3

Science Standards 3.3.c. and 3.3.d.

Supports ELA Standard: Writing 3.1.1.

Student Workbook

California Education and the Environment Initiative

Living Things in Changing Environments

California Education and the Environment Initiative
Approved by the California State Board of Education, 2010

The Education and the Environment Curriculum is a cooperative endeavor of the following entities:
California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

Key Leadership for the Education and Environment Initiative:
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Key Partners:
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Restoring Sweetwater Marsh 11

Name: _____

Instructions: Read each of the sentences that describes a change in the marsh. Write the correct letters in the box next to the drawings of the plants and animals on the next page. (1 point each)

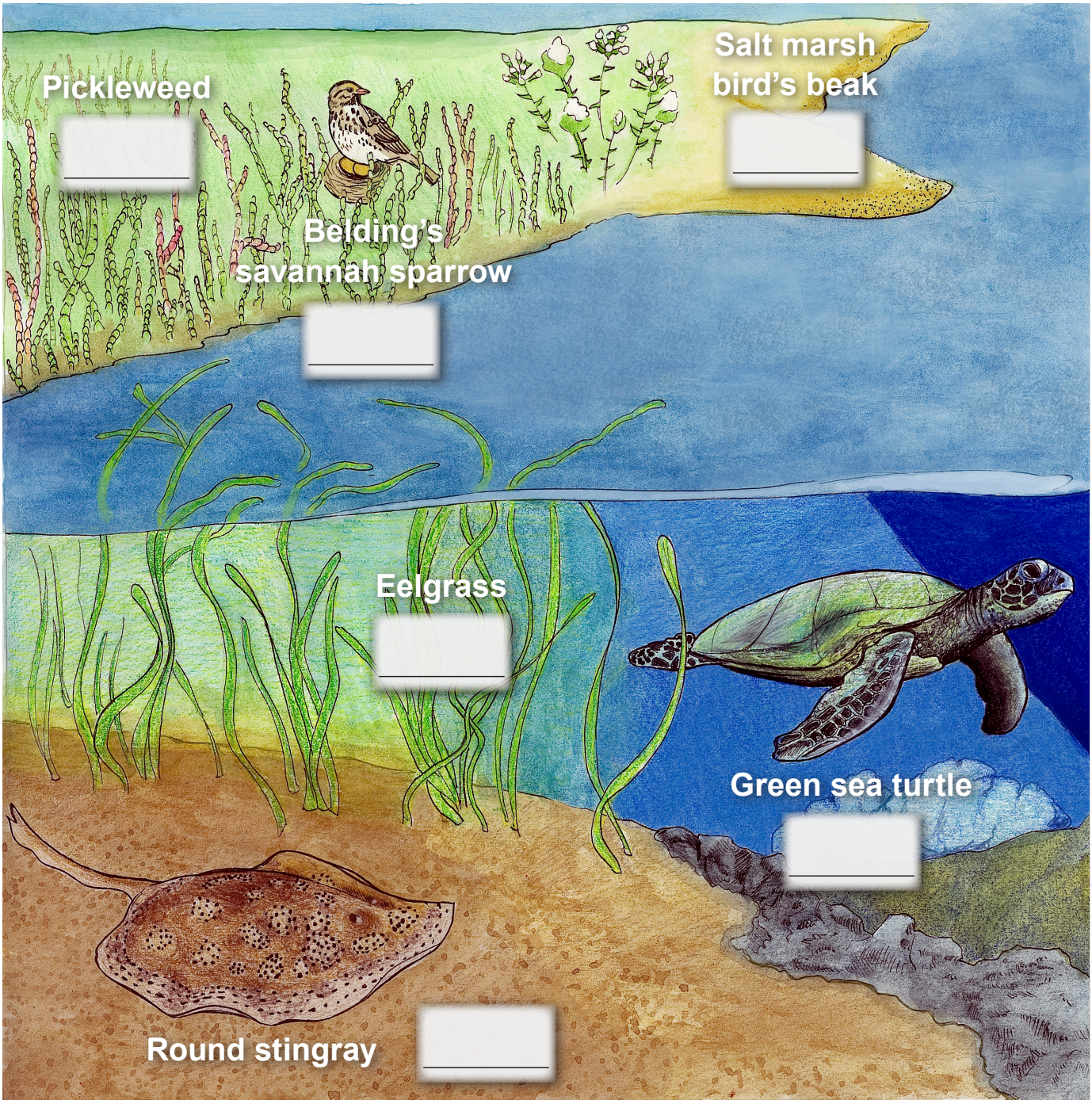
1. **Change:** The marsh becomes muddier.
   Result: This could harm some plants and animals. Write the letter "M" for "muddier" on any plants or animals that will be harmed.

