



Waves and Currents

Waves

A wave is a rhythmic movement that carries energy through matter and space. In the ocean, waves move through seawater.



Causes of Waves

- When wind blows across a body of water, wind energy is transferred to the water
- If the wind speed is great enough, the water begins to pile up, forming a wave
- The height of a wave depends on:
 - The speed of the wind
 - The distance over which the wind blows
 - The length of time the wind blows

Causes of Waves

- **Once set in motion, waves continue moving for long distances, even if the wind stops blowing**
- **The waves you see lapping at a beach could have formed halfway around the world**



Curren

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Ocean Currents

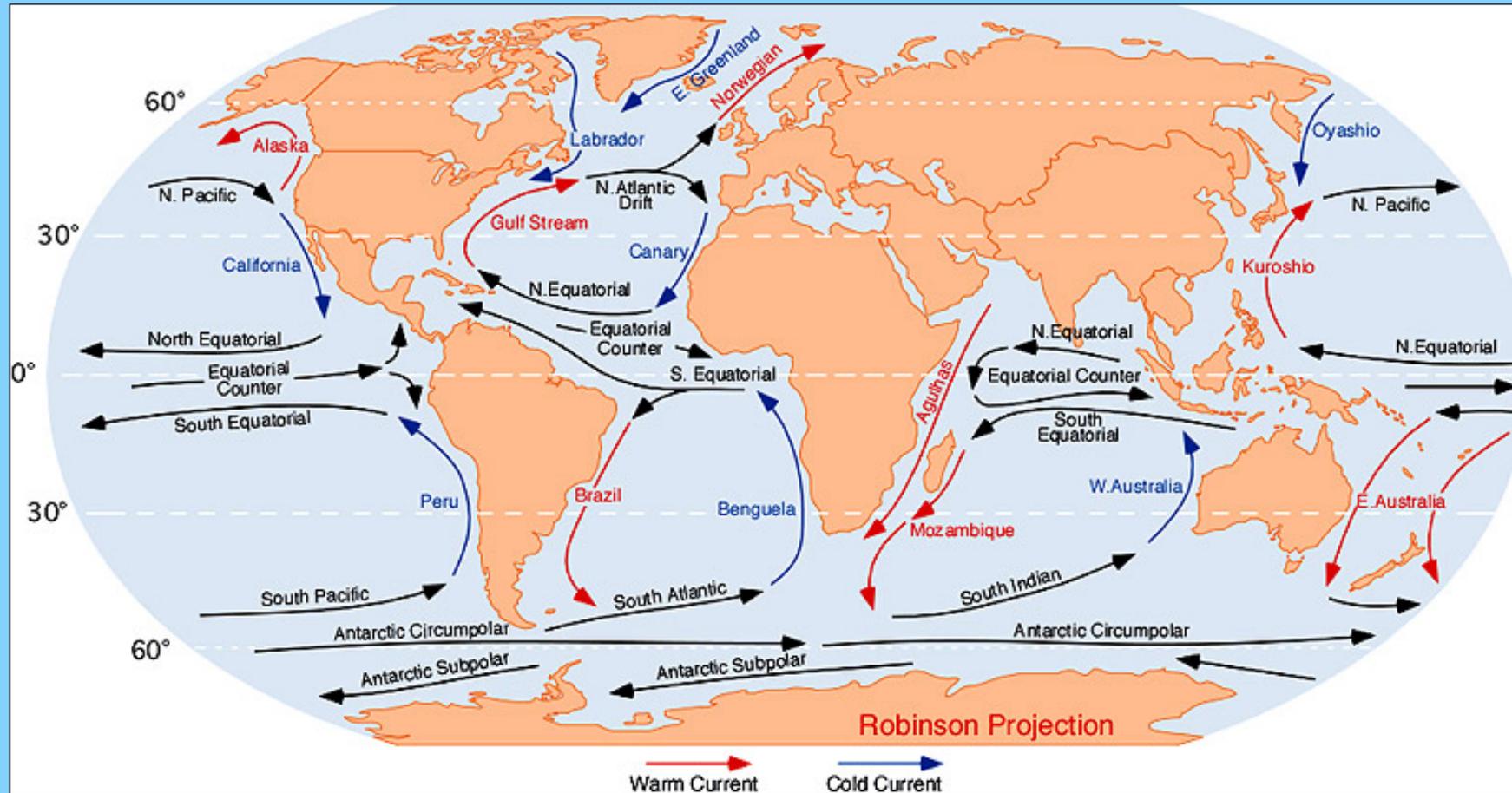
Ocean currents are a mass flow of ocean water.

