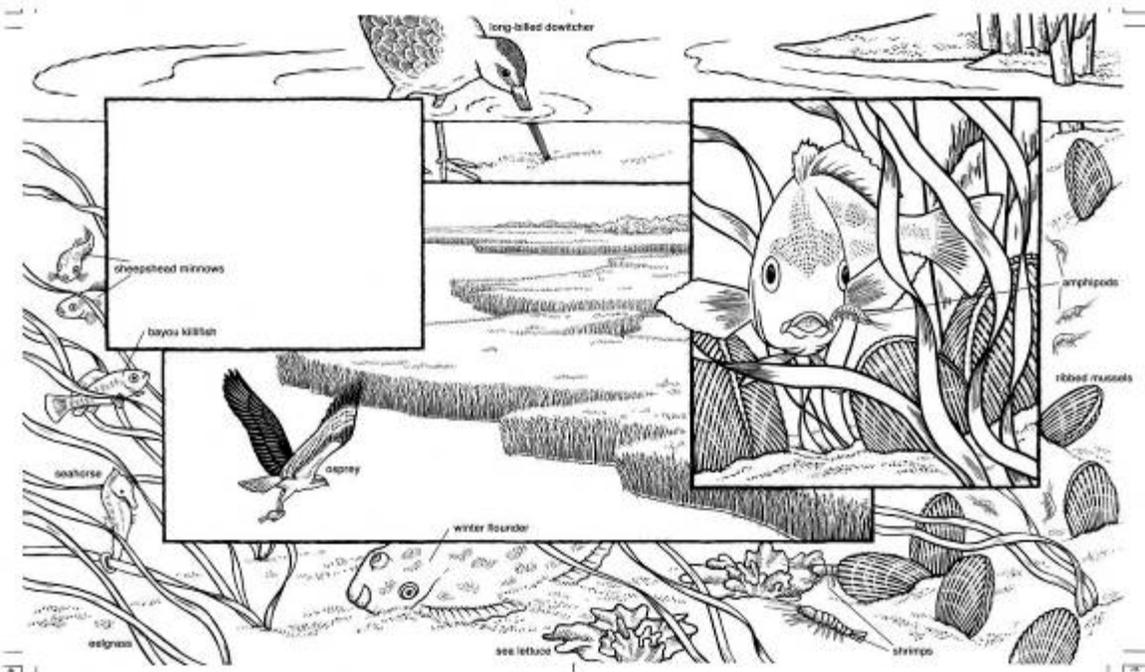
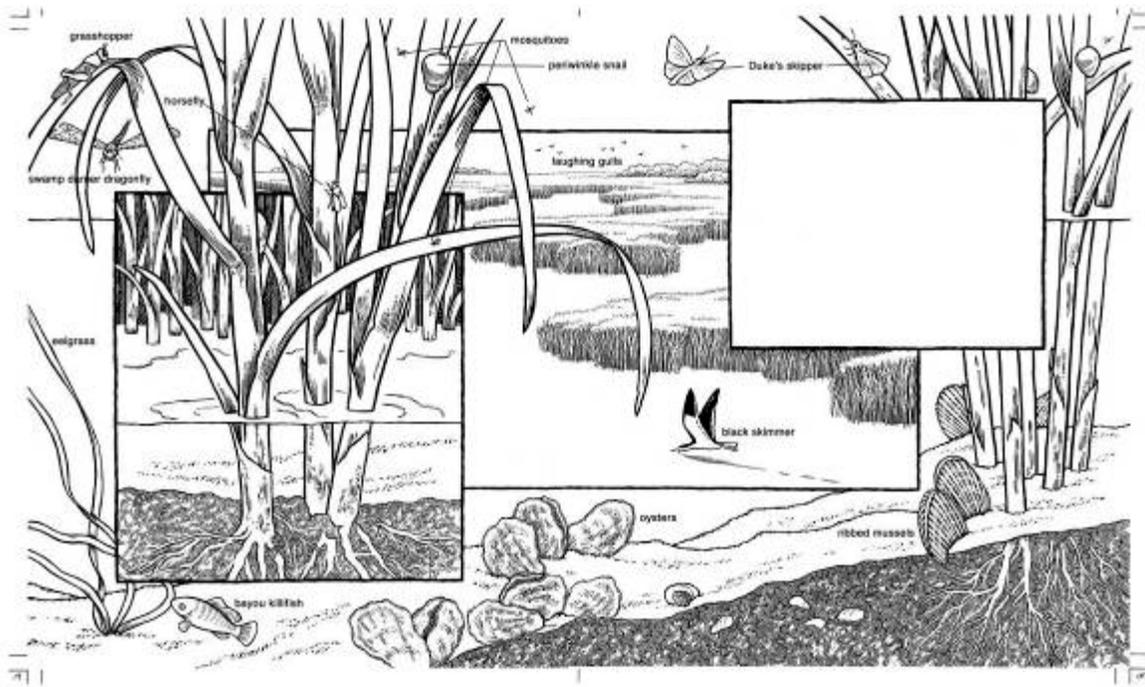
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