



## MARITIME CENTER EXPLORATION

THE UNIQUE PORT ROYAL SOUND  
AND ITS INHABITANTS

All Ages

PORT ROYAL SOUND FOUNDATION  
MARITIME CENTER TOUR

**"IN EVERY WALK WITH NATURE, ONE RECEIVES FAR MORE THAN HE SEEKS."**

*-John Muir*



## AMERICAN ALLIGATOR

You can estimate the size of an American Alligator by looking at its head. The measurement from the tip of his nose to the tip of his eyes in inches is its approximate measurement in feet.



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# DETAILS

## Program Overview

Learning local flora can help identify where you are in the maritime forest. This program helps teach kids about plant growth, speciation, working in groups and how to problem solve using a dichotomous key.

## Lesson Description

Using a dichotomous key students will identify local plants found in our maritime forest and salt marsh. The hour and half nature hike along our Mobley Tract Trail takes them through a maritime forest and a salt marsh and ends at an outdoor classroom where they will identify plant species they have collected along the way.

## What to Wear and Bring

Closed toed shoes that can get muddy (bag to put muddy shoes in), extra shoes, a reusable water bottle, hat, sunglasses, sunscreen, bugspray, pencil or pen and lunch/snack.

## Reservation and Program Information

Chris Kehrer,  
*Naturalist and Education Coordinator*  
ckehrer@portroyalsoundfoundation.org

Jessica Kochman,  
*Naturalist*  
jkochman@portroyalsoundfoundation.org

**Maritime Center**  
(843) 645 - 7774 ext. 203

## Differentiation of Instruction

Please inform us at the time of your reservation of any special needs, disabilities, allergies, or language barriers your students have so that we may better enhance your experience and make any changes necessary.

## Location

The Port Royal Sound Foundation Maritime Center is located at 310 Okatie Hwy, Okatie, SC, 29909, underneath the Lemon Island bridge.

If you are coming from Bluffton please exit to the right of the Lemon Island bridge and drive under the bridge. DO NOT TURN LEFT and cross highway.

If you are coming from Beaufort you will exit to the right, and when departing will drive under the bridge and exit on the opposite side. DO NOT TURN LEFT and cross highway.

## Facilities

Restrooms and water fountain are available at the Maritime Center. The maximum number of children per field trip is 60 kids. Per Beaufort County schoold district policy there will be a 10 to 1 chaperone ratio, chaperones and teachers are free of charge but we encourage as many adults as possible. We will provide a lunch space with trash and recycling cans but clean-up falls onto the school and schools will be charged if deemed necessary.



### Expectations for Student Conduct on Site

“In every walk with nature, one receives far more than he seeks.” - John Muir

In order for students to gain the most knowledge from their experience here at the Maritime Center, please remind them of the expectations for the trip and for their behavior on site. We suggest the following T.R.I.P. guidelines:

- T** Together. Stay with the group and with the adult in charge.
- R** Respect. Be considerate of your surroundings and the people around you. Only touch what you have been told you may touch.
- I** Interest. Show your interest by paying attention to the guide and listen well. Ask thoughtful questions.
- P** Polite. Use your best manners and thank your guide.



# SC STANDARDS & PERFORMANCE INDICATORS

## Grade One Earth Science Natural Resources

### Standards

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**1.E.4:** The student will demonstrate an understanding of the properties and uses of Earth's natural resources.

### Conceptual Understanding

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**1.E.4A.** Earth is made of different materials, including rocks, sand, soil, and water. An Earth material is a resource that comes from Earth. Earth materials can be classified by their observable properties.

**1.E.4B.** Conceptual Understanding: Natural resources are things that people use that come from Earth (such as land, water, air, and trees). Natural resources can be conserved.

### Performance Indicators: Students who demonstrate this understanding can

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**1.E.4A.1** Analyze and interpret data from observations and measurements to compare the properties of Earth materials (including rocks, soils, sand, and water).

**1.E.4A.2** Develop and use models (such as drawings or maps) to describe patterns in the distribution of land and water on Earth and classify bodies of water (including oceans, rivers and streams, lakes, and ponds).

**1.E.4A.3** Conduct structured investigations to answer questions about how the movement of water can change the shape of the land.

**1.E.4B.1** Obtain and communicate information to summarize how natural resources are used in different ways (such as soil and water to grow plants; rocks to make roads, walls, or buildings; or sand to make glass).

**1.E.4B.2** Obtain and communicate information to explain ways natural resources can be conserved (such as reducing trash through reuse, recycling, or replanting trees.).

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade One Life Science: Plants and Their Environments

### Standards

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**1.L.5:** The student will demonstrate an understanding of how the structures of plants help them survive and grow in their environments.

### Conceptual Understanding

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**1.L.5B.** Plants have basic needs that provide energy in order to grow and be healthy. Each plant has a specific environment where it can thrive. There are distinct environments in the world that support different types of plants. These environments can change slowly or quickly. Plants respond to these changes in different ways.

### Performance Indicators: Students who demonstrate this understanding can

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**1.L.5B.1** Conduct investigations to answer questions about what plants need to live and grow (including air, water, sunlight, minerals, and space).

**1.L.5B.2** Develop models to compare how the different characteristics of plants help them survive in distinct environments (including deserts, forests, and grasslands).

**1.L.5B.3** Interpret data from observations to describe how changes in the environment cause plants to respond in different ways (such as turning leaves toward the Sun, leaves changing color, leaves wilting, or trees shedding leaves.)

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Two Animals and Their Environments

### Standards

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**2.L.5:** The student will demonstrate an understanding of how the structures of animals help them survive and grow in their environments.

