Current Events

A Classroom Activity for Ocean Gazing Episodes 32: A Cook at sea

***Adapted from**: Office of Naval Research*

Materials Required

World map including ocean currents,
Rubber ducky to trace the currents

Directions

1. Familiarize yourself with the world map. About how much space is covered by water (ocean); how much by land? **See answer below.*
2. Pick a start point and a destination, then follow the currents to see how many ways you could drift to your end point. And, see where you could end up by accident!

   ** Answer: That's right, about ¾ of the earth is covered by water – most of it ocean. That's why the Earth is really the "The Ocean Planet."*

What's going on here?

Driven by winds, tides and gravity, currents keep our oceans in constant motion. The surface currents on the map reflect the pattern of global winds. Wind bands result from the uneven heating of the earth's surface from the equator to the poles. Blowing from east to west on opposite sides of the equator are the *northeast and southeast trade winds*. At the mid-latitudes, the *westerlies* blow from west to east (*why most of our weather comes from the west!*), and at the highest latitudes, the *polar easterlies* blow in the opposite direction. These winds blow in one direction all year round, driving the ocean's surface waters in currents like "rivers in within the ocean."

Flowing in large rotating loops called *gyres*, surface currents move large amounts of water over great distances. In the Northern Hemisphere, gyres spin in a clockwise direction, while in the Southern Hemisphere, they spin counterclockwise. This circulation reflects the *Coriolis Effect*, a process caused by the Earth's spinning rotation. Gyres begin at the equator where the water is warmed by the sun. The Coriolis Effect pushes water west until it reaches a continent. Then, the water moves towards the poles where it becomes cool. Coming in contact with the very strong, cold polar currents, the water is directed back towards the equator where it starts the circle again.

People on the east coast of the United States are most familiar with the northward flowing portion of the North Atlantic Gyre. First "discovered" by Benjamin Franklin, the Gulf Stream begins in the Caribbean and travels up the coast past Florida. Once reaching the Outer Banks of North

Carolina, it angles off to the northeast towards Newfoundland where it merges with the Norwegian Current. But the effects of its warmer water are felt all the way to Europe. The Gulf Stream usually travels at a speed of 3 or 4 knots (about 3½ to 4 ½ miles per hour).

Why rubber ducks?

On January 10, 1992, a cargo ship traveling from China to the United States hit rough seas and lost 20 of its containers. One of those cargo containers held packages of rubber [plastic] ducks, turtles, frogs and beavers. This container suffered a gash when falling off the ship and 29,000 rubber bath toys dropped into the ocean to begin a journey which, for some, is still in full swing. Over the past 15 years, these buoyant bath toys have been traveling the ocean currents, washing up on beaches across Alaska and the west coast of the U.S.

Only recently, the toys began appearing on beaches in New England. How did they get from the Pacific to the Atlantic? Through the Arctic Ocean in pack ice that melted once it reached the North Atlantic! Little did the toy manufacturer know in 1992 that their product would become part of one of the most simplistic, but data-rich ocean current experiments to date.

A similar story exists for Nike sneakers, Legos, and hockey equipment! And, of course, there are other very popular examples: messages in bottles; driftwood; marine debris; and the not-so-familiar example of seabeans. All these items, and many others, can travel countless miles around the globe via oceans currents!

Sources

The related podcast episode for this activity can be found by going to the podcast section of www.oceangazing.org