

SALT MARSH DISCOVERIES (K-2)

Overview: Students observe and describe natural objects found in the salt marsh, participate in a sensory habitat hike, and explore the salt marsh habitat.

Content Standards Correlations: Science p. 308

Grades: K-2

Key Concept: The salt marsh provides a unique habitat for a specialized group of plants and animals. Endangered species, such as the salt marsh harvest mouse, depend on the salt marshes of the San Francisco Bay for their existence.

Objectives: Students will be able to:

- use their senses to observe and describe the salt marsh habitat in terms of what they see, smell, hear, feel, and taste.
- name one plant and one endangered animal that lives in the salt marsh.
- name one way to help protect the salt marsh.

Materials:

Provided by the Refuge:

- Discovery Box containing natural objects found in the salt marsh
- 1 set of four footsteps
- 1 display of salt marsh plant samples
- 1 key to Salty's Home
- 1 large boundary rope
- 12 hand lenses
- 4 bug boxes
- 2 discovery scopes
- 4 soil thermometers
- 1 scat display
- 1 salt marsh plant book
- 1 bird identification chart
- 1 salt marsh plant display
- picture of "Salty"

TIME FRAME FOR CONDUCTING THIS ACTIVITY

Recommended Time: (30 minutes)

Discovery Box (5 minutes)

- lead the activity to focus attention, build observation and descriptive skills

Plant display (3 minutes)

- identify and describe salt marsh plants

Walk with footsteps (20 minutes)

- walk on the boardwalk through the marsh
- stop and follow instructions on each "footstep"
- the first footstep allows for close observation in the marsh
- lead a brief wrap-up about the salt marsh habitat

Travel Time (2 minutes)

- walk back to the top of the ramp to meet your next group

HOW THIS ACTIVITY RELATES TO THE REFUGE'S RESOURCES

What are the Refuge's resources?

- significant wildlife habitat
- endangered species
- migratory birds

What makes it necessary to manage the resources?

- Loss of wetland habitat due to development, such as landfills, salt ponds, buildings, roads, airports, etc. The salt marsh harvest mouse and the California clapper rail are endangered primarily due to loss of salt marsh habitat.

What can students do to help?

Refuge staff acquire and preserve wetland habitat, but we need your help.

- Reduce, reuse, and recycle, decreasing the need for landfills
- Adopt a wetland or an endangered species.



Northern Harrier

SUPPORTING INFORMATION FOR THIS ACTIVITY

Salt Marsh Habitat

- Tidal salt marshes once surrounded the entire San Francisco Bay.
- More than 80% of the salt marsh surrounding South San Francisco Bay have been lost due to human development. Salt marshes have been dredged, drained, and filled; landfills, roads, salt ponds, airports, and other buildings have been built on top of former salt marshes.
- Historically, all salt marshes around San Francisco Bay were tidal wetlands, serving as a transition zone between the bay or slough and the upland habitat.
- At the Environmental Education Center (EEC), New Chicago Marsh is a nontidal, managed salt marsh. The slough channels feeding New Chicago Marsh were connected to the Bay prior to the 1960s.
- The construction of levees (to create salt ponds) disconnected the sloughs in New Chicago Marsh from Coyote Creek and therefore from the Bay as well.
- To maintain this important habitat, refuge staff installed a water gate that can be opened to allow Bay water to flow slowly into the marsh during the dry season.
- In this nontidal marsh, there are no distinct plant zones. The plants in the salt marsh are low-growing and have adapted to living in salty, water-logged soils. These plants are called "halophytes", meaning salt loving. Pickleweed is a prominent plant that is very salt tolerant.
- The salt marsh is an important habitat for many animal species. Animals use the salt marsh for food and shelter. Many species, especially those that are endangered, depend on the salt marshes of the San Francisco Bay for their survival.
- At the EEC, the endangered salt marsh harvest mouse ("Salty") lives in New Chicago Marsh. Other small mammals that are found in the marsh include rabbits, voles and shrews.
- Many resident and migratory birds depend on the salt marsh for feeding and/or nesting; these include a variety of ducks, geese, plovers, egrets, herons, and northern harriers (marsh hawks).