### Conceptual Understanding

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**2.L.5:** There are many different groups of animals. One way to group animals is by using their physical characteristics. Animals have basic needs that provide for energy, growth, reproduction, and protection. Animals have predictable characteristics at different stages of development.

**2.L.5B.** Conceptual Understanding: Animals (including humans) require air, water, food, and shelter to survive in environments where these needs can be met. There are distinct environments in the world that support different types of animals. Environments can change slowly or quickly. Animals respond to these changes in different ways.

### Performance Indicators: Students who demonstrate this understanding can

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**2.L.5A.1** Obtain and communicate information to classify animals (such as mammals, birds, amphibians, reptiles, fish, or insects) based on their physical characteristics.

**2.L.5A.2** Construct explanations for how structures (including structures for seeing, hearing, grasping, protection, locomotion, and obtaining and using resources) of different animals help them survive.

**2.L.5A.3** Construct explanations using observations and measurements of an animal as it grows and changes to describe the stages of development of the animal.

**2.L.5B.1** Obtain and communicate information to describe and compare how animals interact with other animals and plants in the environment.

**2.L.5B.2** Develop and use models to exemplify characteristics of animals that help them survive in distinct environments (such as salt and freshwater, deserts, forests, wetlands, or polar lands).

**2.L.5B.3** Analyze and interpret data from observations to describe how animals respond to changes in their environment (such as changes in food availability, water, & air)

**2.L.5B.4** Construct scientific arguments to explain how animals can change their environments (such as the shape of the land or the flow of water).

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Three Earth Science: Earth's Materials and Process

### Standards

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**3.E.4:** The student will demonstrate an understanding of the composition of Earth and the processes that shape features of Earth's surface.

### Conceptual Understanding

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**3.E.4A.** Earth is made of materials (including rocks, minerals, soil, and water) that have distinct properties. These materials provide resources for human activities.

**3.E.4B.** Earth's surface has changed over time by natural processes and by human activities. Humans can take steps to reduce the impact of these changes.

### Performance Indicators: Students who demonstrate this understanding can

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**3.E.4A.1** Analyze and interpret data from observations and measurements to describe and compare different Earth materials (including rocks, minerals, and soil) and classify each type of material based on its distinct physical properties.

**3.E.4A.2** Develop and use models to describe and classify the pattern distribution of land and water features on Earth.

**3.E.4A.3** Obtain and communicate information to exemplify how humans obtain, use, and protect renewable and nonrenewable Earth resources.

**3.E.4B.1** Develop and use models to describe the characteristics of Earth's continental landforms and classify landforms as volcanoes, mountains, valleys, canyons, plains, and islands.

**3.E.4B.2** Plan and conduct scientific investigations to determine how natural processes (including weathering, erosion, and gravity) shape Earth's surface.

**3.E.4B.3** Obtain and communicate information to explain how natural events (such as fires, landslides, earthquakes, volcanic eruptions, or floods) and human activities (such as farming, mining, or building) impact the environment.

**3.E.4B.4** Define problems caused by a natural event or human activity and design devices or solutions to reduce the impact on the environment.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Three Life Science: Environments and Habitats

### Standards

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**3.L.5:** The student will demonstrate an understanding of how the characteristics and changes in environments and habitats affect the diversity of organisms.

### Conceptual Understanding

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**3.L.5A** The characteristics of an environment (including physical characteristics, temperature, availability of resources, or the kinds and numbers of organisms present) influence the diversity of organisms that live there. Organisms can survive only in environments where their basic needs are met. All organisms need energy to live and grow. This energy is obtained

from food. The role an organism serves in an ecosystem can be described by the way in which it gets its energy.

**3.L.5B.** When the environment or habitat changes, some plants and animals survive and reproduce, some move to new locations, and some die. Fossils can be used to infer characteristics of environments from long ago.

### Performance Indicators: Students who demonstrate this understanding can

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**3.L.5A.1** Analyze and interpret data about the characteristics of environments (including salt and freshwater, deserts, grasslands, forests, rain forests, and polar lands) to describe how the environment supports a variety of organisms.

**3.L.5A.2** Develop and use a food chain model to classify organisms as producers, consumers, and decomposers and to describe how organisms obtain energy.

**3.L.5B.1** Obtain and communicate information to explain how changes in habitats (such as those that occur naturally or those caused by organisms) can be beneficial or harmful to the organisms that live there.

**3.L.5B.2** Develop and use models to explain how changes in a habitat cause plants and animals to respond in different ways (such as hibernating, migrating, responding to light, death, or extinction).

**3.L.5B.3** Construct scientific arguments using evidence from fossils of plants and animals that lived long ago to infer the characteristics of early environments.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Fourth Earth Science: Weather and Climate

### Standards

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**4.E.2:** The student will demonstrate an understanding of the water cycle and weather and climate patterns.

### Conceptual Understanding

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**4.E.2B.** Conceptual Understanding: Scientists record patterns in weather conditions across time and place to make predictions about what kind of weather might occur next. Climate describes the range of an area's typical weather conditions and the extent to which those conditions vary over long periods of time. Some weather conditions lead to severe weather phenomena that have different effects and safety concerns.

### Performance Indicators: Students who demonstrate this understanding can

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**5.E.3A.1** Analyze and interpret data from observations, measurements, and weather maps to describe patterns in local weather conditions (including temperature, precipitation, wind speed/direction, relative humidity, and cloud types) and predict changes in weather over time.

**4.E.2B.2** Obtain and communicate information about severe weather phenomena (including thunderstorms, hurricanes, and tornadoes) to explain steps humans can take to reduce the impact of severe weather phenomena.