There are two main types of currents we will be discussing: Surface Currents and Density Currents

Ocean Currents: Surface Currents

- Surface currents move water horizontally – parallel to Earth's surface
- Surface currents are powered by wind
- The wind forces the ocean to move in huge, circular patterns
- There are warm surface currents and cold surface currents

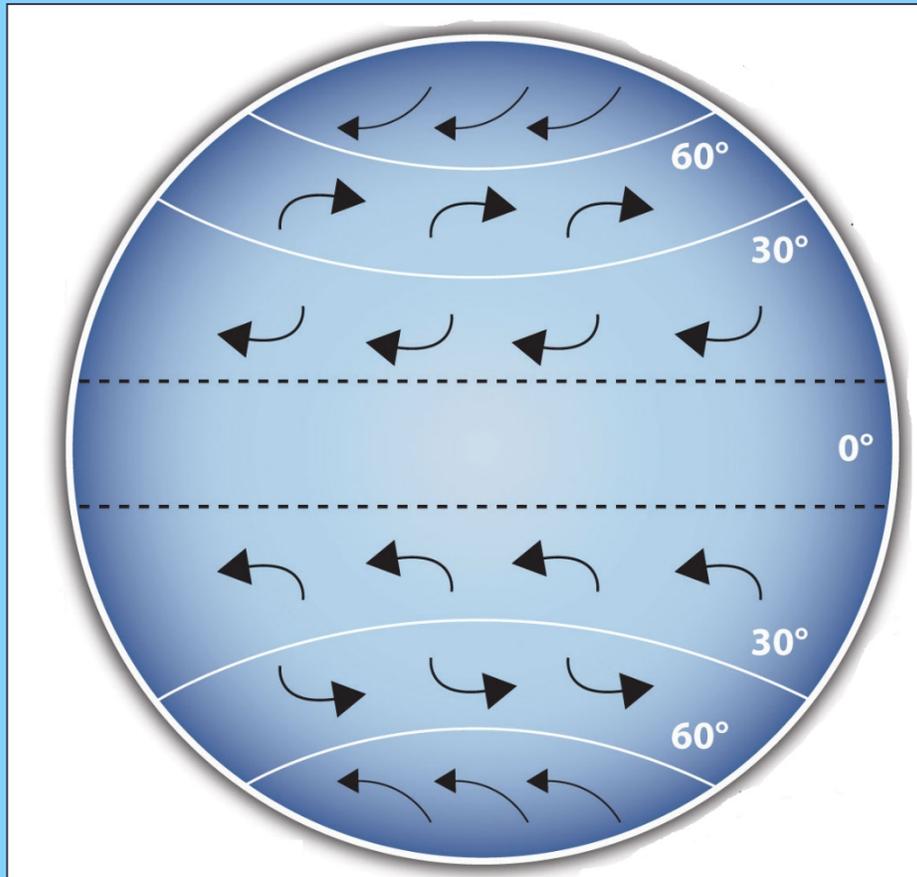
Ocean Currents: Surface Currents



Ocean Currents: Surface Currents

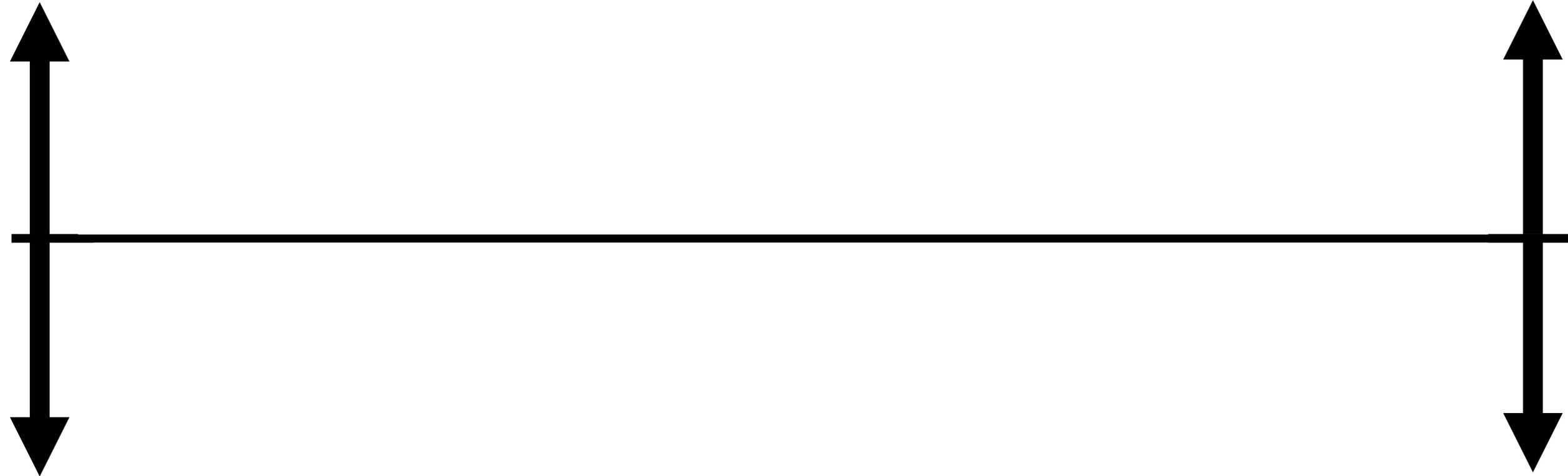
- Surface winds and surface currents are affected by the rotation of the Earth (the Coriolis Effect)
- Because Earth rotates toward the east, winds appear to curve to the right in the northern hemisphere and to the left in the southern hemisphere