How New Chicago Marsh Got Its Name

- In 1890 P.H. Wheeler, an enterprising developer, moved his watch manufacturing operations to Alviso, seeking to finance his troubled business with the sale of lots in what he enthusiastically called "New Chicago." Wheeler purchased the land that now surrounds the Environmental Education Center.
- With the aid of San Jose real estate men and politicians, a large part of Alviso, including the tidal salt marsh, was subdivided into 4,000 lots with streets named after those in "old" Chicago: Michigan Avenue, Dearborn, Grand Boulevard, etc.. With Alviso being touted as an up-incoming manufacturing center, over 3,500 lots were sold by the summer of 1890.
- One lucky person won a lot in the New Chicago subdivision while at the Victory Theater in San Jose. However, when he came out to Alviso to see his prize, the lot was under water! Since he was unable to determine which one was his, he refused to pay the taxes and lost the lot.
- When the promised dredging of Alviso Slough failed to begin, and thus reduced the probability of Alviso becoming a major deep water port in the south Bay, investors became nervous. Wheeler's scheme turned into a fiasco and the plans for the development of what is now called "New Chicago Marsh" ended with the bankruptcy of the San Jose Watch Company.
- In January 1968, the town of Alviso was annexed into the city of San Jose, California. And in 1974 the 365-acre New Chicago Marsh became the first parcel of land to be purchased for, and protected by, the newly established Don Edwards San Francisco Bay National Wildlife Refuge.



Australian Saltbush

HOW TO LEAD THIS ACTIVITY BY FOLLOWING THE "DO, READ, ASK" TEACHING FORMAT

Do

Meet the group at the plant display at the top of the ramp.

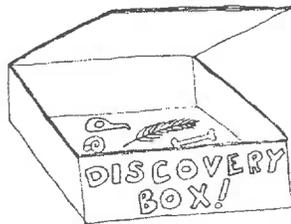
Read

"Welcome to the Salt Marsh Discovery. In this activity we are going to take a hike to explore the salt marsh habitat. You are going to use all of your senses to observe and describe objects and the salt marsh itself."

Discovery Box (5 minutes)

Do

To prepare the students for observing and describing the salt marsh habitat, use the Discovery Box. Gather students in a semi-circle.



Read

"We are going to begin developing our 'sharp eyes' and practice describing objects. This is a Discovery Box. It contains objects that you might find in the salt marsh."

Do

Open the Discovery Box. One at a time, hold up each object and name it.

Read

- "Now that you know what the objects are, I will open the Discovery Box and walk around the circle so that everyone can look inside.
- "Look at all the objects in the box. Do not touch them.
- "In your mind, choose one object. You will be describing that object to the rest of the group.
- "You need to know its size, color, texture, shape, and any design or pattern on it.
- "You are going to describe it to the rest of the group without saying what the object is or how it is used.

- "Don't point to it or tell anyone what you have chosen. Everyone will try to guess what you are describing."

Do

Open the Discovery Box. Walk around the circle so that everyone can look inside. Close the box. Select a student to describe his/her object.

Read

"Remember to describe your object by its size, shape, color, texture, and any design or pattern on it. Don't say what it is or where it comes from. The rest of you need to listen carefully and raise your hand when you think you know what it is."

Do

After several hands are raised, have the student describing the object choose someone to guess. After the object has been correctly guessed, take it out of the box and show the whole group. Allow several students to describe their objects.

Read

"Now that you're experts at describing objects, let's take a look at some salt marsh plants."

Plant Display (3 minutes)

Do

Use the salt marsh plant display to help students identify plants in the salt marsh. Have the students gather around the plant display.

Read

"I'm going to show you samples of two plants that you will find in the salt marsh. Your job is to look closely at the samples so that you can add to my descriptions."

Do

Hold up one plant sample at a time, and give the following descriptions:

Pickleweed

Ask

? **Does anyone know what this plant is?**
(Pickleweed.)

Read

"Pickleweed is smooth and segmented. For most of the year it looks like a series of tiny grey-green pickles attached end to end. In the winter, much of the pickleweed turns orange, red, purple, or brown. In summer, tiny flowers can be seen where the segments branch."

Ask

? How would you describe the way it looks now?

Alkali Heath

Read

"Alkali heath can be seen growing in patches throughout the marsh. It has a delicate, woody stem and tiny leaves. In spring and summer the leaves are a pale green. Small lavender flowers bloom in mid-summer. In fall and winter the leaves become brown and dry."

Ask

? How would you describe the way it looks now?

Read

"We are now ready to begin our hike. As we walk, we will come across footsteps placed on the boardwalk. We will stop at each one, read it, follow the instructions, and share our answers with the group."

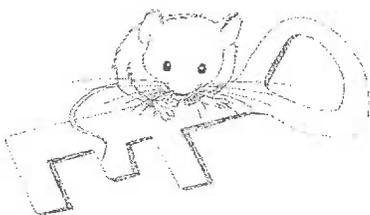
Marsh Walk with Footsteps (20 minutes)

Do

Walk down the ramp to the boardwalk in New Chicago Marsh. Stop at the first footprint (50 yards from the beginning of the boardwalk) and read it aloud.

Read Footstep #1

"Use the Key to Salty's Home to unlock the door to the salt marsh. Carefully, step off the boardwalk and position yourself around the outside of the study area."



