

# ESTUARY EXPLORERS

## Grades 4 - 6

**NJCCCS: 5.1, 5.3, 5.4**

### **Field Trip Overview:**

On the field trip, students will explore a salt marsh estuary. Weather permitting, students will take a field walk and conduct water quality tests for temperature, salinity, and turbidity. In addition, students will use dip nets to collect aquatic organisms that inhabit the Kingsland Impoundment of DeKorte Park. After the collection is complete, students will identify the organisms collected, along with a given sample of plankton, using dissecting microscopes. Students will record all observations in a "salt marsh journal" that will be brought back to school with them.

### **Background Information:**

An estuary is a partially enclosed body of water where saltwater from the sea mixes with freshwater to form a "brackish" water environment. These areas of transition between the land and the sea are tidally driven, like the sea. Every estuary is unique; each individual ecosystem has different components that complete the estuarine habitat. Estuaries are also home to unique aquatic plants and animals, such as marsh grass, aquatic turtles and several varieties of fishes.

Estuaries are important for many reasons. Estuaries are among the most biologically productive ecosystems on the planet. More than two thirds of the fish and shellfish we eat spend some part of their lives in estuaries. These ecosystems also provide many other important ecological functions; they act as filters for terrestrial pollutants and provide protection from flooding. Estuaries also have economic importance. These dynamic bodies of water provide us with an important source of food, but are also a popular tourist destination. Millions of people visit the nation's estuaries each year to boat, swim, bird watch, and fish. The fragile balance of these productive estuarine environments may be easily destroyed by human activities. Changes in water quality or alterations, by dredging and construction, to the multiple components of estuaries can result in harmful changes in the ecosystem.

## **Vocabulary:**

Adaptation: Adjustment to environmental conditions; something a plant or animal has that helps it to survive

Brackish: A mixture of salt and fresh water

Consumers: Organisms that get their energy from other living things

Decomposers: Organisms that break down once-living things, releasing the energy stored in them

Detritus: Decaying plant and animal matter that serves as a nutrient-rich food source

Estuary: Partly enclosed coastal body of water in which river water mixes with seawater

Food Chain: The passage of energy (in the form of food) from producers through several levels of consumers and decomposers

Food Web: Complex network of many interconnected food chains and feeding relationships

Habitat: The environment in which an organism lives that provides necessities for survival such as energy, water, shelter, and space

Plankton: Free floating plants and animals that range in size from microscopic to large jellyfish. Many microscopic plant-like plankton serve as an important food source for marsh animals.

Salinity: The concentration of dissolved salts in the water, measured as the number of units (parts) of salt per thousand units of water

Salt Marsh: Type of wetland semi-enclosed by land but having partial access to open ocean or river

Temperature: The degree or intensity of heat of an object

Turbidity: The ability of light to pass through a medium (in this case, water). It is measured by how far (in cm) we can see through the water to a target called a "Secchi disk"

Wetland: An area of land that is intermittently covered with water

## References / Resources:

- "Where the Rivers Meet the Sea," NOAA, 1990, Michigan Department of Environmental Quality, US EPA, & [www.science.uwaterloo.ca](http://www.science.uwaterloo.ca)
- [EPA: America's Wetlands](#) - EPA website with background information ranging from what a wetland is to their protection and conservation.
- Project Wild: Aquatic Western Regional Environmental Education Council, Inc. 1992.
- WOW!: The Wonders of Wetlands Environmental Concern Inc. and The Watercourse. 1995.

ESTUARY EXPLORERS  
**Pre-Trip Activities**

**WETLAND METAPHORS**

Adapted from Project Wild

**Grades:** 4-6

**Type:** Indoor or Outdoor

**Duration:** 1 hour

**Subjects:** Science, Language Arts

**NJCCCS:** 5.3.6.B, 5.3.6.C

**Objectives:** Students will be able to: 1) describe the functions of a wetlands ecosystem; 2) discuss the importance of wetlands to animal and human life; 3) relate common household products to the vital functions of wetlands.

**Skills:** Description, interpretation, discussion, association, application, classification, comparisons, demonstration, relation, public speaking, summarization.

