NATIONAL GEOGRAPHIC

Location, Location: Coastal Living

Students prepare a news report that highlights problems facing coastal communities and how climate change might affect coastal populations.

GRADES

3 - 5

SUBJECTS

Biology, Ecology, Earth Science, Oceanography, English Language Arts, Geography, Human Geography, Physical Geography

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OVERVIEW

Students prepare a news report that highlights problems facing coastal communities and how climate change might affect coastal populations.

For the complete activity with media resources, visit:

http://www.nationalgeographic.org/activity/location-location-coastal-living/

DIRECTIONS

1. Make connections between population density and coasts.

Ask: *Where do most of the world's people live—along <u>coasts</u> or farther <u>inland</u>?* After students answer, display the MapMaker Interactive: World—Population Density map. Explain to students that darker areas indicate greater <u>population density</u>, which measures how many people live in a square mile. A square mile is a space that is one mile long and one mile wide. The map shows that the most densely populated areas are along coastlines. According to the U.S. Census Bureau, nearly one-third of the population in the United States lives in a coastline

city or county. Tell students that this doesn't happen just in the United States. Scientists at Columbia University's Earth Institute estimate that, worldwide, the number of people living within 60 miles of a coast will rise 35 percent by the year 2025 compared to 1995 levels.

2. Brainstorm and discuss the pros of coastal living.
Distribute a copy of the worksheet Pros and Cons of Coastal Living to each student and have students work independently to list the benefits of living near the ocean in the Pros column. Then discuss their ideas as a class. Ask: *Why do so many people settle near coasts?* Students' responses will vary, but may include that people like living near the water. Tell students that many of the world's largest cities are located on the coast. Throughout history, cities were built around ports because ports provided opportunities for trade, jobs, and transportation. People chose to move to coastal cities for these reasons. Two of the biggest cities in the United States, New York City and Boston, developed around ports. Today the area from Boston to Washington, D.C. is called a megalopolis—one huge city. Emphasize the relationship between coasts and large cities by referring back to the MapMaker Interactive. Point out large cities such as Shanghai, Mumbai, and Los Angeles to show how most of the world's largest cities are on a coast.

3. Brainstorm and discuss the cons of coastal living.
Ask students to independently brainstorm reasons it might be challenging to live near the coast in the Cons column of the worksheet. Then discuss as a class. Ask: *What are possible drawbacks to living near a coast?* Explain to students that coastal communities are often negatively affected by severe storms, hurricanes, and tsunamis, and they are prone to coastal flooding. Pollution and waste disposal from so many people is also a problem. In the future, global climate change will be a big concern, as a projected rise in sea level may mean more flooding, and warmer oceans may generate more storms. Review vocabulary terms such as *tsunami* and *climate change* if needed. Ask: *Can you think of examples of coastal areas that have experienced disasters?* Refer to how flooding from the Japanese Tsunami in 2011 affected Japan, and how Hurricane Katrina and the 2010 oil spill affected areas along the Gulf Coast, including the city of New Orleans.

4. Compare the coastline of today with projected changes due to climate change and discuss how climate change will impact coastal cities.

Display the following web pages: NOAA: Sea Levels Online, which shows trends in sea level change in the United States; and NOAA: Regional Mean Sea Level Trends, which explains why levels are rising along the majority of the coast and falling in other areas. Review the reasons for sea level change with students and discuss any concepts they need help understanding. Then show the University of Kansas: Sea Level Rise animation. Students can view sea level changes for the entire planet, but you can view the results more clearly if you zoom in on a particular region. Playing the movie in loop mode shows changes from one- to six-meter rises in sea level. Ask: *What might happen to people living along coastlines if sea levels rise as shown in the animation?* Students should see that many coastal communities could end up underwater. Explain that such rises in sea level would happen over many years. Estimates are for rises of about one meter over the next 100 years in the most affected areas.

5. Ask students to create a three-minute news report about coastal concerns.

The report can be in written, audio, or video format depending on the time and equipment you have available. Divide students into small groups to conduct research, write the report, and present it to the class. Each group should prepare a report about a different coastal area. Choose a variety of coastal communities that are geographically unique. Some possibilities include Cape Cod, the Outer Banks, the south Florida coast, New Orleans and the Gulf Coast, San Diego, and coastal Alaska. If you live on or near a coast, be sure to have a group prepare a report on your own community.

Informal Assessment

Check students' comprehension by asking them the following questions:

- *Why do people live near coastlines?*
- *What are the main threats to coastal communities?*
- *What are ways people can help protect coasts?*
- *Where would people have to move as a result of sea level rise caused by climate change? Where would you want to move if you lived on the coast and were forced to leave because of the rising ocean? Why?*

Extending the Learning

Use figures and statistics surrounding coastal populations to do some math extensions. For example, look at a United States map and count the states bordering the ocean (23). Make a fraction using the number of the coastline states and all states (23/50). Calculate the percentage of coastline states by dividing by 50. Use population data to calculate the percentage of people living on U.S. coasts; for example, the total U.S. population in 2008 was 304 million and 87 million lived on the coasts (29 percent).