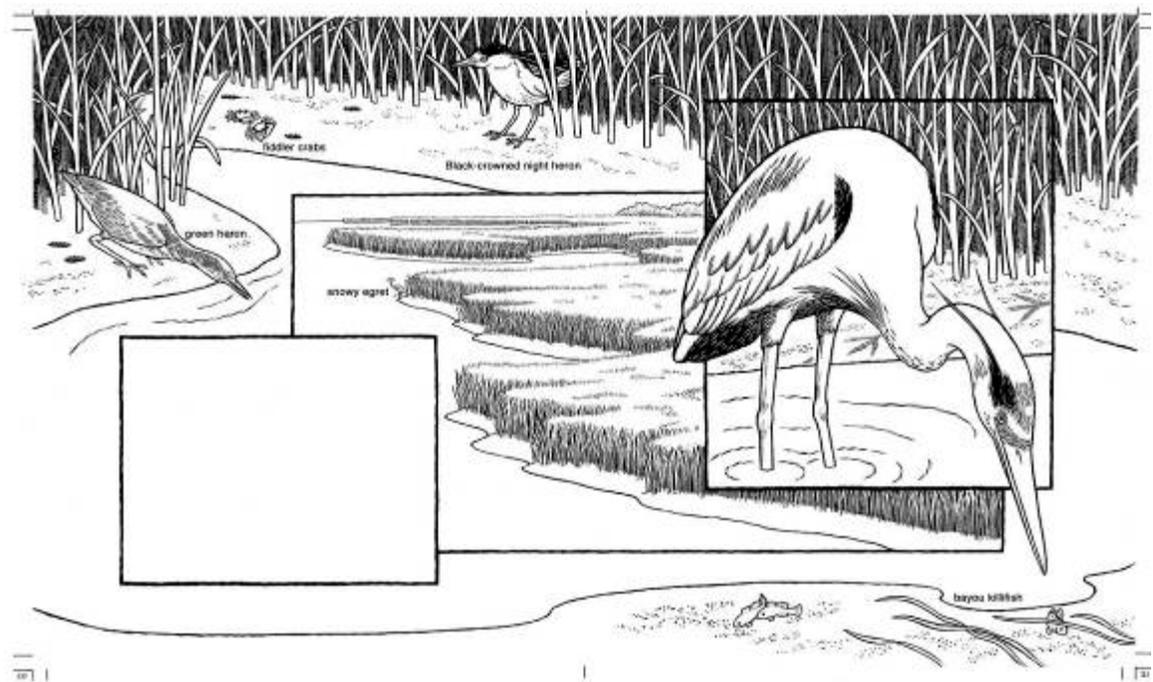
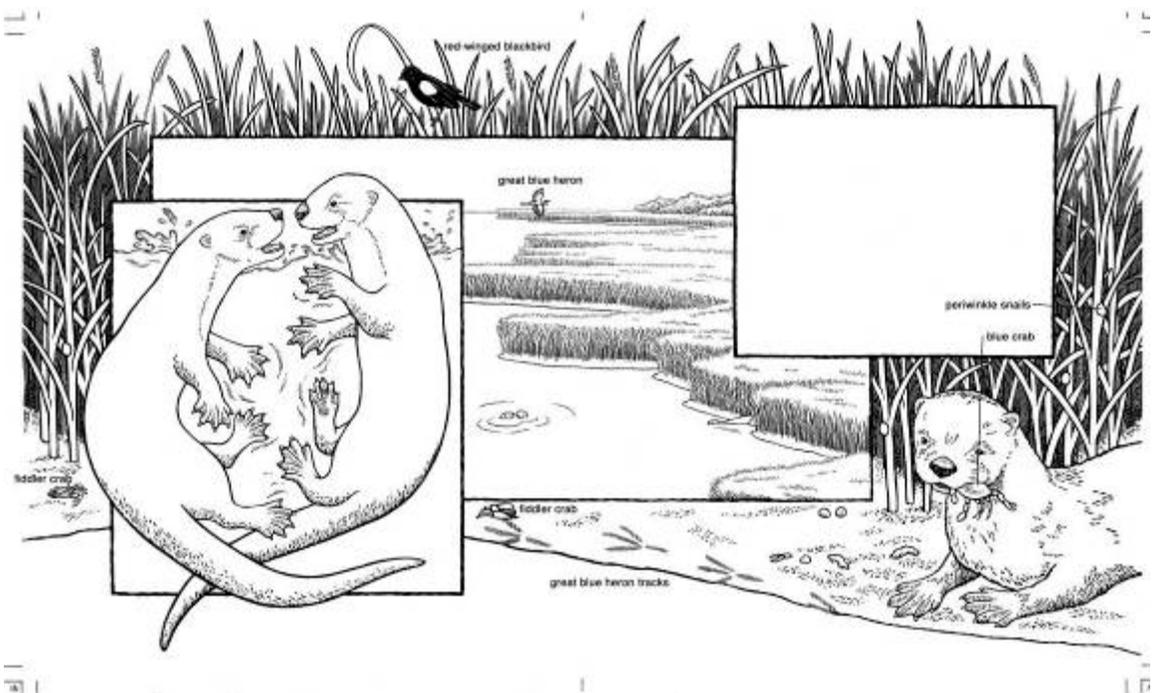
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