

Salt Marsh Connections



STANDARD COURSE OF STUDY CORRELATIONS:

Science, Grade 5, Goal 1: The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

1.01 Describe and compare several common ecosystems (communities of organisms and their interaction with the environment).

1.02 Identify and analyze the functions of organisms within the population of the ecosystem:

- Producers.
- Consumers.
- Decomposers.

1.03 Explain why an ecosystem can support a variety of organisms.

1.04 Discuss and determine the role of light, temperature, and soil composition in an ecosystem's capacity to support life.

1.05 Determine the interaction of organisms within an ecosystem.

1.06 Explain and evaluate some ways that humans affect ecosystems.

- Habitat reduction due to development.
- Pollutants.
- Increased nutrients.

1.07 Determine how materials are recycled in nature.

Science, Grade 6, Goal 3: The learner will build an understanding of the geological cycles, forces, processes, and agents which shape the lithosphere.

3.01 Evaluate the forces that shape the lithosphere including: deposition.

3.06 Evaluate ways in which human activities have affected Earth's pedosphere and the measures taken to control the impact: vegetative cover, land use, nutrient balance.

Science, Grade 6, Goal 4: The learner will investigate the cycling of matter.

4.01 Describe the flow of energy and matter in natural systems:

- Energy flows through ecosystems in one direction, from the sun through producers to consumers to decomposers.
- Matter is transferred from one organism to another and between organisms and their environments.
- Water, nitrogen, carbon dioxide, and oxygen are substances cycled between the living and non-living environments.

4.02 Evaluate the significant role of decomposers.

Science, Grade 6, Goal 7: The learner will conduct investigations and use technologies and information systems to build an understanding of population dynamics.

7.01 Describe ways in which organisms interact with each other and with non-living parts of the environment: Coexistence/Cooperation/Competition, Mutual dependence.

7.02 Investigate factors that determine the growth and survival of organisms including: light, temperature range, mineral availability, soil/rock type, water, energy.

7.03 Explain how changes in habitat may affect organisms.

7.05 Examine evidence that overpopulation by any species impacts the environment.

Science, Grade 8, Goal 3: The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of the hydrosphere.

3.03 Evaluate evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms: estuaries, value and sustainability of marine resources.

3.04 Describe how terrestrial and aquatic food webs are interconnected.

MATERIALS

- 📷 Photos or slides of salt marsh
- 📷 Photos or drawings of salt marsh plants and animals
- 📄 Chart paper

PREPARATION

- 📷 Gather several images of a salt marsh to show the class. A couple of sources: http://www.ncwildlife.org/free_images/images/img_fi_02_640x480.jpg and <http://en.wikipedia.org/wiki/Image:Bride-Brook-Salt-Marsh-s.jpg>
- 📷 Collect photographs or drawing of plants and animals found in the salt marsh. Good sources include:
 - <http://www.ocean.udel.edu/kiosk/>
 - <http://www.saltmarshlife.com>
 - http://www.njmsc.org/education/Lesson_Plans/WebOfLife.pdf
- 📷 Choose a large play area for the "Explore" activity. Before the game, prepare tags in two colors (green for "Plants" and brown for "Nutrients"), enough for each student to have one tag.



Salt marsh photograph by N.C. Wildlife Resources Commission.

INTRODUCTION TO LESSON:

Students will be introduced to the salt marsh: its intrinsic beauty and biological diversity, the interconnectedness of its flora and fauna, and its tremendous economic value. They will learn about the importance of salt marsh grasses in trapping nutrients by playing a simulation game. They will also create food chains using images of salt marsh organisms.



Salt marsh photograph by N.C. Wildlife Resources Commission.

BACKGROUND FOR TEACHER: Many people think of salt marshes as desolate, barren expanses that have little value. In fact, the salt marsh is one of the most productive environments on Earth. Every organism in and around the coastal region depends on the salt marsh for survival, either directly or indirectly. Salt marshes in North Carolina are often called *Spartina* marshes due to the abundance of marshes that are dominated by *Spartina alterniflora* (commonly known as smooth cordgrass or salt-marsh cordgrass). Other types of salt marsh grasses on our coast include *Spartina patens* (saltmeadow cordgrass) and *Juncus roemerianus* (black needlerush).

engage ➤ Show several slides or photographs of a salt marsh to the class. Ask them what their first impression is of the images. Have them work in pairs or small groups to discuss how salt marshes might be important. Ask them to jot down their ideas on chart paper. Let them briefly discuss their ideas with one another. Tell them they will revisit their ideas later on. **Show Chapters 1 and 2 of the video.**

explore ➤ Divide students into groups of four and provide each group with photos or drawings of an array of salt marsh organisms. Have each group create food chains with the images. Have them share the food chains with the class.