**4.E.2B.3** Construct explanations about regional climate differences using data from the long term weather conditions of the region.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Four Life Science: Characteristics & Growth of Organisms

### Standards

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**4.L.5:** The student will demonstrate an understanding of how the structural characteristics and traits of plants and animals allow them to survive, grow, and reproduce.

### Conceptual Understanding

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**4.L.5B** Plants and animals have physical characteristics that allow them to receive information from the environment. Structural adaptations within groups of plants and animals allow them to better survive and reproduce.

### Performance Indicators: Students who demonstrate this understanding can

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**4.L.5B.1** Develop and use models to compare how humans and other animals use their senses and sensory organs to detect and respond to signals from the environment.

**4.L.5B.2** Construct explanations for how structural adaptations (such as the types of roots, stems, or leaves; color of flowers; or seed dispersal) allow plants to survive and reproduce.

**4.L.5B.3** Construct explanations for how structural adaptations (such as methods for defense, locomotion, obtaining resources, or camouflage) allow animals to survive in the environment.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Five Earth Science: Change in Landforms and Oceans

### Standards

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**5.E.3:** The student will demonstrate an understanding of how natural processes and human activities affect the features of Earth’s landforms and oceans.

### Conceptual Understanding

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**5.E.3A.** Some of the land on Earth is located above water and some is located below the oceans. The downhill movement of water as it flows to the ocean shapes the appearance of the land. There are patterns in the location and structure of landforms found on the continents and those found on the ocean floor.

**5.E.3B.** Earth’s oceans and landforms can be affected by natural processes in various ways. Humans cannot eliminate natural hazards caused by these processes but can take steps to reduce their impacts. Human activities can affect the land and oceans in positive and negative ways.

### Performance Indicators: Students who demonstrate this understanding can

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**5.E.3A.1** Construct explanations of how different landforms and surface features result from the location and movement of water on Earth’s surface through watersheds (drainage basins) and rivers.

**5.E.3A.2** Develop and use models to describe and compare the characteristics and locations of the landforms on continents with those on the ocean floor (including the continental shelf and slope, the mid-ocean ridge, the rift zone, the trench, and the abyssal plain).

**5.E.3B.1** Analyze and interpret data to describe and predict how natural processes (such as weathering, erosion, deposition, earthquakes, tsunamis, hurricanes, or storms) affect Earth’s surface.

**5.E.3B.2** Develop and use models to explain the effect of the movement of ocean water (including waves, currents, and tides) on the ocean shore zone (including beaches, barrier islands, estuaries, and inlets).

**5.E.3B.3** Construct scientific arguments to support claims that human activities (such as conservation efforts or pollution) affect the land and oceans of Earth.

**5.E.3B.4** Define problems caused by natural processes or human activities and test possible solutions to reduce the impact on landforms and the ocean shore zone.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Five Life Science: Interdependent Relationships in Ecosystems

### Standards

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**5.L.4:** The student will demonstrate an understanding of relationships among biotic and abiotic factors within terrestrial and aquatic ecosystems.

### Conceptual Understanding

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**5.L.4A.** Conceptual Understanding: Ecosystems are complex, interactive systems that include both the living components (biotic factors) and physical components (abiotic factors) of the environment. Ecosystems can be classified as either terrestrial (such as forests, wetlands, and grasslands) or aquatic (such as oceans, estuaries, lakes, and ponds).

**5.L.4B.** Conceptual Understanding: All organisms need energy to live and grow. Energy is obtained from food. The role an organism serves in an ecosystem can be described by the way in which it gets its energy. Energy is transferred within an ecosystem as organisms produce, consume, or decompose food. A healthy ecosystem is one in which a diversity of life forms are able to meet their needs in a relatively stable web of life.

### Performance Indicators: Students who demonstrate this understanding can

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**5.L.4A.1** Analyze and interpret data to summarize the abiotic factors (including quantity of light and water, range of temperature, salinity, and soil composition) of different terrestrial ecosystems and aquatic ecosystems.

**5.L.4A.2** Obtain and communicate information to describe and compare the biotic factors (including individual organisms, populations, and communities) of different terrestrial and aquatic ecosystems.

**5.L.4B.1** Analyze and interpret data to explain how organisms obtain their energy and classify an organisms as producers, consumers

(including herbivore, carnivore, and omnivore), or decomposers (such as fungi and bacteri

**5.L.4B.2** Develop and use models of food chains and food webs to describe the flow of energy in an ecosystem.

**5.L.4B.3** Construct explanations for how organisms interact with each other in an ecosystem (including predators and prey, and parasites and hosts).

**5.L.4B.4** Construct scientific arguments to explain how limiting factors (including food, water, space, and shelter) or a newly introduced organism can affect an ecosystem.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Six Earth Science: Earth's Weather and Climate

### Standards

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**6.E.2:** The student will demonstrate an understanding of the interactions within Earth's systems (flow of energy) that regulate weather and climate.

### Conceptual Understanding

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**6.E.2A.** Earth's atmosphere, an envelope of gases that surround the planet, makes conditions on Earth suitable for living things and influences weather. Water is always moving between the atmosphere (troposphere) and the surface of Earth as a result of the force of gravity and energy from the Sun. The Sun is the driving energy source for heating Earth and for the circulation of Earth's atmosphere.

**6.E.2B.** Conceptual Understanding: The complex patterns of changes and movement of water in the atmosphere determined by winds, landforms, ocean temperatures and currents, and convection are major determinants of local weather patterns and climate. Technology has enhanced our ability to measure and predict weather patterns.

### Performance Indicators: Students who demonstrate this understanding can

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**6.E.2A.1** Develop and use models to exemplify the properties of the atmosphere (including the gases, temperature and pressure differences, and altitude changes) and the relative scale in relation to the size of Earth.

