

Amazing Adaptations



Figure 1. Leopard Shark (Credit: Elkhorn Slough NERR)

Estuary Concept

Estuaries support an abundance of life, and a diversity of habitat types. Plant and animal species that live in estuaries have specialized physical, biological, and behavioral adaptations which allow them to survive in the ever-changing estuarine environment.

Learning Objectives

- Examine the form and function of different estuary species.
- Describe some adaptations of plants and animals to live and thrive in estuary habitats, such as salt marshes and mangroves.

Teacher Background

In almost all estuaries, the salinity of the water changes constantly over the tidal cycle. To survive in these conditions, plants and animals living in estuaries must be able to respond quickly to drastic changes in salinity. Plants and animals that can tolerate only slight changes in salinity are called stenohaline. These organisms usually live in either freshwater or saltwater environments. Most stenohaline organisms cannot tolerate the rapid changes in salinity that occurs during each tidal cycle in an estuary.

Plants and animals that can tolerate a wide range of salinities are called euryhaline. These are the plants and animals most often

Activity Information

Grade Level

5, 6-8, 9-12

Time Required

2 (1 hr class periods) + homework

Topic

Adaptations

Overview

This activity introduces students to the diversity within an estuary, focusing on adaptations. Students will access a list of species that live in different NERRs and research their adaptations. Then they will present this information to the rest of the class using a variety of products.

found in the brackish waters of estuaries. There are far fewer euryhaline than stenohaline organisms because it requires a lot of energy and specialized adaptations to tolerate constantly changing salinities. Organisms use a variety of behavioral and physical adaptations to do this. Some organisms have evolved special physical structures to cope with changing salinity. The smooth cordgrass found in salt marshes, for example, has special filters on its roots to remove salts from the water it absorbs. This plant also expels excess salt through its leaves.



Figure 2. *Diamondback Terrapin*

Oysters and other bivalves, like mussels and clams, can live in the brackish waters of estuaries by adapting their behavior to the changing environment. During low tides when they are exposed to low-salinity water, oysters close their shells and stop feeding. Isolated in their shells, oysters switch from aerobic respiration (breathing oxygen through their gills) to anaerobic respiration, which does not require oxygen. Hours later, when the high tides return and the salinity levels in the water are considerably higher, the oysters open their shells and return to feeding and breathing oxygen.

Unlike plants or oysters, which typically live their whole lives rooted to one spot, many animals that live in estuaries will move up or down the estuary according to the surrounding waters' salinity in order to survive. Blue crabs are good examples of animals that do this.

Teacher Preparation

1. Determine whether you are having students work individually or in small groups, and if you are assigning species or allowing them to choose. On Estuary Resources page search for "species profile" document for more options.
2. Decide whether you will give them a choice of products (PowerPoint, video, poster, model, or costume) or if they will all use one format.
3. Collect necessary materials if they will be creating posters, models, or costumes to present their research.

Extension idea: Compare and Contrast species. Choose two species (Ex. two fish, two plants, or two different animals from different regions) and then create a report using the products suggested above.

Procedure or Activity Steps:

1. Either break students up into small groups or allow them to work individually and choose or assign local species to research. See "Species Profile" document for more options.
2. Format options for presenting the material to the class: PowerPoint presentation, poster, model, video, or costume. Either display directions on the board or make copies of the directions for students.
3. When students finish their product, create a class exhibit to share students' work.
4. Allow students sufficient time to circulate and read all the class projects, or for students to present their findings.

Materials Needed

- Presentation materials such as: poster board, or computers/tablets with PowerPoint, Google Slides, or some other presentation software
- Computers with internet access
- Art materials if students are creating models or costumes such as: cardstock, pipe cleaners, googly eyes, clay, scissors, tape, and markers

STUDENT INSTRUCTIONS

Poster, PowerPoint, Video, Model or Costume:

You will explore the life of a single animal or plant species and describe how the species adapts to conditions within the estuary. You will either be assigned an organism or allowed to select one that interests you.

Whichever product you are creating, include the following:

1. Common and Latin name of your organism and picture
2. In what habitat is it found?
3. Information such as:
 - life cycle
 - adaptations to changing conditions in the estuary (such as salinity and temperature)
 - adaptations to help this organism find or produce food
 - adaptations to find a mate, reproduce, or protect its young
 - adaptations to avoid predators
 - food sources
 - whether the species is endangered or not
 - references for where you got your images and information (e.g. the URLs of the Web sites)