



Estuaries are important habitats

Note that the activities associated with the Mobile Bay Watershed pavilion will rotate. This lesson plan describes a lesson that is self-contained within the pavilion, but that can be augmented and enhanced by teacher-student interaction. You can find National Science Education Standards and Alabama Course of Study Standards addressed through this activity at disl.org.

Objectives: Participants will learn what an estuary is and use an interactive water feature map to visualize the concept. Participants will learn about the importance of estuaries as nursery grounds and about the different habitats that support this incredible productivity.

Time needed: 10-15 minutes

Target age: Appropriate for General Public; can be adjusted for different ages

Materials needed: the Watershed Pavilion at the Dauphin Island Sea Lab, Estuarium

Description: Estuaries are places where freshwater from rivers meets and mixes with saltwater from the sea. They are nursery grounds for many animals. Many of the animals we harvest as seafood need estuaries for survival. Salt marshes and oyster reefs, which grow in estuaries, are important habitats responsible for the great productivity of estuaries.

Listen to the message on the audio kiosk within the watershed pavilion. The message includes a definition for *estuary* and examples of the roles estuaries serve - how they are important to nature and to humans. It will conclude with an explanation of an activity to try in the Mobile Bay Watershed basin and along the boardwalk. First, students are asked to examine the map to find Mobile Bay, where the rivers meet and mix with saltwater from the Gulf of Mexico. For this activity, the watershed basin will contain clumps of oyster shells, which represent an oyster reef. Oysters stick to hard things, including other oysters. These oyster clumps are like tiny apartment complexes, home to many different kinds of animals, including bryozoans, barnacles, tube-building worms, tiny crustaceans called amphipods, mud crabs, fish, and others. Students will be directed to examine the shells and look for evidence of small animals living on or among them. Under an adult's supervision, and with permission, they may carefully lift the shells out of the water to examine them while holding them above the basin and then return them to the water. *Note that students may be cut or scraped by the shells or encrusting organisms if they are not careful, and that the animals living on the oyster shells may be killed if they are left out of water too long, and the adults supervising students may judge it better not to instruct them to lift them out of the water.* Discuss how these animals serve as habitat, and the advantages of living in this type of habitat. After making observations about the oyster reefs, students can take a walk along the Living Marsh Boardwalk and look for evidence of the diversity of life supported by the salt marsh. As students look for evidence of this productivity, as age appropriate, adults may lead them to draw connections between the estuary, the habitats within the estuary, the wider ocean, and humans.

Extensions: Discussion might include oyster reef restoration, how it is done, by whom, and to what benefit. Discussion might include the ways oysters contribute to our local economy. Discussion might include non-point source pollution and how it affects oyster reef communities and the humans who benefit from them. Discussion might include natural impacts, such as those caused by tropical storms or droughts, to oyster reefs.



After you have visited the Watershed Pavilion, please fill out a short survey to help us improve the exhibit. The survey can be found using the above QR code or in hard copy at the Estuarium admissions desk. Thank you.

National Science Education Standards:

K-4

Science as Inquiry – Abilities necessary to do scientific inquiry

Life Science – Organisms and environments

Science in Personal and Social Perspectives – Types of resources

5-8

Science as Inquiry – Abilities necessary to do scientific inquiry

Life Science – Populations and ecosystems

Science in Personal and Social Perspectives – Populations, resources, and environments; Natural resources;

9-12

Science as Inquiry – Abilities necessary to do scientific inquiry

Life Science – Interdependence of organisms

Alabama Courses of Study:

Grade 1

4.) Describe survival traits of living things, including color, shape, size, texture, and covering.

- Classifying plants and animals according to physical traits

Examples: animals - six legs on insects; plants - green leaves on evergreen trees

- Identifying developmental stages of plants and animals

Examples: plants - seed developing into seedling, seedling developing into tree; animals - piglet developing into pig, kid developing into goat

- Describing a variety of habitats and natural homes of animals

Grade 3

See Extensions.

Grade 4

7.) Describe geological features of Earth, including bodies of water, beaches, ocean ridges, continental shelves, plateaus, faults, canyons, sand dunes, and ice caps.

Grade 5

9.) Describe the relationship of populations within a habitat to various communities and ecosystems.

- Describing the relationship between food chains and food webs
- Describing symbiotic relationships

Grades 9-12

Aquascience Elective

1.) Differentiate among freshwater, brackish water, and saltwater ecosystems.

- Identifying chemical, geological, and physical features of aquatic ecosystems

Biology

12.) Describe protective adaptations of animals, including mimicry, camouflage, beak type, migration, and hibernation.

- Identifying ways in which the theory of evolution explains the nature and diversity of organisms
- Describing natural selection, survival of the fittest, geographic isolation, and fossil record

Environmental Elective

7.) Identify reasons coastal waters serve as an important resource.

Examples: economic stability; biodiversity; recreation

- Classifying biota of estuaries, marshes, tidal pools, wetlands, beaches, and inlets
- Comparing components of marine water to components of inland bodies of water

Geology elective

9.) Describe the movement and storage of water in terms of watersheds, rainfall, surface runoff, aquifers, and surface water reservoirs.

- Identifying major regional and national watersheds

Marine Biology elective

2.) Differentiate among freshwater, brackish water, and saltwater.

6.) Describe components of major marine ecosystems, including estuaries, coral reefs, benthic communities, and open-ocean communities.

Extensions Standards:

NSES:

K-4

Science and Technology – Understandings about science and technology

Science in Personal and Social Perspectives – Characteristics and changes in populations; Changes in environments; Science and technology in local challenges

History and Nature of Science – Science as a human endeavor

5-8

Science and Technology – Understandings about science and technology

Science in Personal and Social Perspectives – Science and technology in local, national, and global challenges

History and Nature of Science – Science as a human endeavor

9-12

Science in Personal and Social Perspectives – Personal and community health; Natural hazards;

Risks and benefits; Science and technology in society

History and Nature of Science – Science as a human endeavor

AL COS:

Grade 1

9.) Identify ways to conserve Earth's resources.

Example: turning off lights and water when not in use

Grade 3

13.) Describe ways to sustain natural resources, including recycling, reusing, conserving, and protecting the environment.

- Recognizing the impact of society on human health and environmental conditions

Grades 9-12

Biology

15.) Identify biomes based on environmental factors and native organisms.

Example: tundra - permafrost, low humidity, lichens, polar bears

Environmental Elective

(extension) 9.) Describe land-use practices that promote sustainability and economic growth.

Examples: no-till planting; crop rotation

- Defining various types and sources of waste and their impact on the soil

Examples: types - biodegradable, nonbiodegradable, organic, radioactive, nonradioactive; sources - pesticides, herbicides

- Identifying ways to manage waste, including composting, recycling, reusing, and reclaiming

12.) Identify positive and negative effects of human activities on biodiversity.

- Identifying endangered and extinct species locally, regionally, and worldwide

- Identifying causes for species extinction locally, regionally, and worldwide

Geology elective

14.) Explain the interaction of the continuous processes of waves, tides, and winds with the coastal environment.

- Identifying the impact of periodic weather phenomena on coastal regions

Examples: hurricanes destroying sand dunes; El Niño or La Niña redefining shorelines

- Identifying the positive and negative impact of humans on coastal regions

Examples: positive - shoreline protection; negative - buildings replacing protective dunes and barriers

Marine Biology elective

5.) Discuss physical and chemical properties of saltwater.

Examples: physical - turbidity, temperature, density; chemical - salinity, pH, dissolved gases

11.) Describe positive and negative effects of human influence on marine environments.

Examples: positive - reef restoration, protection of endangered species; negative - pollution, overfishing