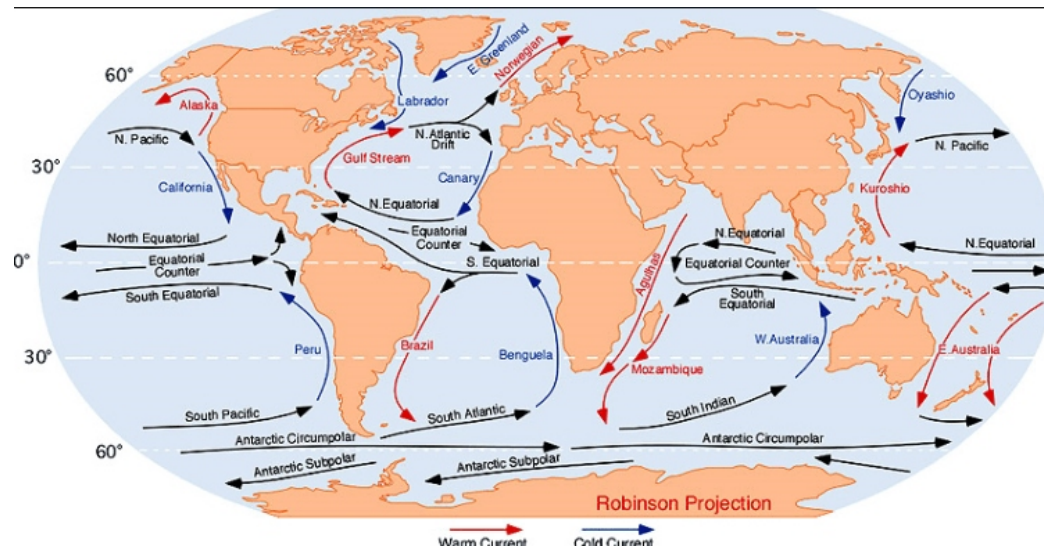




Ocean current refers to the steady flow of surface ocean water in a prevailing direction



The oceans have an important effect on weather dynamics

- 1) Oceans occupy a large portion of the Earth's surface. Water's high heat capacity will affect temperature changes in a given area
- 2) There is a large vast of water at the equator, where the sun is most direct, ocean currents act as conveyer belts to transport energy around the world

Our weather patterns are rapidly changing due to the interaction of the Labrador Current (cold) and the Gulf Stream (warm).

Causes of Ocean Currents

- 1) Convection currents This warm water is less dense than cold water and moves away from the equator towards the poles. The warm water is replaced by cold water from below (originating from the polar regions).
- 2) Prevailing winds and the Coriolis Effect Ocean currents tend to follow the prevailing winds blowing at the surface
- 3) Earth's Rotation Because of Earth's eastward rotation currents on the west sides of the oceans tend to be narrow and fast moving and those on the east sides of oceans are wide and slow moving
- 4) Shapes of the Continents Where currents encounter a landmass they are deflected away the path produced by the prevailing winds
- 5) Heat Capacity of water Oceans acts as huge heat sinks so they heat up slowly and, once heated
- 6) Amount of Salt When sea salt evaporates, the salt left behind makes the remaining water more dense. This dense seawater sinks and creates a deep water current.

Effects of Ocean Currents

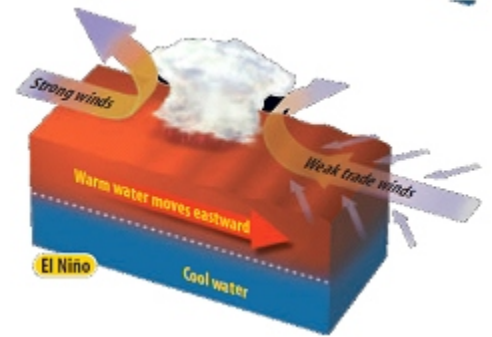
1. Creation of rain forest
2. Creation of Deserts
3. Moderation of Temperature

El Nino and La Nina

El Nino and La Nina refers to a phenomena in the middle of the Pacific Ocean, the periodic warming and cooling of a hugh mass of seawater

El Niño:

- The change in Winds allow warm tropical water in the upper layers of the Pacific to flow back eastward to South America
- Cold deep water is no longer forced below
- Ocean temperatures increase by 1 °C to 7 °C off the coast of Peru



Effect of El Niño..

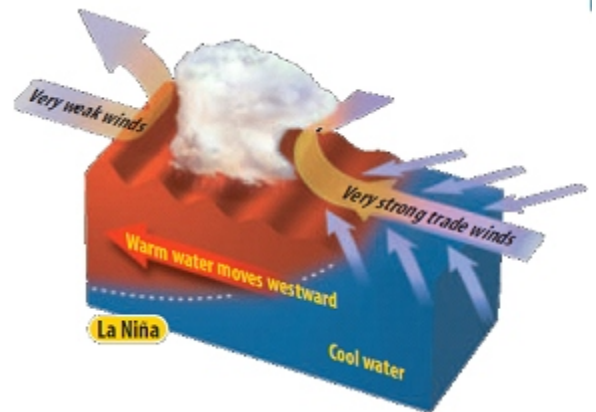
- It can alter the position and strength of the jet stream
- Changes wind and precipitation patterns around the world
 - Cause droughts in Australia and Africa
 - Cause storms and flooding in Peru, Chile and North America

La Niña:

- The opposite of El Niño
- The winds blowing across the Pacific are stronger than normal causing warm water to accumulate in the western Pacific.

