NATIONAL GEOGRAPHIC

RESOURCE LIBRARY
ACTIVITY : 15 MINS

Mapping Ocean Currents

Students apply information about the Ocean Conveyor Belt to predict the movement of a spill of rubber ducks in the ocean.

GRADES

3 - 8

SUBJECTS

Earth Science, Oceanography, Geography, Physical Geography

CONTENTS

1 Image, 1 Video, 2 Links

OVERVIEW

Students apply information about the Ocean Conveyor Belt to predict the movement of a spill of rubber ducks in the ocean.

For the complete activity with media resources, visit:
http://www.nationalgeographic.org/activity/mapping-ocean-currents/

DIRECTIONS

1. Draw ocean currents on a world map.

Display the Ocean Conveyor Belt cartoon from the Resource Carousel. Explain to students that this is a depiction of ocean currents called the Ocean Conveyor Belt. The ocean conveyor belt is caused by differences in water temperature and salinity. Also known as thermohaline circulation, the conveyor belt is a system in which water moves between the cold depths and warm surface in oceans throughout the world. Have students draw the Ocean Conveyor Belt on the World Physical MapMaker Kit.

2. Mark the location of a 1992 cargo ship spill of rubber ducks.

Have students mark 44N, 178E on their maps. Tell students that in this location, in 1992, a cargo ship full of bath toys spilled nearly 92,000 rubber ducks into the Pacific Ocean. These ducks traveled thousands of miles on ocean currents, providing new information about these currents. For example, the first group of ducks to make landfall washed up on the shores of Alaska.

3. Apply Ocean Conveyor Belt information to predict the movement of rubber ducks.

As a class, have students predict where the ducks traveled, based on the Ocean Conveyor Belt. Have students mark the map with a different color where they think the ducks washed up on shore.

4. Test predictions by reading about the ducks' actual paths.

Have students read about where the ducks traveled using the Port Technology article, *How Rubber Ducks Reveal the Ocean Currents*. Have students mark these locations on the map, using a different colored marker than used to mark predictions. Ask: *How accurate were our class predictions?* Explain that there are many ocean currents in addition to the ocean conveyor belt, and many of the ducks traveled on those smaller currents. Show students the Ocean Currents layer on the MapMaker Interactive to see the paths of those smaller currents. Discuss which smaller currents might have influenced the ducks' travels.

Tip

Laminate the individual sheets of the MapMaker Kit map so you can re-use it for several years.

Extending the Learning

Using the MapMaker Interactive, have students look more closely at the smaller currents that affected where the ducks traveled. Ask: *What differences do you notice in the currents?* Students should notice that currents are different temperatures. Some ocean currents are warm and some are cold, as indicated by the red and blue arrows on the map. Discuss how differences in water temperature create movement in the water. This type of movement is

called thermohaline circulation. Warm water is less dense than cold water, meaning that cold water will sink below warm water. Show the Ocean Conveyor Belt cartoon from the Resource Carousel again and discuss how differences in water temperature relate to the Ocean Conveyor Belt.

OBJECTIVES

Subjects & Disciplines

Earth Science

- Oceanography

Geography

- Physical Geography

Learning Objectives

Students will:

- use current events to explore the ocean conveyor belt

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Cooperative learning
- Discovery learning
- Discussions
- Research

Skills Summary

This activity targets the following skills:

- Critical Thinking Skills
  - Analyzing
  - Applying
- Geographic Skills
  - Acquiring Geographic Information
  - Analyzing Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

• **Standard 1:**
How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information
• **Standard 3:**
How to analyze the spatial organization of people, places, and environments on Earth's surface
• **Standard 4:**
The physical and human characteristics of places

OCEAN LITERACY ESSENTIAL PRINCIPLES AND FUNDAMENTAL CONCEPTS

• **Principle 1c:**
Throughout the ocean there is one interconnected circulation system powered by wind, tides, the force of the Earth's rotation (Coriolis effect), the Sun, and water density differences. The shape of ocean basins and adjacent land masses influence the path of circulation.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Markers

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: Printer
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

SETUP

Wall or floor space large enough to hang a giant map

GROUPING

- Large-group instruction
- Small-group instruction

OTHER NOTES

Print out and assemble the map as a class or on your own before class. Use the assembly video provided to help with this process. If you do not have room for the large map, print several tabletop maps for the students to use in small groups.

BACKGROUND & VOCABULARY

Background Information

The ocean conveyor belt is caused by differences in water temperature and salinity. Also known as thermohaline circulation, the conveyor belt is a system in which water moves between the cold depths and warm surface in oceans throughout the world. "Thermo" means temperature and "haline" means salinity.

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
cargo	*noun*	goods carried by a ship, plane, or other vehicle.
circulation	*noun*	moving in a circular motion.
current	*noun*	steady, predictable flow of fluid within a larger body of that fluid.
ocean	*noun*	large body of salt water that covers most of the Earth.
ocean conveyor belt	*noun*	system in which water moves between the cold depths and warm surface in oceans throughout the world. Also called thermohaline circulation.
predict	*verb*	to know the outcome of a situation in advance.
thermohaline circulation	*noun*	ocean conveyor belt system in which water moves between the cold depths and warm surface in oceans throughout the world.

For Further Exploration

Websites

- NOAA: National Ocean Service—Ocean Facts: What is the global ocean conveyor belt?

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