

Galveston Bay Wetlands and Oyster Reefs Pop-Up

Time: 1-3 class periods, depending on age and skill level

Age: Elementary

Materials (per student):

- Lesson copies
- Colored pencils
- Glue or tape
- Scissors
- File folder or box

Lesson adapted by The Galveston Bay Foundation from the “Amazing Oysters Pop-Up Activity” produced by The Virginia Coastal Program at the Department of Environmental Quality.

<https://savetheirl.org/teacher-resources/Oyster%20Pop-up%20Activity.pdf>

Additional background resources include Texas Parks and Wildlife

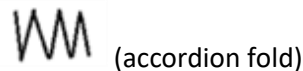
This lesson can be used to introduce the Galveston Bay wetland and oyster reef ecosystems to elementary grade students.

Objectives:

- Students will create a pop-up illustrating the local wetland and oyster reef ecosystems.
- Students will be able to identify the main functions of wetlands and oyster reefs.

Teacher Procedure:

1. Make copies of the coloring/cut-out sheets for each student and gather materials
2. It is helpful to have an example pre-made for students to see before beginning.
3. Lead students in creating the pop-up:
 - a. Color the plants and animals based on the “Plant and Animal Coloring Descriptions” page.
 - b. Cut out the Marsh grass, oysters, and pop-up strips along the SOLID lines.
 - c. Fold along the DOTTED lines.
 - d. Glue or tape the folds onto the bottom of the file folder or box. Marsh grass should be on the left and oysters on the right.
 - e. Cut the pop-up strips as long as needed, fold them in an accordion fold and tape or glue one edge to the back of the grass and oysters and the other edge to the side of the folder or box.
4. Lead students in determining the functions of wetlands and oyster reefs. Functions are described in the background information pages. Have students write the functions on the bottom of the folder or box. Teachers can choose from a variety of delivery methods for students to fill out their foldables.
 - a. Stations: Students rotate around to 5 different stations to gather information for their foldables.
 - b. Lecture: Teacher can make a power point
 - c. Packet: Teacher can create a packet for students to work on by themselves
 - d. Online research



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Background Information



Wetlands:

A wetland ecosystem has three primary characteristics. One, it must be inundated with water at least part of the year. Two, the soils are hydric, or display characteristics of being waterlogged for most of the year. Three, the plants are hydrophilic, or specially adapted to waterlogged soils and a wet environment. Through these characteristics, wetlands provide some very important functions for nearby ecosystems and humans. The dominant wetland plant in Galveston Bay is Smooth Cordgrass (*Spartina alterniflora*) Functions of wetlands include:

1. **Absorb pollution.** As runoff from agricultural fields and streets pass through wetland ecosystems, nutrient pollutants such as nitrates and phosphates settle out, and are also absorbed by the above soil roots of wetland plants. Some wetland soils can absorb heavy metal pollution from the waterways. Marsh grass also absorbs carbon from the atmosphere.
2. **Biodiversity.** Wetlands support a great diversity of plant and animal life. Many wetlands are important stops for migratory birds or important nesting grounds. Salt marshes provide crucial habitat for larval and juvenile shrimp, fish and crab.
3. **Recharge groundwater.** The permeable soil and waterflow through wetlands contributes to groundwater recharge.
4. **Decrease flooding.** Wetland soils absorb excess water. Wetland ecosystems along rivers help to contain flooding from upstream flooding events. Prairie ecosystems absorb water into the soil over large areas.
5. **Prevent erosion.** Wetland ecosystems capture sediment from runoff as it passes over the ecosystem into neighboring waterways. Wetland ecosystems also decrease shoreline erosion by breaking wave energy.

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Oyster Reefs:

The dominant oyster that is found in Galveston Bay is the Eastern Oyster (*Crassostrea virginica*). Eastern oysters are abundant in shallow saltwater bays, lagoons and estuaries, in water 8 to 25 feet (2.5 to 7.5 m) deep and between 28 and 90 degrees F. Growth of oysters in Texas waters is relatively fast and occurs throughout the year. Under ideal conditions, spat may reach one inch in three months, two inches in seven months, and three inches in 15 months.

