Surface Ocean Currents

Background

Surface ocean currents are generated by the winds of the atmosphere. The surface current direction is affected by wind direction, Earth rotation, and land interference. The trade winds, westerlies and polar easterlies influence the direction of surface ocean water movement. Earth's rotation causes the movement of free moving bodies to include ocean water to be deflected. Ocean bodies in the northern and southern hemisphere deflection opposite of each other. And finally, the continental landmasses interfere with the continuous movement of ocean water. This interference is seen as ocean flow; trace the borders of the continents. Only in the southern hemisphere, continuous ocean current can be found as ocean water flows between Antarctica and Australia.

As surface currents move they also move either of their warm or cold temperatures to new locations. The redistributing of warm water to colder locations and cold water to warmer locations helps to lessen the extreme temperatures of the equator and poles. Moderate temperatures and climate found in the mid-latitudes are the result of this warm and cold temperature mixing.

Learning Objectives

Understand winds, Earth's rotation, and land mass interference affect surface ocean current flow
Explain the mixing of extreme water temperatures to cause moderate climate

Materials and Reference Needed

World Map
Guided Notes

Directions

1. Title the diagram (Ocean Surface Currents)
2. Using the world map draw the direction of ocean water flow using arrows. Use a red pencil to indicate warm surface currents. Use a blue pencil to indicate cold surface currents
3. Label each surface current
4. Label the five ocean gyres
5. Construct a data table to display the currents that make up each gyre.

Analysis and Conclusion

Answer each question with a complete sentence of sentences.

1. What are names of the currents that make up the Indian Ocean Gyre.
2. What is the name of the current the travels southward along the east coast of Australia.
3. Why is the climate of the British Isles more moderate than the climate of other places at the same latitude?
4. What is the name of the current that travels uninterrupted around the earth?
5. What is the name of the current that flows southerly along the west coast of the United States?
6. Is this current warm or cold and how does it affect the climate of the west coast?
7. What are the names of the two currents that flow at the equator?
8. Name the two currents that flow in opposite directions. (Hint: Check the southern hemisphere)
9. What is the name of the current that cools the northeast boundary of the United States?
10. How would the climate of Florida be affected if the Gulf Stream were to reverse direction?
11. Because of the influence of the Earth's rotation (Coriolis effect), what is the general motion of surface currents in the North Atlantic Ocean? _____ In the South Pacific Ocean? _____

Bonus 1 to 6 points

Name the surface currents that would carry a message in a bottle from the southeast tip of Australia to the northwest tip of Africa. Be sure to name the currents in the order in which the bottle would travel.