OBJECTIVES

Subjects & Disciplines

Biology
- Ecology

Earth Science
- Oceanography
- English Language Arts

Geography
- Human Geography
- Physical Geography

Learning Objectives

Students will:

- explain why many of the world's people live near coastlines
- list drawbacks to living on a coastline
- gather, organize, and interpret scientific and geographic data from maps, videos, and online sources
- produce a news report on coastal concerns
- evaluate the pros and cons of coastal living

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Cooperative learning
- Discussions
- Research
- Visual instruction
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Themes
  - Global Awareness
- Critical Thinking Skills
  - Analyzing
  - Evaluating
  - Remembering
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information
  - Answering Geographic Questions
  - Asking Geographic Questions
  - Organizing Geographic Information

National Standards, Principles, and Practices

IRA/NCTE STANDARDS FOR THE ENGLISH LANGUAGE ARTS

• Standard 4:
Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

• Standard 8:
Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and

communicate knowledge.

NATIONAL COUNCIL FOR SOCIAL STUDIES CURRICULUM STANDARDS

- **Theme 2:**
Time, Continuity, and Change
- **Theme 3:**
People, Places, and Environments

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**
How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information
- **Standard 12:**
The processes, patterns, and functions of human settlement
- **Standard 15:**
How physical systems affect human systems
- **Standard 17:**
How to apply geography to interpret the past
- **Standard 9:**
The characteristics, distribution, and migration of human populations on Earth's surface

OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

- **Principle 1d:**
Sea level is the average height of the ocean relative to the land, taking into account the differences caused by tides. Sea level changes as plate tectonics cause the volume of ocean basins and the height of the land to change. It changes as ice caps on land melt or grow. It also changes as sea water expands and contracts when ocean water warms and cools.
- **Principle 6d:**
Much of the world's population lives in coastal areas.
- **Principle 6f:**
Coastal regions are susceptible to natural hazards (such as tsunamis, hurricanes, cyclones, sea level change, and storm surges).

ISTE STANDARDS FOR STUDENTS (ISTE STANDARDS*S)

- **Standard 1:**
Creativity and Innovation
- **Standard 2:**
Communication and Collaboration
- **Standard 3:**
Research and Information Fluency

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Paper
- Pencils
- Pens

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per small group, Projector
- Plug-Ins: Quicktime

PHYSICAL SPACE

- Classroom
- Media Center/Library

GROUPING

- Large-group instruction

OTHER NOTES

- Ideally, students will complete this project over the course of 2-3 hour-long sessions.
- Before starting the activity, decide what coastal areas you would like students to research for their news reports. Gather library resources on those areas, or choose appropriate

Internet resources for students.

BACKGROUND & VOCABULARY

Background Information

Worldwide, approximately 40 percent of the population lives on or near a coastline. People choose to live on coasts for many beneficial reasons, but coastal living also has drawbacks. Climate change, rising population, and other factors will increasingly affect those who live on coasts.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
city	*noun*	large settlement with a high population density.
climate change	*noun*	gradual changes in all the interconnected weather elements on our planet.
coast	*noun*	edge of land along the sea or other large body of water.
coastal flooding	*noun*	process where a storm or tsunami causes the sea to rush inland, as a storm surge. Also called estuarine flooding.
hurricane	*noun*	tropical storm with wind speeds of at least 119 kilometers (74 miles) per hour. Hurricanes are the same thing as typhoons, but usually located in the Atlantic Ocean region.
inland	*adjective*	area not near the ocean.
megalopolis	*noun*	the union of two or more urban areas into a continuous metropolitan area. Also called a conurbation.
ocean	*noun*	large body of salt water that covers most of the Earth.
pollution	*noun*	introduction of harmful materials into the environment.

Term	Part of Speech	Definition
population density	noun	the number of people living in a set area, such as a square mile.
port	noun	place on a body of water where ships can tie up or dock and load and unload cargo.
sea level	noun	base level for measuring elevations. Sea level is determined by measurements taken over a 19-year cycle.
sea level rise	noun	increase in the average reach of the ocean. The current sea level rise is 1.8 millimeters (.07 inch) per year.
trade	noun	buying, selling, or exchanging of goods and services.
transportation	noun	movement of people or goods from one place to another.
tsunami	noun	ocean waves triggered by an earthquake, volcano, or other movement of the ocean floor.

For Further Exploration

Articles & Profiles

- National Geographic News: Warming to Cause Catastrophic Rise in Sea Level?

Websites

- EPA: A Student's Guide to Global Climate Change
- ScienCentral: Faster Sea Level Rise
- NASA: Global Climate Change—Effects: The current and future consequences of global change
- Center for Climate and Energy Solutions (C2ES): Kids Corner
- National Geographic EarthPulse: The Human Condition
- NASA: Global Climate Change—Climate Kids
- NOAA: State of the Coast—The U.S. Population Living in Coastal Watershed Counties

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