2. **Change:** The marsh becomes saltier.
   Result: This could harm some plants and animals. Write the letter "S" for "saltier" on any plants or animals that will be harmed.

3. **Change:** The marsh becomes warmer.
   Result: This could help some plants and animals. Write the letter "W" for "warmer" on any plants or animals that will be helped.

4. **Change:** Pickleweed is torn out of the marsh.
   Result: This could harm some plants or animals. Write the letter "P" for "pickleweed" on any plants or animals that will be harmed.

Name: _____


Pickleweed
_____
Salt marsh bird's beak
_____
Belding's savannah sparrow
_____
Eelgrass
_____
Green sea turtle
_____
Round stingray
_____

Name: _____

Instructions: Read about the changes to the salt marsh. Then look at the listed animals and plants. Which would survive? Which would move away or die? (1 point each)

Mark each with these letters:

S = Survive
M = Move away
D = Die

1. People dredged the bay. This made deeper water for large ships. What happened to these plants and animals?

   Eelgrass: _____

   Round stingray: _____

2. People removed pickleweed when they built roads and bridges. What happened to these plants and animals?

   Salt marsh bird's beak: _____

   Belding's savannah sparrow: _____

   Green sea turtle: _____

   Eelgrass: _____

3. People built a power plant near the salt marsh. This made the water warmer and cloudier. What happened to these plants and animals?

   Eelgrass: _____

   Green sea turtle: _____

Characters

- Narrator (1)
- Chamise (3)
- Pacific rattlesnake (2)
- California sagebrush (3)
- California gnatcatcher (3)
- Grasses (3)
- Brown-headed cowbird (2)
- People (remaining students)

Act 1: The Chaparral and Scrubland Habitats

Narrator: Let's visit the chaparral and scrubland habitats. These places have dry, hot summers. They have cool, wet winters. Sometimes these places catch on fire. Plants here have adaptations to survive these conditions. Let's meet some of them.

Chamise: (*Stand on the left side of the stage.*)
We are chamise shrubs. We live in chaparral habitats. We grow from seeds. If there is a fire, we can also grow new shoots from our root burls.

Pacific rattlesnake: (*Sit among the chamise.*)
We are Pacific rattlesnakes. We hide, rest, and nest in thick patches of chamise. We eat mice and rats. That helps keep their populations from rising. We might bite if we are disturbed.

California sagebrush: (*Stand on the right side of the stage.*)
We are California sagebrush. We grow in scrublands near the coast. We are a kind of shrub that survives the heat and drought of summer. After a fire, our seeds can grow into new shrubs.

California gnatcatcher: (*Sit among the California sagebrush.*)
We are California gnatcatchers. We are small birds, only about 4 inches tall. We eat insects. We live and make our nests in California sagebrush.

Act 2: Changes in the Chaparral

Narrator: The chaparral in San Diego has changed in the past 100 years.

People: (*Walk to the chamise.*)
We are people. We have moved to California. We cleared the land of chamise so that we could build houses and roads.

Pacific rattlesnake: That makes life hard for us. We live under the chamise. Cars on roads run over us.
(*Exit the stage.*)

People: Sometimes we light fires in the chaparral. Our power lines might fall and start a fire. We might not watch our campfires. Sometimes, people light fires on purpose.

