Ocean motion: Wind-driven currents

Model the flow of ocean surface currents by blowing air across a tub of rheoscopic fluid and water, with clay structures simulating coastlines, islands, and seafloor features.

Background
- Winds, water density, and tides all drive ocean currents. Coastal and sea floor features influence their location, direction, and speed.
- Earth's rotation results in the Coriolis Effect which also influences ocean currents.
- Large-scale, surface ocean currents are driven by global wind systems that are fueled by energy from the sun. These currents transfer heat from the tropics to the Polar Regions, influencing local and global climate.

Materials
- Deep clear pan, or tub
- Rheoscopic fluid (available from science supplies stores)
- Hair dryer and/or straws
- Clay
- Water
- Food coloring

Instructions
- In the pan or tub, create land masses and seafloor features out of clay. Allow clay to dry.
- Fill with water mixed with blue food coloring and rheoscopic fluid to represent the ocean.
- Blow through straws or use a hair dryer to simulate the wind blowing across the surface of the water.
- Observe the currents when the wind comes from different locations, speeds, and directions.

Extensions
- Float small pieces of paper or colored plastic on the "ocean" to simulate marine debris or plankton. Discs from a hole punch work well. Map their path.
- Change the location and shapes of the underwater features and the land masses.
- Have students create winds that will form a La Niña and an El Niño.
- Have students create winds that will form a gyre.
- Investigate and form upwellings.
- Create convection currents with a heat source or ice.
- Have students draw the land masses and the visible water currents.
- Change the direction of the wind and draw again.

Related resources
- NOAA Education ocean currents resources: https://www.noaa.gov/education/resource-collections/ocean-coasts-education-resources/ocean-currents
- What and where are garbage patches: https://marinedebris.noaa.gov/info/patch.html
- Ocean circulations: https://www.weather.gov/jetstream/circulation
- Major ocean currents: https://www.weather.gov/jetstream/currents_max
- Ocean currents predictions: https://tidesandcurrents.noaa.gov/noaacurrents/Regions