Sometimes, sand grains, shell fragments or other particles become lodged within the mantle tissue. Mantle cells stick to such a particle and become lodged within the mantle tissue, continuing to secrete around it - eventually forming a "pearl." Because the commercial oyster found in Galveston Bay does not have the ingredient in its secretion to form the mother-of-pearl coating that gives the luster and beauty of the true pearl, its pearls, although interesting, are not valuable. Several pearls may occur in one oyster. A world record has not been established, but a Galveston Bay oyster containing 356 pearls must be a leading contender. Functions of oyster reefs include:

1. **Filtration:** Oysters are a natural filtration system. One oyster filters 50 gallons of water each day!
2. **Biodiversity:** Oyster reefs provide shelter to many species. Plants attach to the reef and attract grazers, such as silversides, juvenile black sea bass and silver perch. In addition, the nooks and crannies of the reef provide ideal hiding spots for a variety of species. Thin flat fish like skillet fish can slip in and hide in the small spaces within the reef. These small fish live, feed and breed in the reef. Their larval forms eat oyster larvae and the mature fish are eaten by other reef residents such as mud crabs and striped bass. Reefs are shelter and feeding grounds for a variety of animals throughout the food chain including striped bass, oyster toad fish, puffer fish, skates, blue crabs, grass shrimp, mussels, and barnacles. The diversity and abundance of species living in the reef area depends on the health of the reef. Not only do healthier reefs contain more oysters, but they also contain more fish and crabs.
3. **Absorb carbon:** As they grow, oysters take in carbon from the water to build their shell
4. **Decrease erosion:** Oyster reefs stabilize the Bay bottom and break wave energy, helping to reduce shoreline erosion
5. **Good for the economy!** Many people like to eat oysters. In an average year, the Galveston Bay oyster fishery contributes approx. \$9 million to the Texas economy.

