



Beach House Gone [MC]

Grades: K-2

Time: 45 minutes to 1 hour

Goals: To understand what role beach development can play in erosion of a barrier island beach.

Objectives:

Students will be able to: define erosion; differentiate between beach erosion on a developed and undeveloped barrier island; and explore how to prevent beach erosion.

Materials:

Rectangular oven baking pans
Sand
Small rocks
Straw, sticks, or twigs
Toy houses
Water
Squeeze bottles

Procedures:

1. Pre-Activity (introduction): Begin by demonstrating erosion in one of the rectangular baking pans. Add sand about half-way. Ask the students to predict what will happen to the sand when water is added and what will happen to the water after you've added it. Explain that this is what erosion is and the water will carry away the sand if there is nothing there to keep the sand from being taken away. Explain that there are natural parts of the beach, such as plants, that are adapted to keeping the sand from eroding away. The students will be demonstrating how these plants work as well as what happens when the plants are replaced by homes that we build too close to the water.
2. Activity: Divide the class into groups of 4-5 students. Pass out two baking pans, straw, sticks, twigs, rocks, and toy houses to each group. As you go around and add sand to each of their pans, instruct them to create one natural beach with "dune grass" represented by the sticks and rocks and one beach that has no grass and just houses. They can shape their beaches any way they like. Once their beaches have been built, explain that you will pass out the water and they will demonstrate erosion on both beaches. They can squirt the water all over the sand and visually see how erosion changes the contours of their beaches.
3. Post-Activity (review): Once their desks are cleared, begin a discussion about what happened to the beaches when the sticks and rocks were on the beach and when the houses replaced them. Discuss how adding development to a barrier island can worsen the effects of erosion and cause more damage than with natural plants such as dune grasses and seaside goldenrod.

**Key Words:**

Erosion

Dunes

Dune grass

Development

Backshore

Foreshore

Nearshore

Background Information:

Adapted from New Wave of Learning

Beginning with the dunes, the sand here is finer in texture and lighter in color. This zone is called the backshore because it is located farthest from the ocean. There are two reasons for its texture and color: the fine grains are easily picked up by wind and the sun warms the grains until they are dry and faded in color. The sand particles are smaller in size and because they are not weighed down by water, they are easily moved around the beach. This type of sand can give you sand-burn if the winds blow too fierce during a storm. Most species of animals cannot live in this zone because they would have to tunnel very deep in order to access water for food and nutrients.

The sand we throw our beach blankets, chairs, and umbrellas on is located in a zone called the foreshore. It is directly located *before* the ocean reaches the normal high water mark. The sand particles here are slightly more coarse and larger in size. Because the sun heats this zone throughout the day, the top layer tends to be a shade lighter than underneath because the water table is closer to the surface. It is because of this moisture that small organisms such as worms, crabs, and sand fleas can live in this zone and tend to be nocturnal to avoid the heat from direct sunlight.

The sand nearest to the ocean is located in a zone called the nearshore. These sands are exposed during low tides and inundated with water during high tides. In relation to the other zones, these sands are much coarser and the particles are larger in size. With water being the key factor to its coloration, the sand particles tend to be much darker. Iron and copper in the water can also contribute to the coloration, mixing a red or charcoal pigment in with the usual browns and tans. There are few organisms that can tolerate the extremes of being exposed to the sun and inundated with water throughout the daily tidal cycles, but various species of mollusks can burry themselves in the moist sand when the surface area is exposed.

As with all barrier island formations, they are not without their erosion issues. Erosion is the process of sand being pulled from a shoreline and deposited offshore on shoals or sandbars or further down the coast. During the summer months in the northern hemisphere, both wind and water chisel away what become scarps – areas of sharp slopes at the edge of the foreshore. During the winter, those same areas are flattened by winter storms and the sand is more uniform across the beach.