- So, currents north of the equator turn to the right and currents south of the equator turn to the left

Ocean Currents: Surface Currents



**Curving of
surface
winds due to
the Earth's
rotation**

Currents



 Warm Current

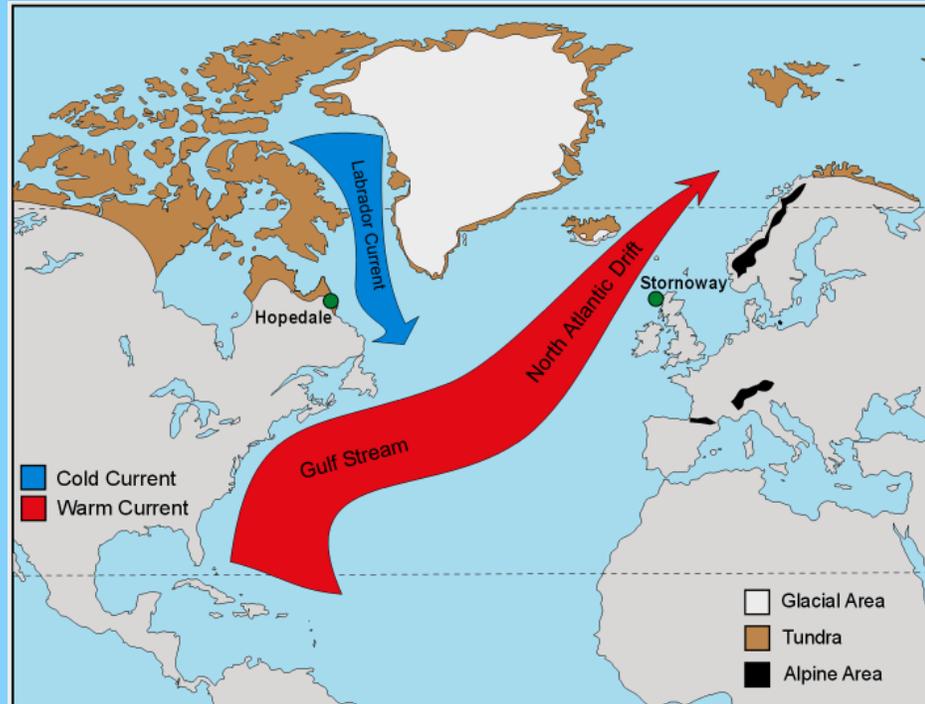
 Cold Current

Climate

- The ocean absorbs, stores, and moves the sun's heat (energy)
- Surface currents transport this energy all over the world
- Surface currents move warmer water into cooler regions and return cooler water to the warmer regions (tropics)
- Currents can have a cooling effect on an area's climate or a warming effect on an area's climate
- As warm water flows from the equator, heat is released into the atmosphere and the air is warmed.

