

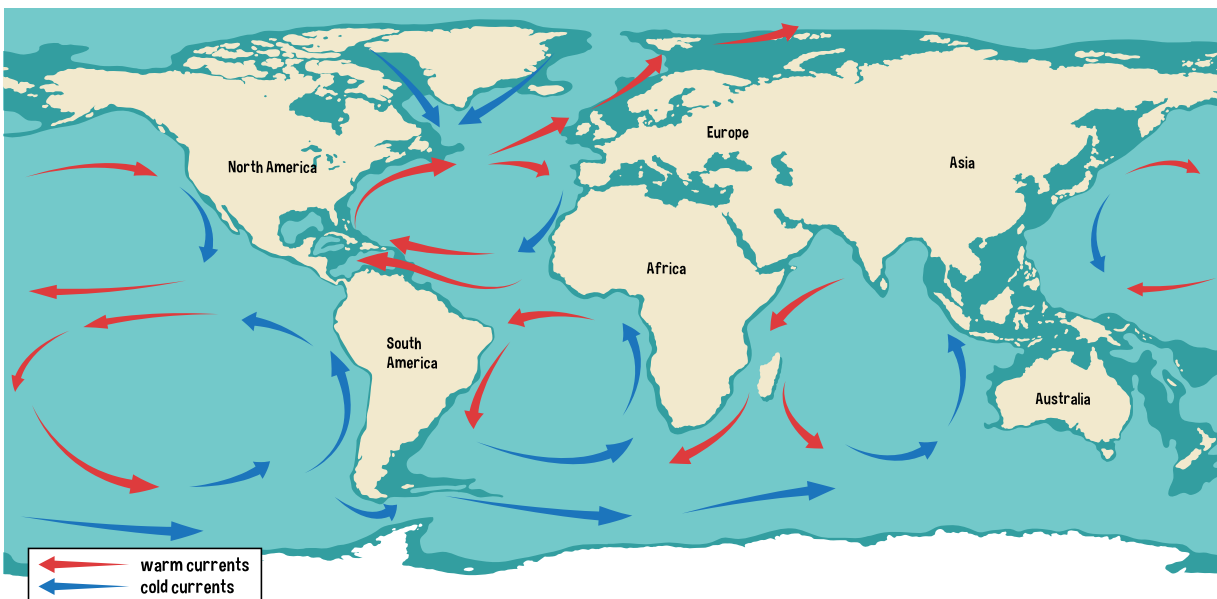
Sample Lesson #3

The Ocean: Surface Currents

Water covers more than 70% of Earth's surface. Most of Earth's water is in one enormous, connected body of salt water. During the day, the sun heats Earth's surface. As the sun sets, Earth's surface begins to cool. Land loses heat quickly, while water holds heat for a longer time. Because of this, the ocean acts as a heat reservoir. Over time, the ocean releases its energy as it moves around the globe. As a result, the ocean plays an important role in weather and climate.

Ocean water moves around the planet in **currents**, streams of water that move in a certain direction. **Surface currents** are large-scale patterns shaped by global winds, the continents, and Earth's rotation. As global winds blow across the ocean's surface, they push and pull on the water. This action creates a current. When a surface current reaches land, it must turn. The Coriolis effect determines the direction the current will take.

Note the movement of surface currents on the map. In the Northern Hemisphere, surface currents turn toward the right. In the Southern Hemisphere, surface currents turn toward the left.



Surface currents are shaped by global winds, Earth's continents, and the Coriolis effect.

Ocean currents move heat as they flow from warmer areas to colder areas. Water near the equator moves toward the poles, taking heat with it. Cold water near the poles then circulates toward the equator. The water is heated and the cycle continues.

The **Gulf Stream** is an example of how surface currents distribute energy. The strong current of the Gulf Stream brings warm water from the Gulf of Mexico across the Atlantic Ocean to the British Isles. Heat from the Gulf Stream makes the British Isles warmer than other countries at the same latitude.

1. Surface currents are (global / local) patterns.

2. What causes the ocean's surface water to move?
- A) Earth's rotation
B) the water is pulled by global winds
C) Earth's magnetic field
D) none of these
3. Surface currents have patterns. What determines these patterns? Underline your answer in the text.
4. When currents reach land, they must turn. What determines which way they turn?
-

5. Why is the ocean so important in determining climate and weather?
- A) Ocean water heats up faster than land or air.
B) The ocean has a high heat capacity and holds a great deal of energy.
C) Ocean circulation moves energy around the globe.
D) both B and C
6. The average temperature of the United Kingdom is several degrees warmer than in other areas at the same latitude. Why? Underline your answer in the text.
7. Global winds play an important role in determining _____.
- weather climate both

8. Earth's surface is changed by the forces of wind, water, and ice. For each feature, was it created by *erosion* (**E**) or *deposition* (**D**)?

_____ cave _____ the Grand Canyon
_____ stalactite _____ an alluvial fan

9. A(n) _____ is an inherited trait that helps an organism survive in its environment
- amino acid adaptation mutation accumulation

10. Which statement is not true?
- A) Chromosomes inside the nucleus contain DNA.
B) Sections on chromosomes that control traits are called genes.
C) Genes on chromosomes carry instructions for making proteins.
D) DNA travels out of the nucleus to the ribosome to make proteins.