**6.E.2A.2** Critically analyze scientific arguments based on evidence for and against how different phenomena (natural and human induced) may contribute to the composition of Earth's atmosphere.

**6.E.2A.3** Construct explanations of the processes involved in the cycling of water through Earth's systems (including transpiration, evaporation, condensation and crystallization, precipitation, and downhill flow of water on land).

**6.E.2B.1** Analyze and interpret data from weather conditions (including wind speed and direction, air temperature, humidity, cloud types, and air pressure), weather maps, satellites, and radar to predict local weather patterns and conditions.

**Performance Indicators:** Students who demonstrate this understanding can

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**6.E.2B.2** Develop and use models to explain how relationships between the movement and interactions of air masses, high and low pressure systems, and frontal boundaries result in weather conditions and storms (including thunderstorms, hurricanes and tornadoes).

**6.E.2B.3** Develop and use models to represent how solar energy and convection impact

Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).

**6.E.2B.4** Construct explanations for how climate is determined in an area (including latitude, elevation, shape of the land, distance from water, global winds, and ocean currents).

A close-up photograph of a person's hands holding a horseshoe crab. The crab is a mottled greenish-brown color with a prominent, dark, pointed spine extending from its back. The person holding it is wearing a grey and white patterned shirt. The background is slightly blurred, showing more of the person and a hint of a blue wall.

## HORSE SHOE CRAB

Horse Shoe Crabs are living fossils with some fossil records dating back several million years ago.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Six Life Science: Diversity of Life - Classification and Animals

### Standards

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**6.L4:** The student will demonstrate an understanding of how scientists classify organisms and how the structures, processes, behaviors, and adaptations of animals allow them to survive.

### Conceptual Understanding

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**6.L.4A.** Life is the quality that differentiates living things (organisms) from nonliving objects or those that were once living. All organisms are made up of cells, need food and water, a way to dispose of waste, and an environment in which they can live. Because of the diversity of life on Earth, scientists have developed a way to organize groups of organisms according to their characteristic traits, making it easier to identify and study them.

**6.L.4B.** The Animal Kingdom includes a diversity of organisms that have many characteristics in common. Classification of animals is based on structures that function in growth, reproduction, and survival. Animals have both structural and behavioral adaptations that increase the chances of reproduction and survival in changing environments.

### Performance Indicators: Students who demonstrate this understanding can

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**6.L.4A.1** Obtain and communicate information to support claims that living organisms (1) obtain and use resources for energy, (2) respond to stimuli, (3) reproduce, and (4) grow and develop.

**6.L.4A.2** Develop and use models to classify organisms based on the current hierarchical taxonomic structure (including the kingdoms of protists, plants, fungi, and animals).

**6.L.4B.1** Analyze and interpret data related to the diversity of animals to support claims that all animals (vertebrates and invertebrates) share common characteristics.

**6.L.4B.2** Obtain and communicate information to explain how the structural adaptations

and processes of animals allow for defense, movement, or resource obtainment.

**6.L.4B.3** Construct explanations of how animal responses (including hibernation, migration, grouping, and courtship) to environmental stimuli allow them to survive and reproduce.

**6.L.4B.4** Obtain and communicate information to compare and classify innate and learned behaviors in animals.

**6.L.4B.5** Analyze and interpret data to compare how endothermic and ectothermic animals respond to changes in environmental temperature.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Seven Life Science: Organization in Living Systems

### Standards

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**7.L.3:** The student will demonstrate an understanding of how the levels of organization within organisms support the essential functions of life.

### Conceptual Understanding

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**7.L.3A.** Cells are the most basic unit of any living organism. All organisms are composed of one (unicellular) or many cells (multicellular) and require food and water, a way to dispose of waste, and an environment in which they can live in order to survive. Through the use of technology, scientists have discovered special structures within individual cells that have specific functions that allow the cell to grow, survive, and reproduce. Bacteria are one-celled

organisms found almost everywhere and can be both helpful and harmful. They can be simply classified by their size, shape and whether or not they can move.

**7.L.3B.** Multicellular organisms (including humans) are complex systems with specialized cells that perform specific functions. Organs and organ systems are composed of cells that function to serve the needs of cells which in turn serve the needs of the organism.

### Performance Indicators: Students who demonstrate this understanding can

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**L.3A.1** Obtain and communicate information to support claims that (1) organisms are made of one or more cells, (2) cells are the basic unit of structure and function of organisms, and (3) cells come only from existing cells.

**7.L.3A.2** Analyze and interpret data from observations to describe different types of cells and classify cells as plant, animal, protist, or bacteria.

**7.L.3A.3** Develop and use models to explain how the relevant structures within cells (including cytoplasm, cell membrane, cell wall, nucleus, mitochondria, chloroplasts, lysosomes, and vacuoles) function to support the life of plant, animal, and bacterial cells.

**7.L.3A.4** Construct scientific arguments to support claims that bacteria are both helpful and harmful to other organisms and the environment.

**7.L.3B.1** Develop and use models to explain how the structural organizations within multicellular organisms function to serve the needs of the organism.

**7.L.3B.2** Construct explanations for how systems in the human body (including circulatory, respiratory, digestive, excretory, nervous, and musculoskeletal systems) work together to support the essential life functions of the body.

# SC STANDARDS & PERFORMANCE INDICATORS

## Grade Seven Ecology: Interactions of Living Systems and The Environment

### Standards

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**7.EC.5:** The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environments.

### Conceptual Understanding

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**7.EC.5A** In all ecosystems, organisms and populations of organisms depend on their environmental interactions with other living things (biotic factors) and with physical (abiotic) factors (such as light, temperature, water, or soil quality). Disruptions to any component of an ecosystem can lead to shifts in its diversity and abundance of populations.