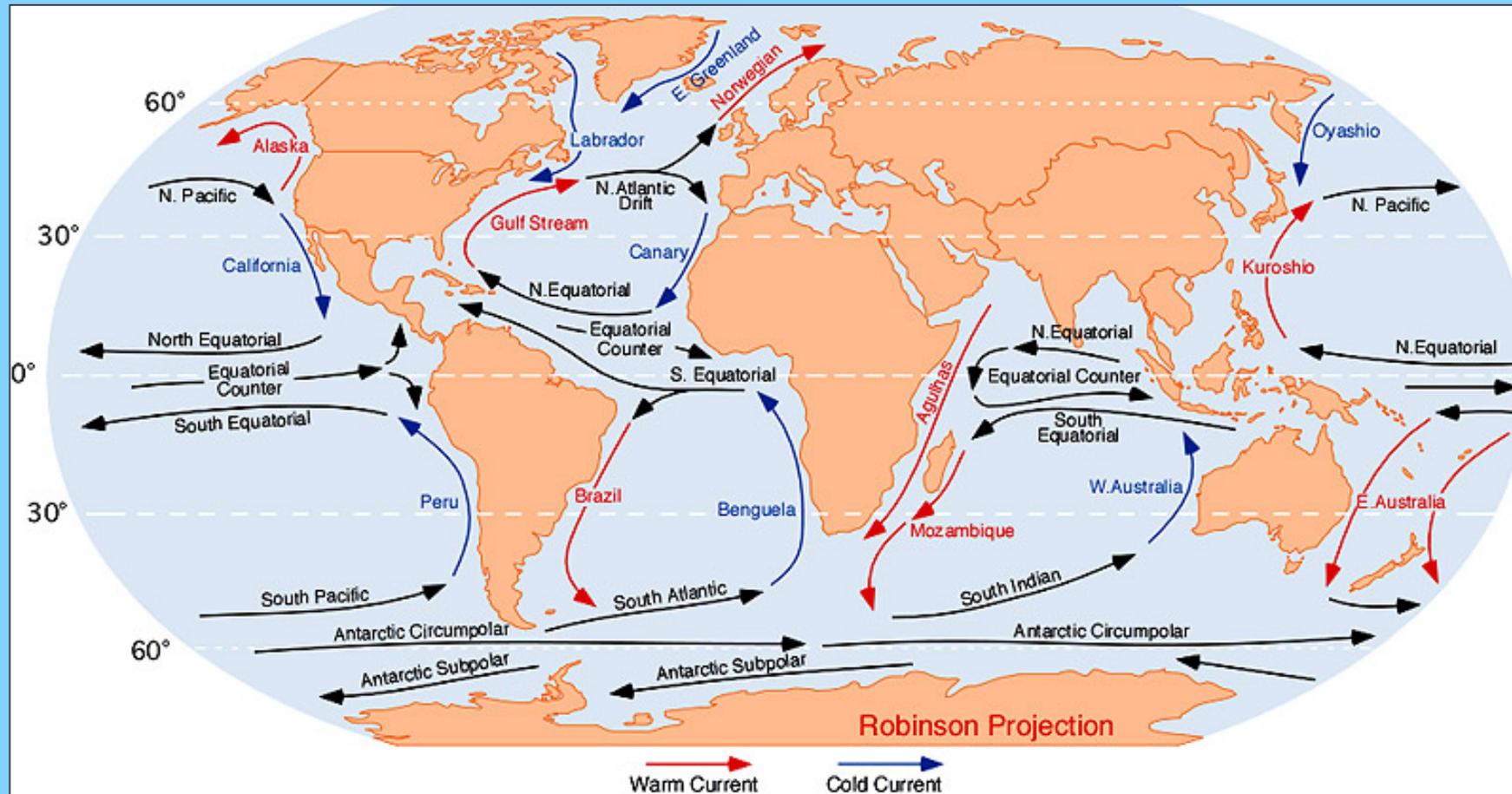
Climate

- Think about what you learned in social studies about Europe's climate. What surface current makes Europe's climate temperate (mild)?
- The Gulf Stream is a surface current that moves warm water from the tropics to the cooler regions around Europe.