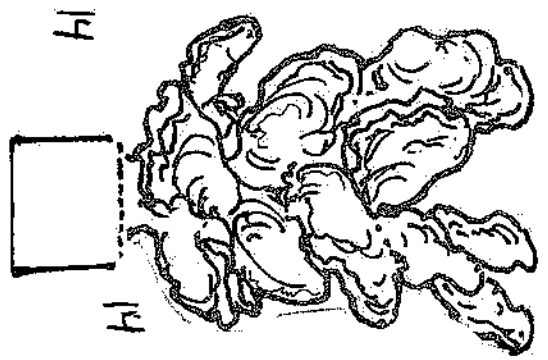
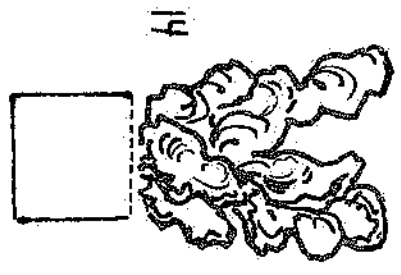
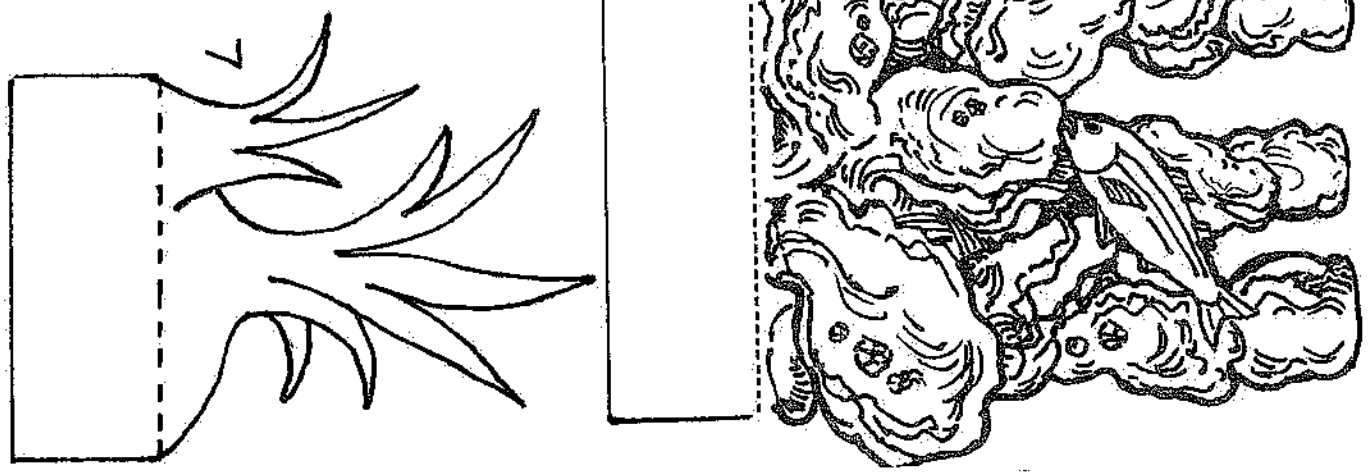
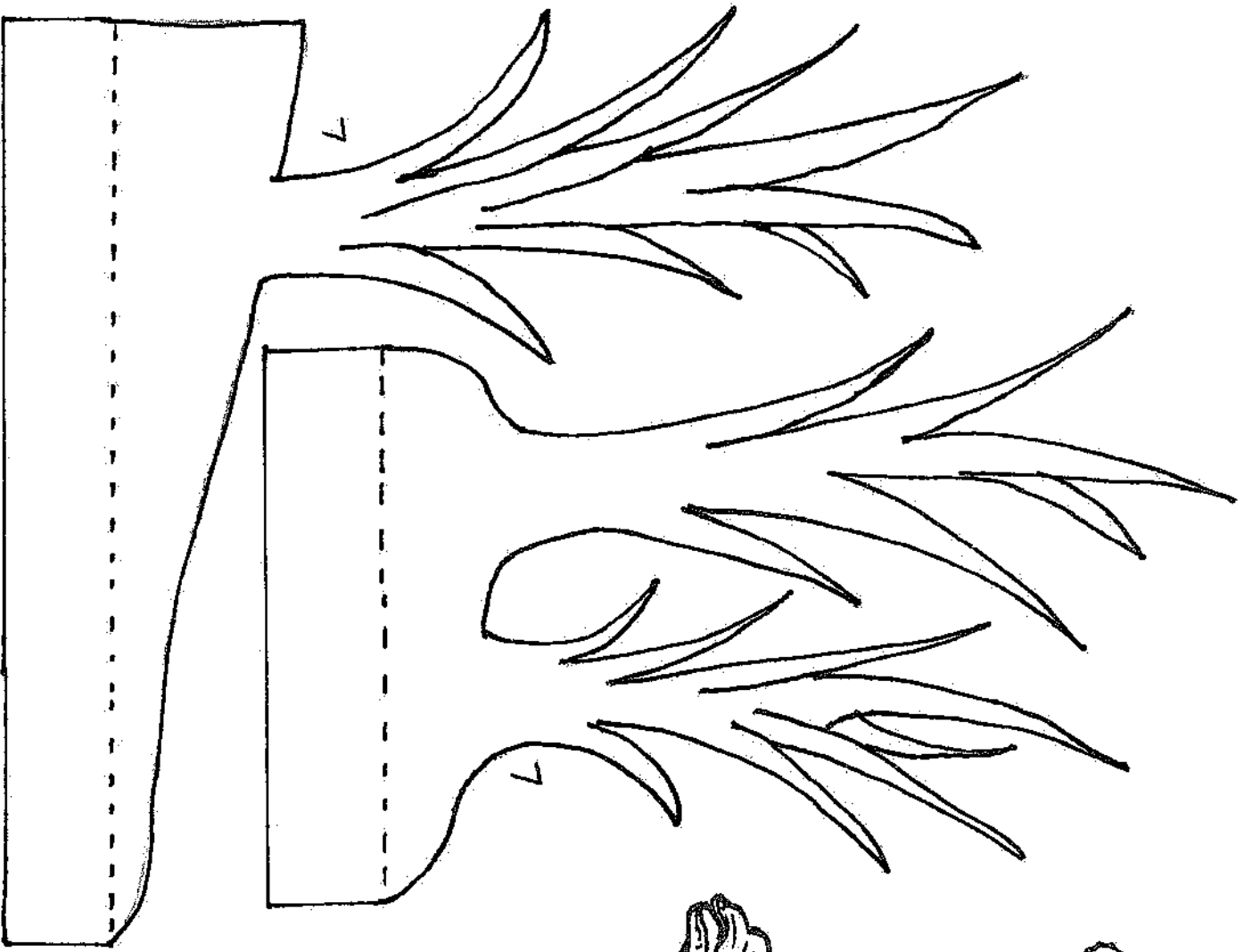
Plant and Animal Coloring Descriptions

(see the number next to each picture)