**7.EC.5B.** Organisms in all ecosystems interact with and depend upon each other. Organisms with similar needs compete for limited resources. Food webs and energy pyramids are models that demonstrate how energy is transferred within an ecosystem.

### Performance Indicators: Students who demonstrate this understanding can

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**7.EC.5A.1** Develop and use models to describe the characteristics of the levels of organization within ecosystems (including species, populations, communities, ecosystems, and biomes).

**7.EC.5A.2** Construct explanations of how soil quality (including composition, texture, particle size, permeability, and pH) affects the characteristics of an ecosystem using evidence from soil profiles.

**7.EC.5A.3** Analyze and interpret data to predict changes in the number of organisms within a population when certain changes occur to the physical environment (such as changes due to natural hazards or limiting factors).

**7.EC.5B.1** Develop and use models to explain how organisms interact in a competitive or mutually beneficial relationship for food, shelter, or space (including competition, mutualism, commensalism, parasitism, and predator-prey relationships).

**7.EC.5B.2** Develop and use models (food webs and energy pyramids) to exemplify how the transfer of energy in an ecosystem supports the concept that energy is conserved.

**7.EC.5B.3** Analyze and interpret data to predict how changes in the number of organisms of one species affects the balance of an ecosystem.

**7.EC.5B.4** Define problems caused by the introduction of a new species in an environment and design devices or solutions to minimize the impact(s) to the balance of an ecosystem.

# TEACHER AND STUDENT RESOURCES



[Horseshoe Crab Fun  
G 3 - 8 NWF Lesson](#)  
[Horseshoe Crabs & Red Knots](#)



[Life Cycle of Oysters](#)



[How do adaptations  
enable animals to survive  
in harsh environments?](#)  
[Links to careers  
in wildlife management.](#)



["What Makes Port Royal  
Sound Unique?"](#)  
[Low Country Institute Production](#)



[South Carolina Aquarium Website,  
Charleston, SC](#)



[Careers in wildlife management:  
Job Profiles and Videos](#)



[How do swamp animals  
survive drought?](#)  
[Explain why alligators are an  
important part of the swamp  
community. Interpret graphs.](#)



[Nature & Art - Careers  
as an artist & photographer](#)



[Hilton Head Island Watershed Map](#)



[Port Royal Sound Map](#)



[Explore the concept of  
sustainability through first  
person narratives from  
various time periods.](#)



[Students conduct a simulation  
to explore the evolution of fishing  
and the effects of changing  
technology on fish populations.](#)



[Watershed Model SC  
Lab Exercise](#)



[Anatomy of a Blue Crab](#)

**Suggested stories, poetry & video for pre or post-visit enrichment:****Untamed**

Untamed a story by Will Harlan Grades 7 + Carol Ruckdeschel is the wildest woman in America. She wrestles alligators, eats roadkill, rides horses bareback, and lives in a ramshackle cabin that she built by hand in an island wilderness. A combination of Henry David Thoreau and Jane Goodall, Carol is a self-taught scientist who has become a tireless defender of sea turtles on Cumberland Island, a national park off the coast of Georgia.

**Flush**

Middle school novel by Carl Hiaasen Noah's dad is sure that the owner of the Coral Queen casino boat is flushing raw sewage into the harbor – which has made taking a dip at the local beach like swimming in a toilet. He can't prove it though, and so he decides that sinking the boat will make an effective statement.

**All the Water in the World**

Poetry by George Ella Lyon, Katherine Tillotson (Illustrator)  
Online Teacher's Guide

**Oceana: Our Endangered Oceans and What We Can Do to Save Them**

Ted Danson Video Summary.

## DIAMONDBACK TERRAPIN

The Diamondback Terrapin is the only turtle you can find year round in a salt marsh.



# VOCABULARY

**Algae:** marine or freshwater plants that are single-celled, colonial, or multi-celled, with chlorophyll but no true roots, stems, leaves, flowers, or seeds. Algae is at the base of most aquatic food chains.

**Aquifer:** an underground supply of water, usually found in permeable layers of rock

**Barrier Island:** a long, narrow body of sand and other loose sediments separated from the mainland by a sound, and from the other islands by inlets at both ends. The sand is transported by waves, currents, and winds.

**Channel:** in an estuary, the area never completely drained at low tide, where water of varying degrees of salinity flows back and forth

**Community:** group of interdependent organisms inhabiting the same region

**Detritus:** newly dead or decaying organic matter coated with bacteria. Provides food for many organisms in the salt marsh and estuary

**Ecology:** the study of interactions and interrelationships of organisms and their environment

**Ecosystem:** a community of interrelated organisms and their environment

**Erosion:** the wearing away of soil, sand, or rock by the influence of water, wind, and other forces of nature.

**Estuary:** a semi-enclosed body of water where river meets the sea and fresh water and saltwater mix

**Filter-feeding:** a way that some animals sort out and eat very small plants and animals from the water

**Food chain:** a sequence of organisms in which each is food for the next

**Food web:** all the feeding relations of a community taken together; includes production, consumption, decomposition, and the flow of energy

**Habitat:** the place where an organism lives and finds its food, shelter, water and space.

**Longshore Current:** a river-like current that flows alongside the ocean side of a barrier island. Longshore currents bring sand from adjacent barrier islands into the mouth of the inlet and tidal currents move the sand into the sound or ocean.