BEYOND THE CLASSROOM

Visit one of the three North Carolina Aquariums (<http://www.ncaquariums.com>) at Pine Knoll Shores, Fort Fisher or Roanoke Island. Each of these sites offers field experiences, field guides and teacher resource materials.

Additional Resources

National Geographic Lesson Plans • <http://www.national-geographic.com/xpeditions/lessons/matrix.html>

Wechsler, Doug. 2008. *Marvels in the Muck: Life in the Salt Marshes*. Honesdale, Pa.: Boyds Mills Press.

WOW!: The Wonders Of Wetlands • A comprehensive, interdisciplinary curriculum guide for K-12 educators available from Environmental Concern: <http://www.wetland.org/>.

North Carolina Wildlife Resources Commission's "Outdoor Kids" Web page • http://www.ncwildlife.org/pg10_OutdoorKids/pg10d_8.htm

University of Delaware College of Marine and Earth Studies • <http://www.ocean.udel.edu/kiosk/> • Interactive site with plant and animal habitats.



explain ➤ Show Chapters 3-5 of the video. Afterward, discuss organisms besides fish and birds that are dependent on the salt marsh. Discuss food chains and/or food webs. The Web site <http://www.cas.psu.edu/docs/webcourse/wetland/wet1/balnat.html> provides a good explanation of food chains and food webs as well as interactive activities to help identify producers, consumers and decomposers.

elaborate ➤ Tell students that they will be playing a game* that simulates the cycling of nutrients in the salt marsh.

- Assemble students in the play area and divide class into two groups.
- Assign Team 1 to be “Plants” and give each team member a green tag. Assign Team 2 to be “Nutrients” and give each team member a brown tag.
- Have Team 1 members stand close together, but not close enough that their arms touch. Collectively, they will represent a salt marsh. Tell them that each of them represents an individual marsh plant. They may sway back and forth with the wind and tides, but are not allowed to move their feet.
- Have Team 2 line up around the edges of the Team 1 “marsh.” Tell them that each of them represents nutrients that are moved through the marsh by water and wind. They might be one of many types of nutrients: detritus, sand, silt, waste products, mud, invertebrate animals, etc.
- Begin the game by having the Nutrients circulate among the Plants. Nutrients may hop on one foot or drag one foot as they pass through the marsh.
- If a Plant tags a Nutrient, the Nutrient is trapped and “filtered out of the water.” The Nutrient must surrender its tag to the Plant (which simulates plants taking up nutrients). If a Nutrient is not tagged by a Plant, it makes its way to the outside of the marsh (the ocean or tidal creek). That Nutrient may try to move safely again through the marsh during the next round of the game.
- Repeat the game several times.

Allow students to brainstorm different ways to configure Plants to capture more or fewer Nutrients. Discuss the results of each alteration of the game. (Possible modifications to the game: Students spaced closer together, students spaced farther apart, students strategically placed; plants may be “brittle” grass that cannot bend; nutrients may pass through quickly to represent a flood, etc.)

* Adapted from *WOW! The Wonders of Wetlands*, Environmental Concern Inc.

evaluate ➤ To evaluate what the students learned from the game, lead a discussion including some of these questions:

- Why are nutrients important to plants and animals?
- Why are wetlands important to the waters they border?
- Why is the filtering of water to remove sediments, nutrients and pollution essential to animals found in the salt marsh?
- What would happen if there were more plants?
- What would happen if there were fewer plants?
- What would happen if large portions of marsh grasses were removed?
- What would happen if you removed the grasses and filled in the marsh for some other purpose, such as homes or businesses?
- Is it important to plant and maintain plants everywhere, even on lawns and areas near pavement? Explain.