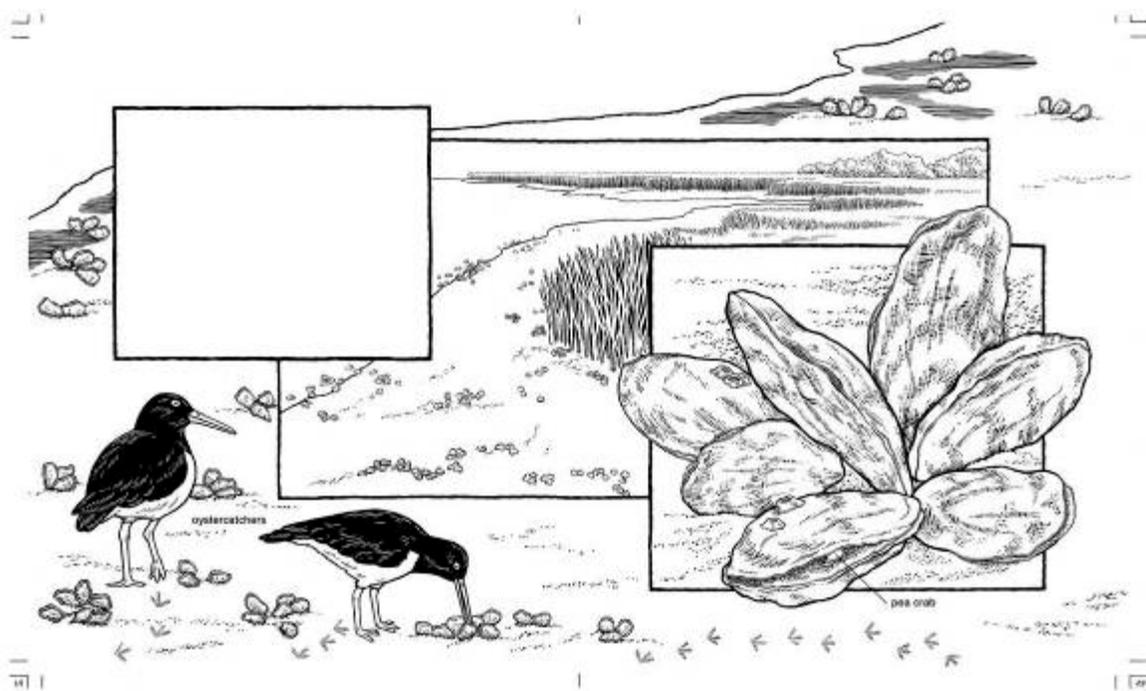
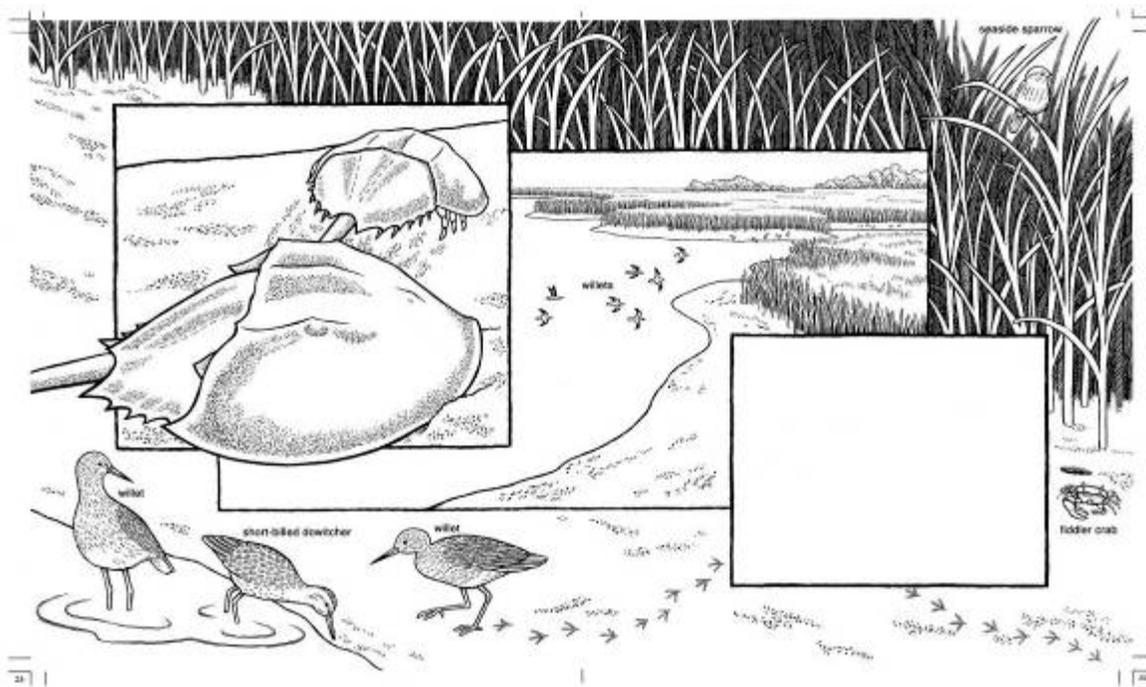