**Macroinvertebrates:** large organisms without backbones, such as worms, snails, and insects

**Maritime Forest:** when barrier islands are wide enough, these specialized woodlands can develop. They are composed of salt tolerant plants, dominated by live oak, yaupon and American holly, and red cedar

**Migration:** to fly (or travel) to another place in search of warmer climate and steady food supply

**Natural resources:** organisms or materials of the natural world that humans value

**Nonpoint Source Pollution:** toxic chemicals that enter a body of water from many sources

**Nutrients:** organic or inorganic materials that living things require for growth and repair

**Plankton:** small or microscopic organisms that float or drift with the current. May be plants (phytoplankton) or animals (zooplankton)

**Point Source Pollution:** pollution from a single, identifiable source

**Pollution:** a toxic or harmful substance that has been introduced into the natural environment

**Population:** a group of organisms of the same species living in the same area

**Salt Marsh:** coastal wetland flooded periodically by tidal, brackish water, with plants adapted to salty soils. It is where grasses are anchored to the muddy soil creating a safe-haven for many estuarine animals.

**Spartina alterniflora:** Also known as Spartina Grass or Cord Grass. The dominant plant of SC coastal salt marshes.

**Sediments:** particles deposited by wind and water

**Silt:** a fine-grained sediment found in the sound and salt marsh

**Tides:** the alternate rising and falling of the sea, usually twice in each day at a particular place, due to the attraction of the moon and sun.

**Turbulence:** how much churning and movement there is in the water. It is related to 'turbidity' or the cloudiness in the water, which is measured with a secchi disk

**Watershed:** area of land drained by a river or river system.

**Wetlands:** areas flooded periodically or constantly that support plants adapted to water saturated soil

# PRE-VISIT EXPERIENCE: BEFORE MARITIME CENTER TOUR

## Introduction to Port Royal Sound

This teacher-led experience should be completed BEFORE the students attend the on-site experience at the Maritime Center and will greatly enhance the learning students accomplish on-site.

**Time to Complete:** 50 minutes (per lesson)

### Lesson Description

Students will meet Port Royal Sound as a unique natural environment and as our shared local watershed. The Low Country Institute provides a PowerPoint presentation with a portrayal of land, marshes, water, and life of Port Royal Sound. It can be adapted to any level. During and after watching the presentation, students complete the labeling of a map of this area as they consider the special connections between life, land and water.

### Materials for the Pre-Visit Experience:

["What Makes Port Royal Sound Unique?"](#)

[Low Country Institute Production](#)

[Port Royal Sound Map](#)

### Teacher Preparation

Watch the presentation without the students first. Decide on the focus, format and time frame that best fits your class.

Collect and provide local maps, atlases, road maps etc. - on paper as well and links

to map websites.

Confirm access to a reliable computer projector or enough online devices for students to work alone or in groups.

Provide: copies of PRS Map, linked above for all, as well as markers, pens, pencils, and many maps, from world to local, to share and compare.

### Procedures

Students watch the PowerPoint presentation, pausing to allow for discussion and writing.

Students add labels for places they know to their maps, including roads, bridges & parks.

Support their discussion and understanding of why and how Port Royal Sound is unique.

Model and then let students practice making evidence based statements about watersheds in general and Port Royal Sound in particular.

### Cuminating Assessments

1. What and where is Port Royal Sound (PRS)? What communities surround it?
2. Identify the location of PRS on world and national maps. Point out on a local map locations of important places in PRS watershed.
3. What special characteristics identify this unique environment?
4. How do living things, including humans, rely on our watershed to survive?

## Outcomes / Extensions

Students share their maps. They can make large, poster size maps and choose the best ones to post in the classroom or hallway.

Students edit local maps with drainage divide lines and arrows showing the paths run-off takes through the watershed where they live.

[Hilton Head Island Watershed Map](#)

Students can find maps of places they want to visit and label them with travel plans.

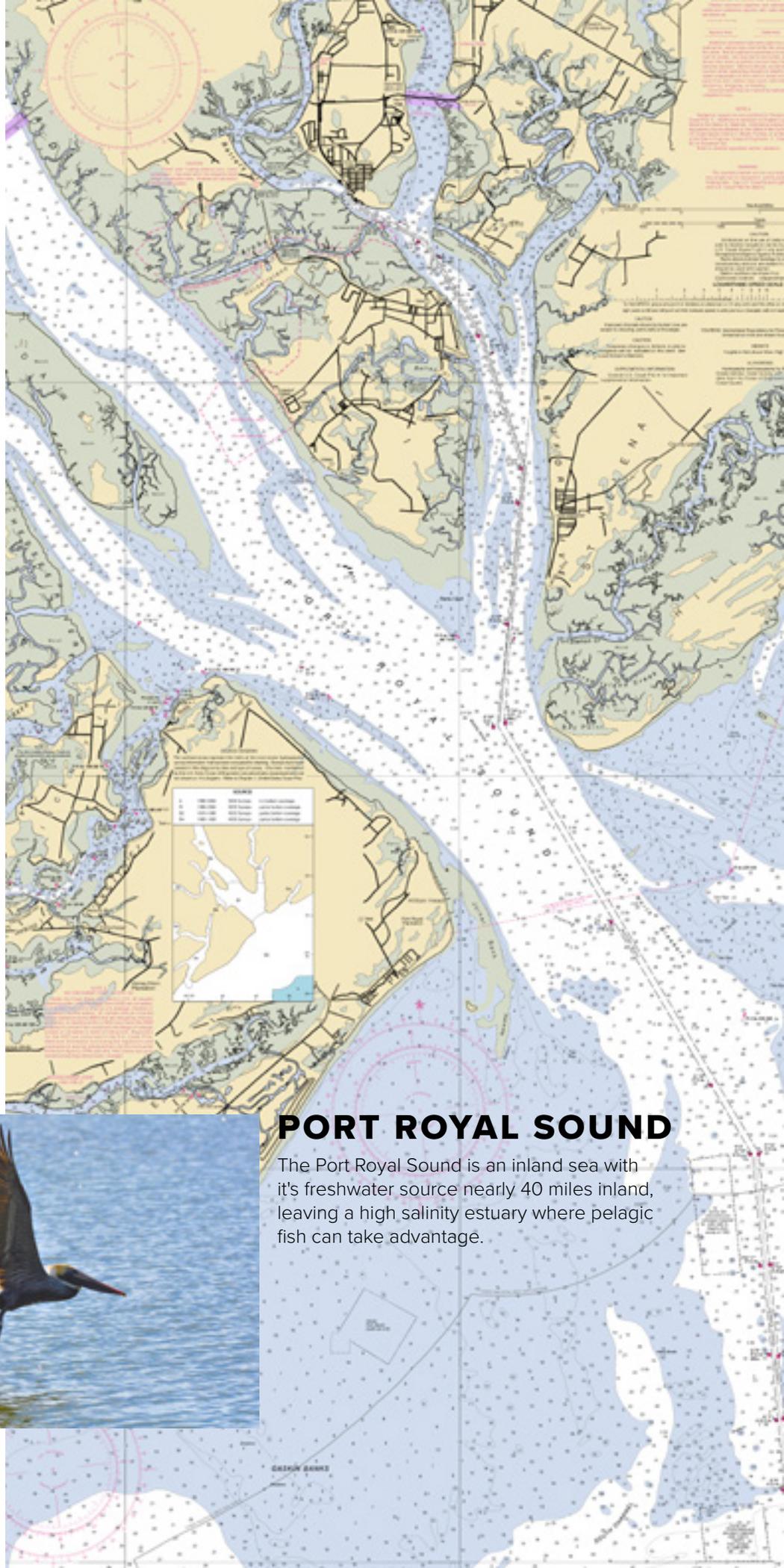
Challenge students to observe and keep track of water levels in streams and ponds near where they live, how they fluctuate and why. Have students report back to the class what they observe.

