Barrier Islands and Sea-level Rise

Make a Clay Model of a Barrier Island

Overview

Students can refer to the LEARN page of the module as they construct a clay model of a barrier island and do the three different activities.

Grade Level

6th - 12th

Materials

All groups:
- clear plastic container
- measuring cup
- fine sand
- modeling clay
- butter knife and spoon
- photo of Assateague Island (provided)

Group 2:
- hair dryer or fan

Group 3:
- super-saturated saltwater
- sponge
- dark blue food coloring

Time Required

1.5 hours

National Park Service
www.nps.gov

Integration & Application Network (IAN)
University of Maryland Center for Environmental Science
www.ian.umces.edu

Objectives

Students will learn how these three processes—overwash, erosion, and saltwater intrusion—can change the natural features of a barrier island when intensified by sea-level rise.

National Science Education Standards

Standard B: Physical Science
- Motions and forces
- Interactions of energy and matter

Standard C: Life Science
- Interdependence of organisms
- Matter, energy, and organization in living systems
- Behavior of organisms

Standard D: Earth and Space Science
- Energy in the Earth system

Standard E: Science and Technology
- Understandings about science and technology

Procedure

1. Divide the class into groups of three or four students. One third of the class will do the overwash activity, the next third will do the erosion activity, and the last third will do the saltwater intrusion activity.

2. Have each group build their clay model of a a barrier island by placing clay on top of the photo and molding the clay to the approximate shape of the island.

3. Have students follow the directions on the next page for the their group's assigned activity.

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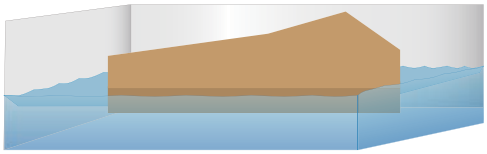
Student Worksheet

Procedure

Group A: Overwash

1. Place the clay model in the container and put a fine layer of sand on top of it.
2. Fill the container with water so that it only starts to rise up the sides of the model.
3. Use a spoon or your hand to push water toward one side of the model, so the water moves across the model. Note what changes occur.



Group B: Erosion

1. Place the clay model in the container and put a fine layer of sand on top of it.
2. Fill the container with water so that it only starts to rise up the sides of the model.
3. Using a hair dryer or a fan on low, blow the water across the island model. Note the changes as the water washes over the model.

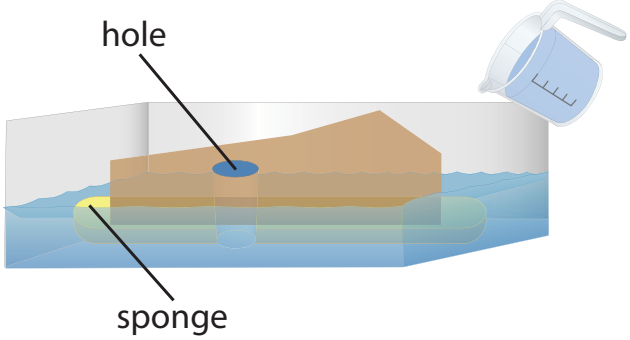
Group C: Saltwater Intrusion

1. After your model is constructed, make a hole to represent a freshwater pond through the model from top to bottom.

2. Place the model in the container on top of a sponge and add water to the container.

3. Add two drops of dark blue food coloring to only the water inside the hole of the model.

4. Pour a super-saturated saltwater solution to the side of the container. Notice what happens to the level of the dark blue water in the hole.



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Teacher Discussion Questions

Discussion

Have the class separate and form new groups with one person from each activity grouped together. This will allow each person to share the procedure and results from their original group. Each group should make a comparative analysis of the differences and answer the following questions together to present to the class.

Overwash:

In what ways did the sand move across the barrier island model and change the two edges (shores) of the island? Describe and illustrate the change.
What causes overwash to occur?
What impacts can overwash have on the ultimate shape of the island?
What impacts could overwash have on the piping plovers that live on the island?
Overwash can cause a breach in the island. What is a breach?

Erosion:

How did the sand on your barrier island model move from one place to another? Describe and illustrate the changes.
What causes erosion to occur?
How would this movement of sand impact the beach habitat on a barrier island?
How does longshore transport affect erosion patterns?
Does erosion impact any other habitats on the island? Describe the impact.

Saltwater Intrusion:

How did the water level in the blue-colored freshwater pond change after adding saltwater to the model?
What impact would this have on the freshwater resources of the island?
How would saltwater intrusion affect the wild horses that live on the island?

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