**Materials needed:** \* can be modified based on the availability of items:

- Sponge
- Soap
- Antacid
- Cereal
- Coffee Filter
- Small Chair
- Strainer
- Egg Beater
- Pillow
- Picture Cards (optional)
- Any additional items which can be used as metaphors

**Classroom Set up:** Metaphor items should be contained in a bag or a box for use during the lesson.

**Vocabulary:** Wetlands and metaphor

**Procedure:**

**1. Introduction-** (20 minutes)

- a. To begin the class, students can imagine to themselves what a wetland would be like. In silence, have them close their eyes and draw a mental picture in their minds of a wetland. Students can picture flora and fauna, as well as air quality. After a few minutes, invite the class into a group discussion of their observations. A list may be compiled containing flora and fauna that was seen in their wetlands.
- b. At this point, background information about the functions of wetlands may be provided to the students. This will make the process of identifying the metaphors somewhat simplified, though not necessary dependent on prior knowledge.

**2. Activity- Indoor or Outdoor** (30 minutes)

- a. Divide the class into groups of 4. Once divided, introduce the bag or box containing the wetland metaphor items. Explain to the class that everything in the bag contains items that have an association with a function of a wetland.
- b. In their groups of 4, a representative will be chosen, and when called upon, this person will chose an item from the bag or box. The student will then return to the group and as a team, they will discuss how the object could represent a function of a wetland.
- c. After each group has discussed their item, they can share their findings with the class.

**3. Closure-** Summarize the groups' findings on the board, and discuss why wetlands are important to animals as well as humans. Some things to consider are: How do humans use wetlands? Why do we alter wetlands? What are the students overall thoughts on wetlands?

**Resources:**

"Wetland Metaphors." Project Wild: Aquatic. Western Regional Environmental Education Council, Inc. 1992.

ESTUARY EXPLORERS  
**Post-Trip Activities**

**MARSH MARKET**

ADAPTED FROM WOW!: THE WONDERS OF WETLANDS

**Grades:** 4-6

**Type:** Indoor

**Duration:** 1 hour

**Subjects:** Ecology, Biology

**NJCCCS:** 5.3.6.B, 5.3.6.C

**Objectives:** Students will be able to: 1) describe the way in which a food web functions; 2) discuss the roles plants and animals play in the food web; 3) identify the part people play in the food web; 4) predict how human usage of natural resources will impact the overall food web.

**Skills:** Identification, definition, description, listing, summarizing, predicting, association, discussion, analysis, order, connect, arrange.

**Materials needed:**

- Ball of string or yarn
- Large index cards
- Paper and markers
- Tape

**Classroom Set up:** All materials listed above should be set up and ready for use by the start of the lesson.

**Vocabulary:** Carnivore, herbivore, omnivore, insectivore, predator, prey, food web, decomposers, primary producers, primary consumers, secondary consumers, tertiary consumers, and decomposition, consumption

**Procedure:**

**1. Introduction-** (30 minutes)

- a. To begin the lesson, prepare a list of plants and animals that live or spend at least part of their time in a wetland. From the list,

allocate items to students in the class. It is their responsibility to research what the animal eats as well as its predators.

- b. When the students have completed their research, compile a list on the board of which animals are herbivores, carnivores, omnivores, and insectivores. From this list, record the name of each plant or animal on a separate index card. The cards can then be taped to the blackboard and students one by one will select a card. Since the cards have tape on them, the students can tape the cards to their shirts.

## 2. Activity- Indoor (20 minutes)

- a. The food web will begin to take shape by choosing a student who has a plant card. This student will receive a ball of string and wrap it once around her hand. The student must then pass the ball of string on to a classmate who would eat his plant. Once again, the classmate will wrap the string around his hand and then pass the ball of string on to a student who would eat him, or who would be a food source for him. It will be possible that a student may be passed the ball of string several times. If this is the case, try to make sure all of the students become involved.
- b. Students will continue to pass along the string until a wetland food web is constructed. The class can now position themselves so that all of the string is taut.

3. **Closure-** While the students are still assembled, discuss some of the possible ways that the food web could potentially be disturbed. What would happen if an animal's role in the web was altered, or if the animal disappeared from the web? You can take this a step further by creating scenarios in which plants, animals, or everything would be impacted by an outside influence. Such examples could be chemical spills, drought, or construction on a wetland.

## Resources:

"Marsh Market." WOW!: The Wonders of Wetlands. Environmental Concern Inc. and The Watercourse. 1995.