Research and participate in the River of Words project to connect their talents in art, poetry and photography with personal experiences in nature.



## PORT ROYAL SOUND

The Port Royal Sound is an inland sea with its freshwater source nearly 40 miles inland, leaving a high salinity estuary where pelagic fish can take advantage.



# ONSITE EXPERIENCE

## MARITIME CENTER TOUR

### Objectives

Explore the exhibits at Port Royal Sound Foundation Maritime Center (MC)

Discover and share the unique qualities found in and around Port Royal Sound (PRS.)

Evaluate our position as humans living in this special ecosystem.

### Focus Questions

How is Port Royal Sound (PRS) unique?

In what ways does PRS affect the history and culture of the people who live here?

Which animal exhibit interests you most? Why? How do these species fit in?

What are some of the special relationships people have with certain animals on display?

What would it take to manage and maintain a facility like the MC? What careers are represented here?

### Materials and Set-up

- Clipboards, notebooks, pencils,
- Laser Pointer (Tour Guide/Teacher Only)
- Groups of students to work together & report findings

### Procedures

To enable the students to focus their attention and interest, we suggest the following guidelines to direct the group's experience in the MC.

Determine the time available for the tour and calculate the time for each of the three main rooms.

**“The Jigsaw Puzzle Method”** Create small groups that will be assigned one (or two) stations in each room. Each group is tasked with answering assigned questions and recording observations at its station(s). Groups may either rotate to other stations or “specialize” in one topic. The whole class reconvenes afterwards, and each group reports its findings to the others.

### Suggested Stations and Specific Content Questions – Room by Room

#### BATEAU ROOM

##### Wall Map

1. Locate the PRSF MC and important landmarks like your house, school, major roads & bridges, creeks, towns, islands, parks, military bases, etc.
2. What is the map's scale?
3. How does the amount of water compare to the amount of land?

##### Sharks

1. What is the name and how long was the largest shark?
2. How many teeth could a shark have in its lifetime?
3. How many species of shark are found in PRS?

### Marine Animal Sounds

1. Why & how do these animals make their sounds? What are they trying to communicate?
2. Compare the sounds as you listen. Are they made by fish? Mammals? Invertebrates?
3. How and where were these recordings made? By whom?

### Windows on PRS & Walls Displays

1. Is the tide high or low? Is it coming or going? How can you tell?
2. How deep is PRS? Why is it always changing?
3. What living things can you see and identify through the windows?
4. What special natural ecosystems can you see?

### The Fish Tank

1. How many different fish are in the Fish Tank?
2. How are they shaped and colored?
3. What local organization donated the fish?

### Carolina Snowball

1. What & who was Snowball? How was she important to the people of Beaufort County?
2. What happened to Snowball? How did her life affect our laws and attitudes?
3. What kind of dolphin lives in PRS?

### Hanging Ceiling Animals

1. What animals are hanging from the ceiling?
2. How does each one make its living in PRS?
3. How do people affect these species?

## OYSTER ROOM

### Crabs

1. What is the smallest size Blue Crab that can be kept when fishing?
2. Where does a crab give birth?
3. How are Blue Crabs harvested?

### Oysters

1. How many oyster factories were there once around Port Royal Sound?
2. How are oysters harvested?
3. What were the gray concrete benches used for?

### Shrimp

1. What are three shrimp species that live in PRS?
2. Does a shrimp give birth in the ocean or the in the sound?
3. What is the large net hanging from the ceiling?

## TANK ROOM

**Before moving to the Tank Viewing Room, the field trip director gathers students to remind them of special behavior required. With SAFETY of the animals and people in mind:**

1. No running.
2. No touching without direct attention and permission from tour director.
3. Keep hands out of water and tanks.
4. Keep voices low. Listen for directions from the tour director and teachers.
5. Wash hands, and rinse well before and after touching.