Surface Currents

Notice again the Red arrows and the Blue arrows showing the movement of warm water and the movement of cold water



Gulf Stream and Climate

<http://www.youtube.com/watch?v=UuGrBhK2c7U>

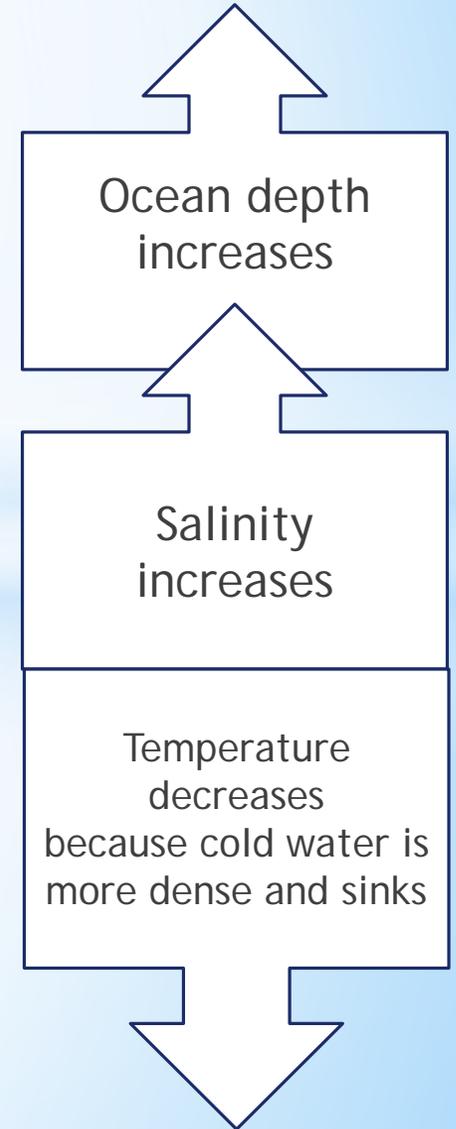
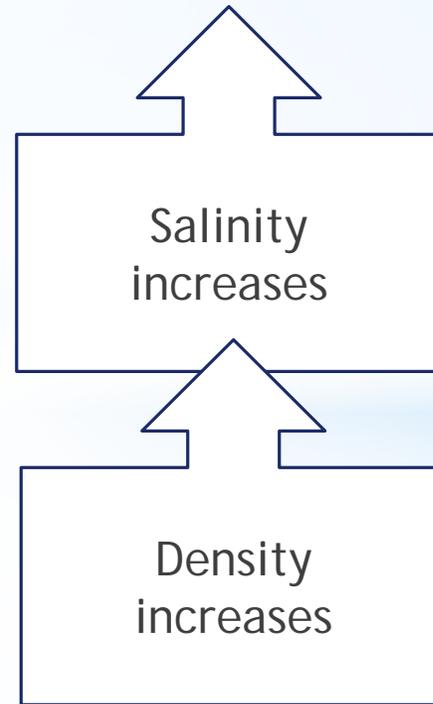
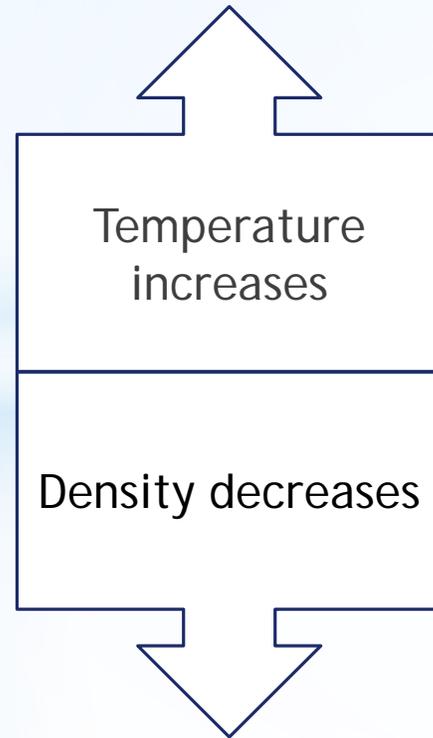
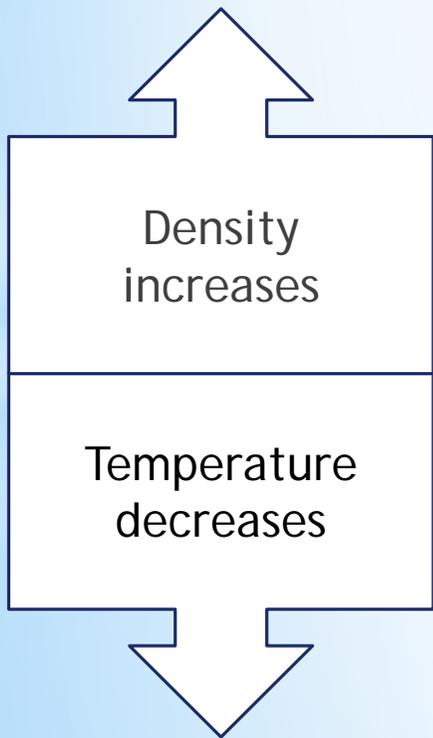
masses of water are moved by wind, but what did they say was the primary cause of ocean currents?