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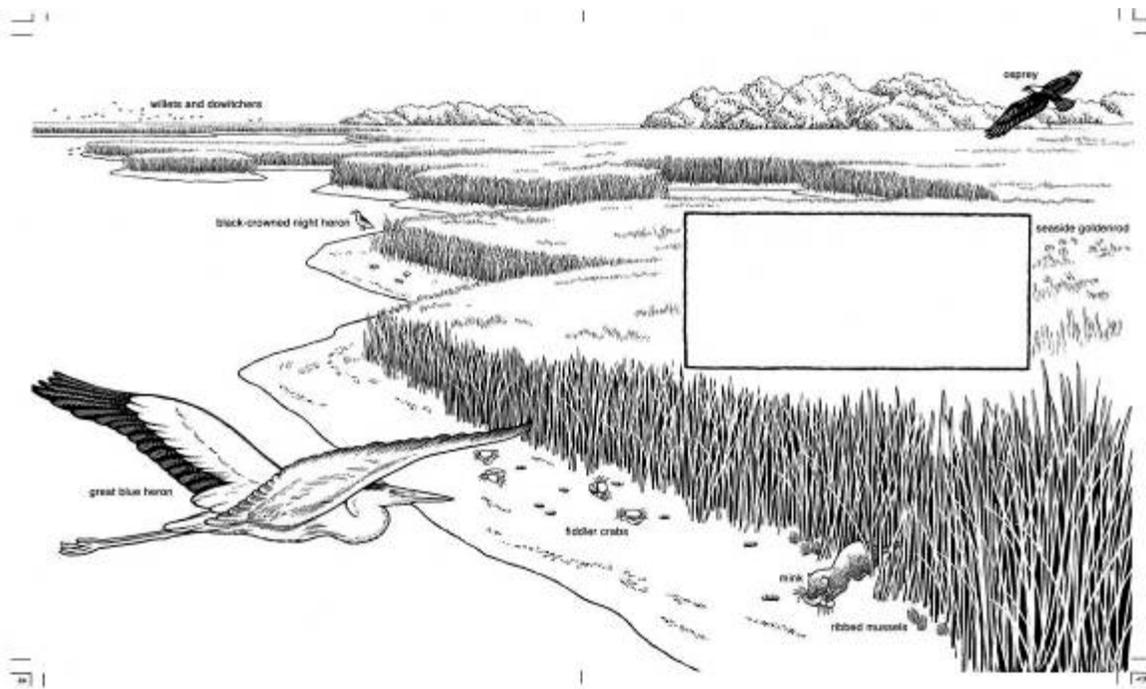
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