



Classroom Teacher Preparation

Engineering 6: Saving the Beach

Please use the following to prepare for the next SfS lesson.

Description:

In this human impact lesson, students examine the causes of beach erosion and discuss how erosion affects a beach and its 'stakeholders'. Students work in small groups to engineer solutions to beach erosion through brainstorming, planning, and designing prototypes for their model beaches.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

3rd-5th

- Define erosion, using specific examples of the causes and effects of beach erosion
- Identify some pros and cons of the different prototypes created to control beach erosion and their impact on stakeholders

All lessons are also matched to both national NGSS and local state standards, available here:

www.sciencefromscientists.org/standards

Disciplinary Core Idea (DCI):

ESS2. Earth’s Systems – ESS2.A Earth materials and systems

- (3rd-5th) Water, ice, wind, organisms, and gravity break rocks, soils, and sediments into smaller pieces and move them around

ESS3. Earth and Human Activity – ESS3.C Human impacts on Earth systems

- (3rd-5th) Societal activities have had major effects on the land, ocean, atmosphere, and even outer space. Societal activities can also help protect Earth’s resources and environments.

Science & Engineering Practice (SEP)

Constructing Explanations and Designing Solutions

- (3rd-5th) Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

Crosscutting Concept (CCC)

Cause and Effect

- (3rd-5th) Cause and effect relationships are routinely identified, tested, and used to explain change

Preparation:

Students should be aware of what a beach is. Before we visit, it would be helpful to discuss the features of a beach, especially in regions where students are likely to be unfamiliar with coastal beaches!

Room Set Up for Activities:

Students will work in groups of 3-5 and will need a flat table or floor space to set up their activity. Instructors will need access to a water source. Water will be used throughout the activity and absorbent underpads will be used to prevent



water damage to school property. All school supplies and books should be put away before the activity begins. It is helpful to have extra paper towels handy for the students. Teachers should assist students with water use throughout the activity.

Safety:

There are no safety concerns for the lesson.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Human Impact** or Engineering. Modules include:

Earth Science 1: Oil Spill – Students explore the issues surrounding an oil spill, particularly the methods of environmental cleanup. Students act as environmental engineers to test different methods for effectively cleaning up a model oil spill and determine the harmful effects that oil spills and their cleanup cause for animals and the environment.

Life Science 10: Population and Sustainability – Introduces population-related concepts, focusing on those relating to human impact. Students (unsuspectingly) explore the concept of the Tragedy of the Commons through a group 'fishing' activity.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Our Classroom Post can be found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

For a Lesson Extension, we recommend trying one of the activities offered here:

<http://baytrippers.thinkport.org/learn/lesson.htm>. These are related to human impact (including erosion) in Chesapeake Bay.

Additional Resources:

- California Scientists Monitor Coastal Erosion Video: https://www.youtube.com/watch?v=CGNYofMQ7_8
- Flora and Fauna of a Beach Website: <http://coastalcare.org/educate/flora-and-fauna/>

Beach Erosion in Massachusetts

- Slideshow - See Cape Cod's Coastline Change Dramatically in 30 years: http://earthobservatory.nasa.gov/Features/WorldOfChange/cape_cod.php
- Erosion dooms homes in Wellfleet, MA: <https://www.youtube.com/watch?t=29&v=XXwOXIMbwpl>
- Over The Cliff: Cape Cod home Lost to Ocean Erosion Video: <https://www.youtube.com/watch?t=83&v=xQ5vawZOmco>
- Vanishing Cape Cod Shoreline Video: <https://www.youtube.com/watch?v=dD0oSpluJqk>