Effects of La Niña...

- Warm ocean waters, clouds, and moisture are pushed away from North America
- A weaker Jet stream often brings cooler weather to the northern parts of the continent and hot and drier weather to southern parts.



Part A: Multiple Choice

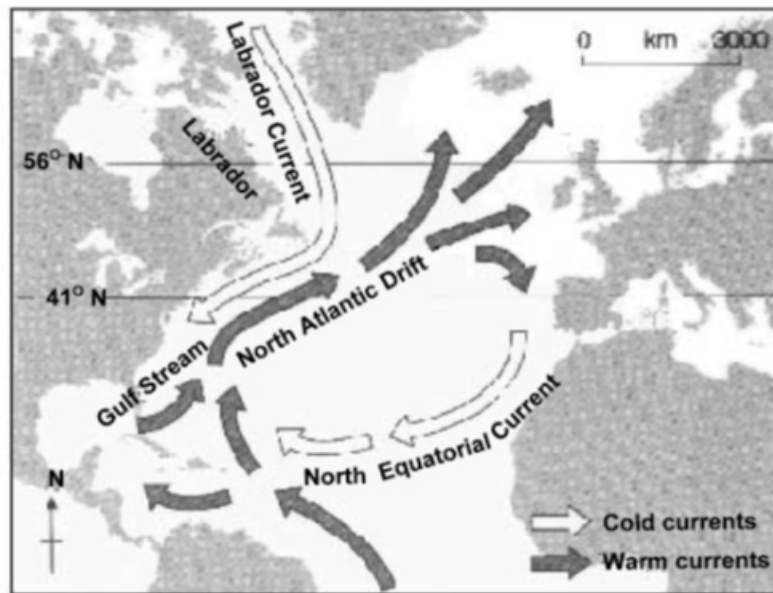
1. What is the horizontal movement of unusually warm or cold surface water?
 - (A) convection cell
 - (B) cyclone
 - (C) ocean current
 - (D) typhoon
2. Which best describe the nature of currents on the eastern part of an ocean in the northern hemisphere?
 - (A) cold and rapidly moving toward the equator
 - (B) warm and rapidly moving toward the pole
 - (C) cold and slowly moving toward the equator
 - (D) warm and slowly moving toward the pole
3. Which the only current to circulate around the entire earth?
 - (A) Gulf Stream
 - (B) Antarctic Circumpolar Current
 - (C) Kuroshio Current
 - (D) Canaries Current

4. How does the Gulf stream affect weather conditions in St. John's compared to a city located at the same latitude but in central Canada?
- (A) Winter is warmer and summer is cooler in St. John's.
 - (B) Winter is colder and summer is hotter in St. John's.
 - (C) Winter is warmer and summer is warmer in St. John's.
 - (D) Winter is cooler and summer is cooler in St. John's.
5. When a cold dry current around 30o latitude reaches the west coast of a continent, it tends to produce
- (A) desert
 - (B) grassland
 - (C) tropical rain forest
 - (D) temperate deciduous forest
6. How does the rotation of Earth act on currents on the west sides of oceans?
- (A) It causes them to be narrow and rapid moving.
 - (B) It causes them to be wide and rapid moving.
 - (C) It causes them to be narrow and slow moving.
 - (D) It causes them to be wide and slow moving
8. What is the general effect of El Niño?
- (A) The surface temperatures of the Pacific Ocean increases, the trade winds travel westward, and rainfall increases along the coast of Peru
 - (B) The surface temperatures of the Pacific Ocean increases, the trade winds travel eastward, and rainfall decreases along the coast of Peru.
 - (C) The surface temperatures of the Pacific Ocean decreases, the trade winds travel westward, and rainfall increases along the coast of Peru.
 - (D) The surface temperatures of the Pacific Ocean increases, the trade winds travel eastward, and rainfall increases along the coast of Peru
9. What causes El Niño?
- (A) a reversal of the Pacific trade winds, while the ocean currents remain the same
 - (B) a reversal of the Pacific ocean currents, while the trade winds remain the same
 - (C) an increase in the strength of the Pacific trade winds and ocean currents, which still travel in the same directions
 - (D) a reversal of both the Pacific trade winds and the ocean currents
10. Which of the following statements is NOT true about winds?
- (A) Winds carry evaporated water away from the ocean surface.
 - (B) Winds carry solar energy to and from different locations.
 - (C) Winds move in unpredictable patterns across Earth's surface.
 - (D) Winds blow from areas of high pressure to areas of low pressure.
11. Which of the following helps to keep Newfoundland's temperatures moderate?
- (A) rain-shadow effect
 - (B) sun
 - (C) Exploits River
 - (D) ocean
12. As ocean currents move,
- (A) they release heat quickly.
 - (B) they influence the amount of solar energy an area receives.
 - (C) they carry warm or cool water to different locations.
 - (D) they bring warm temperatures to the West Coast.

13. Why does the equator experience high temperatures year round?

- (A) It has a high latitude.
- (B) It has no large bodies of water.
- (C) The sun's rays hit it at a lesser angle.
- (D) The sun's rays hit it directly.

14. According to the diagram below, how does the Labrador Current affect the coast of Labrador?



- (A) high summer humidity and heavy cloud cover
- (B) high wind levels and occasional fog
- (C) low annual precipitation and cool summers
- (D) low atmospheric pressure and mild winters