Different densities are responsible for ocean currents.

What factors did we learn influence ocean water's density?

Temperature and Salinity Affect the Density of Ocean Water.

Temperature, Salinity and Density

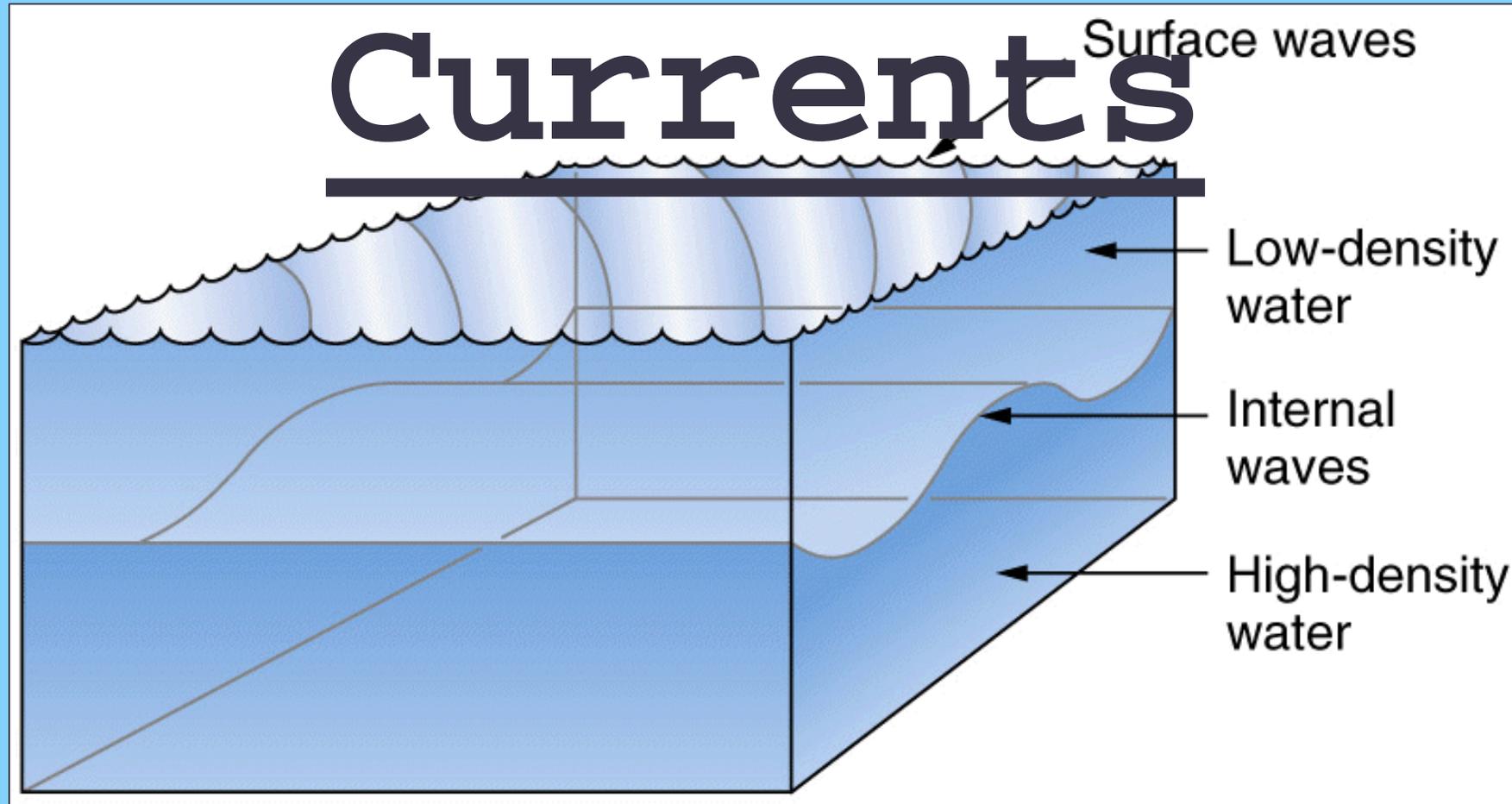


Currents

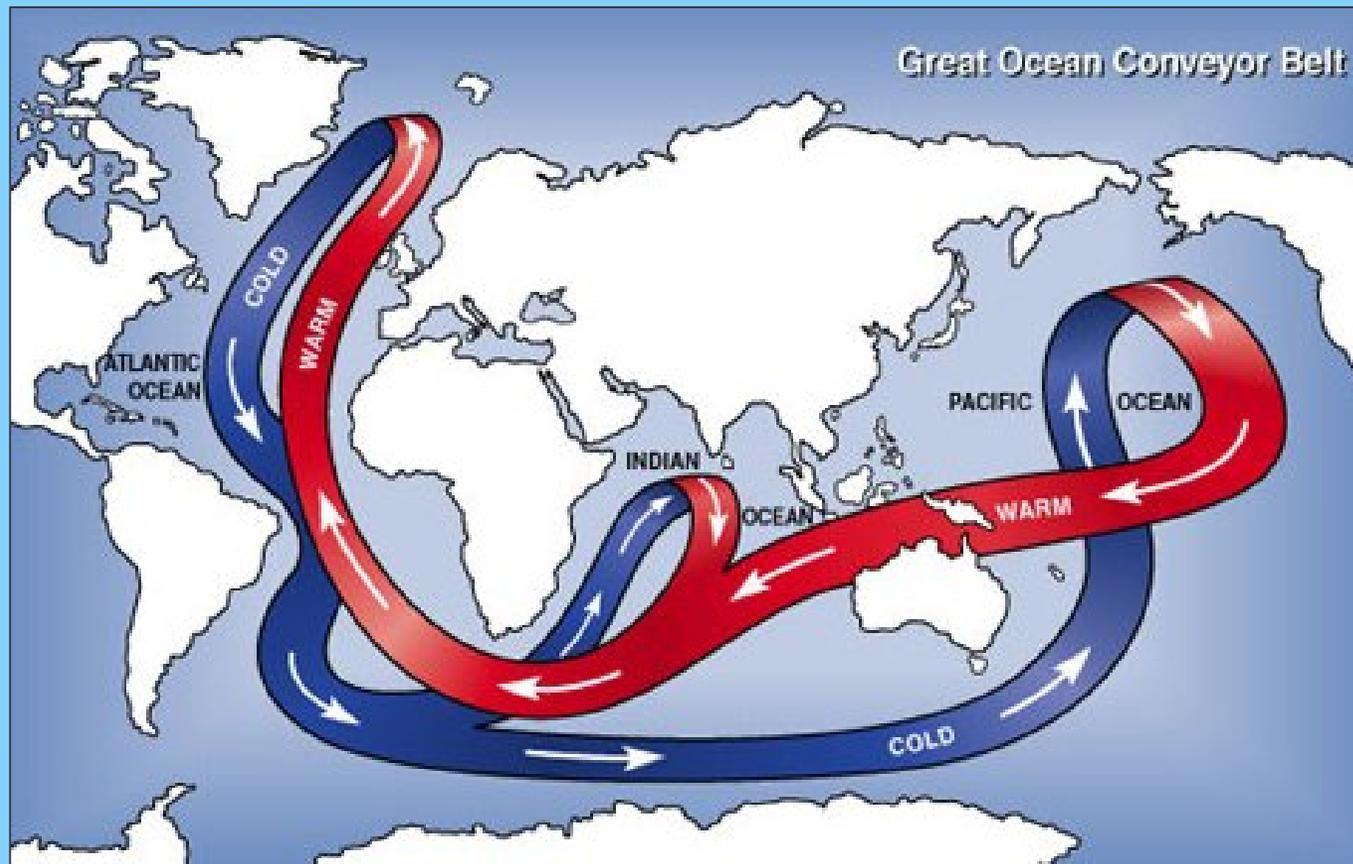
- Deep in the ocean, waters circulate not because of wind but because of density differences.
- A density current forms when a mass of seawater becomes more dense than the surrounding water.
- More dense seawater sinks beneath less dense seawater.
- Density currents circulate ocean water slowly.