<p>1. Striped Blennie <i>Scientific Name: Chasmodes bosquianus</i> Females are darker olive-green with a network of paler green lines along the body</p>	<p>8. Oyster Toad Fish <i>Scientific Name: Opsanus tau</i> Slimy and ragged – the ugliest in the Bay! Fleshy flaps hang from their lips and over their eyes Covered with warts, brown and muddy colored</p>
<p>2. Striped Bass (Rockfish) <i>Scientific Name: Morone saxatilis</i> Silvery with dark stripes</p>	<p>9. Clearnose Skate <i>Scientific Name: Raja eglanteria</i> Two transparent patches on each side of a pointed nose Back is brown to gray with scattered dark spots and bars</p>
<p>3. Skilletfish <i>Scientific Name: Gobiosox strumosus</i> Shaped like a skillet with a broad flat head Eyes are small and widely spaced Pelvic fins are formed into large suction discs Evenly speckled with brown</p>	<p>10. Blue Crab <i>Scientific Name: Callinectes sapidus</i> Bright blue claws – female claws are tipped in red Olive to bluish green shell covering its back Transparent backfin</p>
<p>4. Naked Gobie <i>Scientific Name: Gobiosoma boscii</i> Have no scales Dark greenish brown on top, pale below Have eight or nine light, vertical bars along their sides</p>	<p>11. Roseate Spoonbill <i>Scientific Name: Platalea ajaja</i> Yellow head, white neck, pink body feathers White beak Pink legs, black feet</p>
<p>5. American Eel <i>Scientific Name: Anguilla ostrate</i> Have long uninterrupted fins along the back, tail and belly Pale grayish brown with transparent fins</p>	<p>12. Brown Pelican <i>Scientific Name: Pelecanus occidentalis</i> Yellow head, white neck, brown body feathers Orange beak, black legs and feet</p>
<p>6. Puffer Fish <i>Scientific Name: Sphoeroides maculatus</i> Small, club-shaped covered with prickles Tiny beaked mouths Yellow with deep greenish blue bars on the side Dark above and pure white on the belly</p>	<p>13. Snowy Egret <i>Scientific Name: Egretta thula</i> White feathers Black legs, Yellow feet Black beak, yellow around eye</p>
<p>7. Smooth Cordgrass <i>Scientific Name: Spartina alterniflora</i> Green to light green stalks and leaves</p>	<p>14. Eastern Oyster <i>Scientific Name: Crassostrea virginica</i> Light gray to tan shell covering a soft body</p>

Pop-up Strip

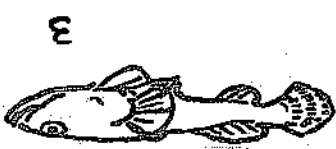
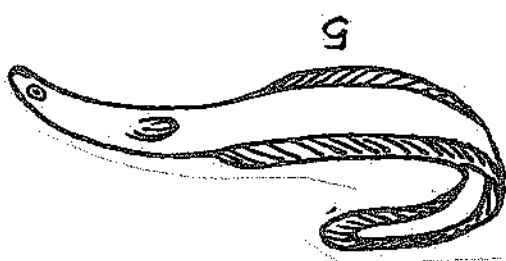
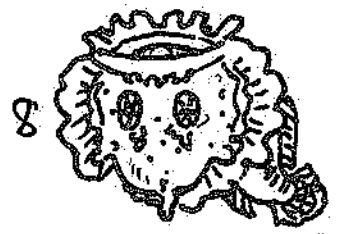
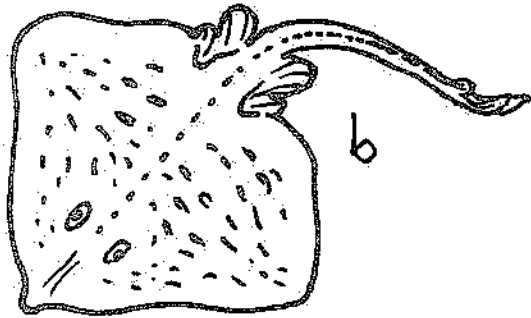
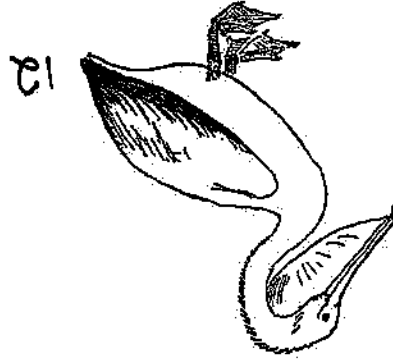
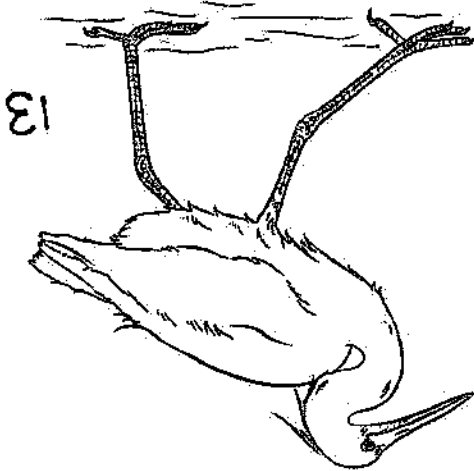
Pop-up Strip



Pop-up Strip

Pop-up Strip

Pop-up Strip



Wetlands & Oyster Reef Pop-up Example

