

Name: _____

Date: _____ Period: _____

Predicting the Patterns and Characteristics of Surface Ocean Currents

Introduction: When viewed from space, the surface currents of the major ocean basins can be seen to follow the prevailing wind systems that drive them. Contained by continental boundaries and deflected by the Earth's rotation, these surface currents flow in large, roughly circular patterns called gyres. The gyres play an important role in redistributing heat from the low to the high latitudes, thus influencing ocean temperature, weather, and climate. The following activity investigates gyres by first looking at single surface currents and then building to a global perspective of ocean gyre circulation.

Procedure: Using the current cards provided, draw the appropriate currents on the map. Use blue and red colored pencils to indicate the cold or hot temperatures of the currents. Label each current with its correct name. After putting all Atlantic and Pacific currents on the map, estimate the comparable currents in the Indian Ocean and draw them in.

Questions: Choose the correct answer.

1. The trade winds that prevail between the equator and a latitude of 30 degrees have strong east to west components. Ocean currents under the trade winds flow generally in the (same)(opposite) direction.
2. The prevailing westerlies found between a latitude of 30 and 60 degrees are winds that have a strong west to east component. Ocean currents under the prevailing westerlies flow generally in the (same)(opposite) direction.
3. The ocean currents driven by these prevailing wind systems are deflected by continental boundaries to help form the gyres. The one latitude where blocking continental boundaries are lacking is (0)(30 N)(30 S)(60 N)(60 S).
4. The ocean gyres in the major ocean basins form large, roughly circular closed currents which are centered at a latitude of approximately (0)(30)(60) degrees.
5. As seen from space, the gyre circulation patterns in the northern hemisphere show a (clockwise)(counterclockwise) flow. In the southern hemisphere, these gyre circulations are (clockwise)(counterclockwise).
6. Near Perth, located on the west coast of Australia, the ocean current flows from the direction of the (equator)(south pole).
7. In ocean gyres, regardless of hemisphere, warm water is transported poleward in the (eastern)(western) region of each ocean basin. The cold currents from the higher latitudes are found in the (eastern)(western) region of each ocean basin.
8. Near Peru, located on the west coast of South America, the ocean gyre current is (warm)(cold).
9. In ocean gyres, regardless of hemisphere, the faster currents are found in the (eastern)(western) region of each ocean basin. The slower currents are found in the (eastern)(western) region of each ocean basin.
10. Near Tokyo, Japan, the ocean gyre surface current is (fast)(slow).

Discussion: The surface circulation of the ocean is primarily a consequence of the interaction between the Sun, the atmosphere, and the ocean. From what you have learned in this activity, explain why.

Global Ocean Basin Chart