### The Chechessee River/Protection of the PRSF

1. How many turtle nests were on Hilton Head Island last season? Why do we protect turtle nests?
2. What dangers do plastic bags in the water present to marine life?
3. How long does it take for a plastic bottle to decompose? Aluminum can? Styrofoam? Fishing line? What can we do to reduce this trash in our oceans and waterways?
4. What local publication highlights student art and poetry? Why is this kind of booklet important?

### Live Animal Displays

Eastern Diamondback Terrapins  
Alligator  
Side Tanks & Wall Posters  
Open Viewing Tank

Tour director will call the whole group to cluster around the large Viewing Tank to point out and describe resident fish and other animals, such as hermit crabs, whelks, pufferfish, bass, menhaden, stingray, horseshoe crab, blue and stone crabs.

Animals to touch with director's help: Horseshoe Crab, Whelk, Hermit Crab

### Tank Room Content Questions

1. How many different species of fish and other animals did you see?
2. What was the feel of the Whelk- muscle?
3. Describe adaptations these animals have to help them hide, eat and protect themselves.
4. For what does a Horseshoe Crab use its tail and is it dangerous to you?
5. How do humans use Horseshoe Crab blood?

6. Why are Horseshoe Crabs important to Red Knot Sandpipers?
7. Why does a hermit crab move from shell to shell?
8. Where do Diamondback Terrapins live? What do they eat?
9. Where do alligators live?
10. Are alligators dangerous to humans? Why or why not?
11. How old is our alligator? What does it eat?

### Culminating Assessment

- Refer to Focus Questions from the start of the tour:
- How is Port Royal Sound (PRS) unique?
- In what ways does PRS affect the history and culture of the people who live here?
- Which animal exhibit interests you most? Why? How do these species fit in?
- Describe some of the special relationships people have with certain animals on display?
- What would it take to manage and maintain a facility like the MC? What careers are represented here?

Ask students (group by group?) to share discoveries, favorites, how what they saw and learned might affect them in the future. Invite them to return with parents, families and friends. Challenge them to help keep Port Royal Sound healthy and clean.



# POST-VISIT EXPERIENCE AFTER MARITIME CENTER TOUR

Teacher-Led Experience to be completed  
In classroom after pRSF experience

## WATERSHED MODEL SOUTH CAROLINA LAB EXERCISE

**Time to Complete:** 50 minutes (per class)

### Lesson Description

Students create a model of a watershed that resembles the state of South Carolina. They use a spray bottle of water to represent rain and markers to represent buildings. They locate communities, factories, farms, resorts and their own homes within the model. They analyze how the water flows through the model and the effect of human behavior on the watershed, including the aquifer, surface water, lakes, streams and estuaries.

### Teacher Prep, Materials and Resources

Gather materials for each group of students:

- High-sided tray or long high-sided pan
- Roll of aluminum foil
- Newspaper sections
- Markers: permanent & water-color, pens, pencils
- Spray bottle of water
- Food coloring, Packets of Condiments like ketchup or mustard etc. Pepper shaker.
- Sinks, water, soap for clean-up

Copy exercise directions, linked below & in "Student and Teacher Resources", enough for all. Place one copy for each group into transparent, waterproof sleeve to protect directions during lab.

Gather maps of SC that show elevation, as well as photos and diagrams of watersheds & watershed features, such as river, streams, drainage divides, ridges, canyons, lakes, wetlands, estuaries etc will also be advantageous.

[Watershed Model SC Lab Exercise](#)

### Culminating Assessments

1. How does the watershed model work? What does it show? Compare and contrast your model to a real watershed in nature.
2. How does your model demonstrate point source pollution and non point source pollution?
3. Choose a water problem experienced by your community. Describe the problem from the point of view of each member of the community, i.e. farmer, business owner, factory worker, resort owner, tourist etc.
4. What is the source of our local drinking water? What water problems are occurring in here in our county? What about other communities and around the world?
5. Propose some solutions to these water problems, how things would improve if they were solved, and what it would take to implement them?

## SOLVING AN ENVIRONMENTAL DISASTER

### Lesson Description

Students will be given an environmental disaster scenario which they will work together in groups to solve the problem. Each group will have different aspects of the situation to solve. How do you contain the disaster? How do you fix the disaster? How do you protect wildlife? How do you monitor short/long term effects?

### Teacher Prep

Divide class into teams to analyze different aspects of disaster.

Allow teams to research actual scenarios such as BP oil spill.

Teams should research techniques used in various accounts to create their own protocol.

[Effective Disaster Management Strategies in the 21st Century](#)

### Culminating Assessments

Disaster example: An oil/chemical tanker spills into the Port Royal Sound.

How do you contain spill? Consider tides, buffers, and unique techniques.

How do you clean up disaster?  
Physical labor, machines, innovative techniques  
How do you protect wildlife?  
Shorebirds, fish, marine mammals

How do you monitor short term effects?  
Monitor marsh buffers, Monitor filter feeders such as shellfish.

How do you monitor long term effects?  
Monitor aquatic sentinals that may store toxic chemicals such as atlantic bottlenose dolphins.

### Extension Ideas

Careers in Marine Science and Museums

Port Royal Sound: The Past, Present & Future

Managing the Viewing Tank





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**PORT ROYAL SOUND FOUNDATION**

310 Okatie Hwy, Okatie, SC 29909

[www.portroyalsoundfoundation.org](http://www.portroyalsoundfoundation.org)

(843) 645-7774

[ckehrer@portroyalsoundfoundation.org](mailto:ckehrer@portroyalsoundfoundation.org)

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