Chamise: That can cause large fires in the chaparral.
(*Burn to the ground.*)

Grasses: (*Stand between the burnt chamise.*)
We do not usually live in chaparral. But, after fires, our seeds will grow there. There are no other plants to block the sunlight.

Chamise: If fires happen too often, we cannot survive. We cannot compete with the grasses. They take over before we can start growing again. Then we cannot grow new shoots.
(*Exit the stage.*)

Act 3: Changes in the Scrubland

Narrator: The scrubland near the coast of San Diego has changed, too.

People: (*Stand with the California sagebrush.*)
The scrubland of San Diego is located in a beautiful spot!

California sagebrush: When people built cities and roads, they removed us. We are gone from most of the places we used to live. (*All but one exit the stage.*)

California gnatcatcher: That is a problem for us. We no longer have many places to nest. There are also fewer of us. It is harder for us to find other birds to have babies with.
(*All but one exit the stage.*)

Brown-headed cowbird: (*Stand with the California sagebrush.*)
We are brown-headed cowbirds, and we love these changes in the scrubland. We live in open spaces. We like to be near cows. They kick up insects for us to eat. That's why we are called cowbirds. Because there are now open spaces with cows here, we moved here from other places.

California gnatcatcher: Those cowbirds are another problem for us. They lay their eggs in our nests. Sometimes we just stop sitting on the nest. Then all of the eggs die. Sometimes we do not notice the difference between the eggs, so we continue sitting on the nest. When the eggs hatch, we feed the babies, including the cowbird babies. The cowbirds demand food, so we have less food to give to our own babies. The cowbirds are another reason that we are having trouble surviving here.
(*Exit the stage.*)

Name: _____

Instructions: Read the two paragraphs. Use the words and phrases from the Word Bank to fill in the blanks. (2 points each)

Word Bank

build houses and roads	grow again	harms	change
caused fires more often	grasses	prevent	helps
cleared land	harm		

Living things have changed the chaparral in Southern California. People have cut down plants to _____. Their activities also have _____. In nature, some fire is okay. Plants in the chaparral can _____. Frequent fire is different. It helps the nonnative _____ grow. But nonnative grasses can _____ the environment. They _____ many native plants from growing.

People have changed scrubland, too. They have _____ to make farms, ranches, and cities. Their actions _____ birds like the California gnatcatcher. This bird lives and nests in shrubs. The new open space _____ birds like the brown-headed cowbird. This bird _____ other birds by laying its eggs in their nests. These are some examples of how living things change ecosystems.

Name: _____

Instructions: Read the questions below and write your answers on the lines provided.

1. What kinds of changes happened in the San Bernardino Mountains? In the left column, write three changes caused by people. In the right column, write three natural changes. (6 points total)

Changes Caused by People	Natural Changes

2. What kind of plant was killed by these changes? (1 point)

3. What kind of animal was killed by these changes? (1 point)

Name: _____

Part 1: Ways to Restore the Marsh

Sweetwater Marsh has had many big changes. Some animals and plants have been harmed. They cannot live in places where they used to live. People are trying to restore populations of those animals and plants. People are trying to change parts of the marsh back to the way it was. They hope that plants and animals can now live there again.

Instructions: Read Chapter 3 of the ***California Connections: Sweetwater Marsh National Wildlife Refuge*** reader. Below, list all the ways people are trying to restore the marsh.

Ways to restore the marsh:

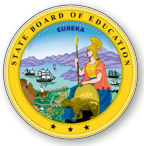
Name: _____

Part 2: Summarizing

Instructions: Think about these two questions:

1. What kinds of things are people doing to restore the marsh?
2. How does this help plants and animals survive?

Write a paragraph about how people are restoring the Sweetwater Marsh in the space below. Include two examples of things that people are doing to restore the marsh. Describe how each example will help a plant or animal survive. (10 points)



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