Do

Unlock the door to the salt marsh, step off the boardwalk, and help students place themselves around the rope. Use the plant book to identify plants you find in your site.

Plants

? Can anyone find pickleweed? Do you see salt crystals on the pickleweed? (No.) How does pickleweed get rid of salt? (It sends the salt to the tips of the branches, which turn red and fall off.)

? What do you *think* pickleweed tastes like? (Salty, like pickles, great!)

Do

Adult leader should pick pickleweed and give each student a small sample to taste. *Students may NOT* pick plants.



Pickleweed

Ask

? What does pickleweed taste like? (Salty, like pickles, ucky, bitter, great!)

? Now, who can point to the alkali heath?

Do

Pass out the hand lenses.

Read

"Look carefully at the leaves."

Ask

? Can anyone find salt crystals on the leaves? (Use the hand lenses to look at the salt crystals on the alkali heath. You may also put leaves in the discovery scope and pass the scope around.)

? Why do these plants have salt crystals on them? (They drink salt water and have to get rid of the salt. Alkali heath 'sweats' out extra salt through specialized glands on its leaves. They 'sweat' out the salt through openings on their leaves, just like humans sweat through pores.)

Animals

Do

Use the scat display to identify scat and the bird identification chart for bird identification.

Ask

? **Can anyone find any animals inside our circle?** (Students may be able to find insects or spiders. You may put insects inside the bug box or discovery scope for everyone to look at. Some spiders are poisonous and may bite. Be sure to return the animal to the marsh.)

? **What evidence of animals can we find?** (Webs, scat, feathers, holes, tracks, nests, shells.) Can anyone find any evidence of animals? (Place any evidence in the bug box or discovery scope for everyone to look at.)

? **What endangered animal lives in the salt marsh?** (The salt marsh harvest mouse.)

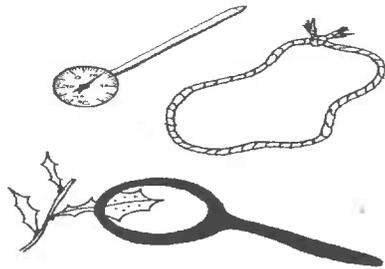
Do

Hold up a picture of Salty, the salt marsh harvest mouse.

Ask

? **What does the salt marsh harvest mouse eat?** (Pickleweed. It also nests in pickleweed.)

? **What animals might eat the salt marsh harvest mouse?** (Many different birds: hawks, owls, eagles, egrets, herons, and the endangered California clapper rail.)



Do

Collect the hand lenses.

Soil

Ask

? **What does the soil smell like?** . The soil may smell very 'earthy'

? **What does the soil in the salt marsh feel like?**

Rub some of the soil between your fingers. **Is it wet or dry?** (It will feel wet if the area you are studying has been flooded with water recently.)

? **Does the soil feel warm or cold?** Let's see what temperature it is. (Measure the temperature of the soil using the soil thermometer. Gently insert the thermometer's rod in the soil. Wait one minute and read the temperature.)

Read

"The temperature of the soil is _____°F and is _____°C."

Ask

? **How does the temperature affect what lives here?** (Animals and plants have certain temperatures that are best for them to survive.)

? **Do you think the salt marsh is important? Why/why not?** (The salt marsh is a special habitat. It supports many forms of life, some found nowhere else in the world. It is a home for many plants and animals, including endangered species. It is a place for people to study and enjoy.)

Do

When you are finished exploring the salt marsh, get back on the boardwalk, lock the door to Salty's home, and walk to the next "footstep".

Read Footstep #2

"Close your eyes for 30 seconds. Listen for both natural and human-made sounds."

Ask:

? **What natural sounds did you hear?** If you heard bird sounds, raise your hand. What human-made sounds did you hear? Which sounds were the loudest?

Do

Continue along the boardwalk. Stop and read the next footstep aloud.

Read Footstep #3

"Close your eyes. This time, concentrate on your sense of smell. Think of one or two words to describe how the salt marsh smells." (musty, like rotten eggs, salty, ocean-like)

Do

Ask each student to give their description of salt marsh smells. After everyone has responded walk to the next footstep.

Read Footstep #4

"Use 6 words to describe Salty's salt marsh home. Include all five senses: sight, smell, touch, taste, and hearing. Let's describe them one at a time."

Examples

- (1) Green, musty, salty, damp, quiet, important
- (2) Quiet, sunny, warm, salty, smelly, special

Ask

? What can you do to protect Salty's home?

(Accept all reasonable answers. Include: do not litter; only enter the salt marsh if you have special

permission and the key to Salty's home; tell others about the salt marsh and why it is important.)

Travel Time (2 minutes)

Do

Send students and their chaperone to their next station. Quickly return to the top of the ramp to meet your next group.

SALT MARSH DISCOVERIES MAP (K-2)