Density

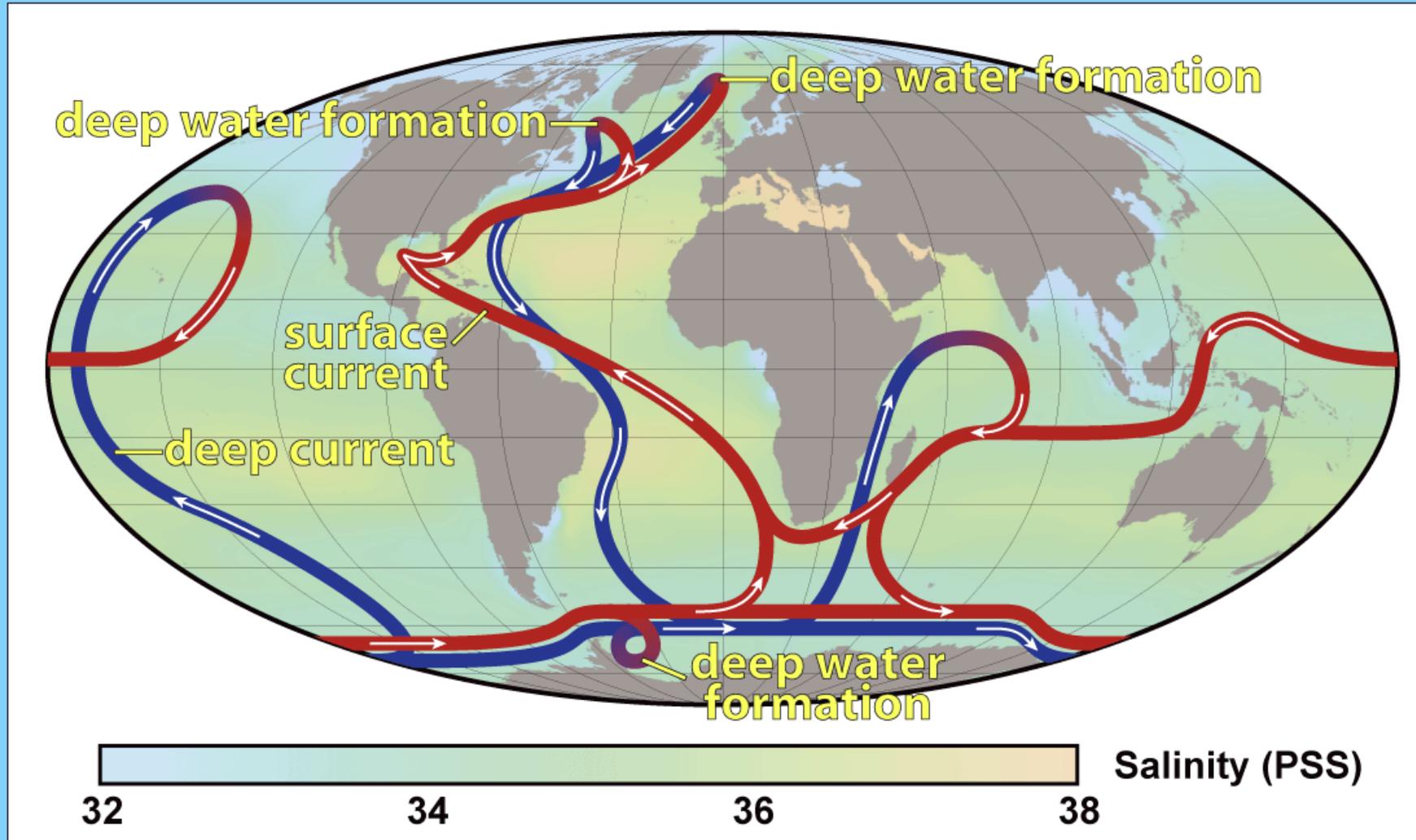
Currents



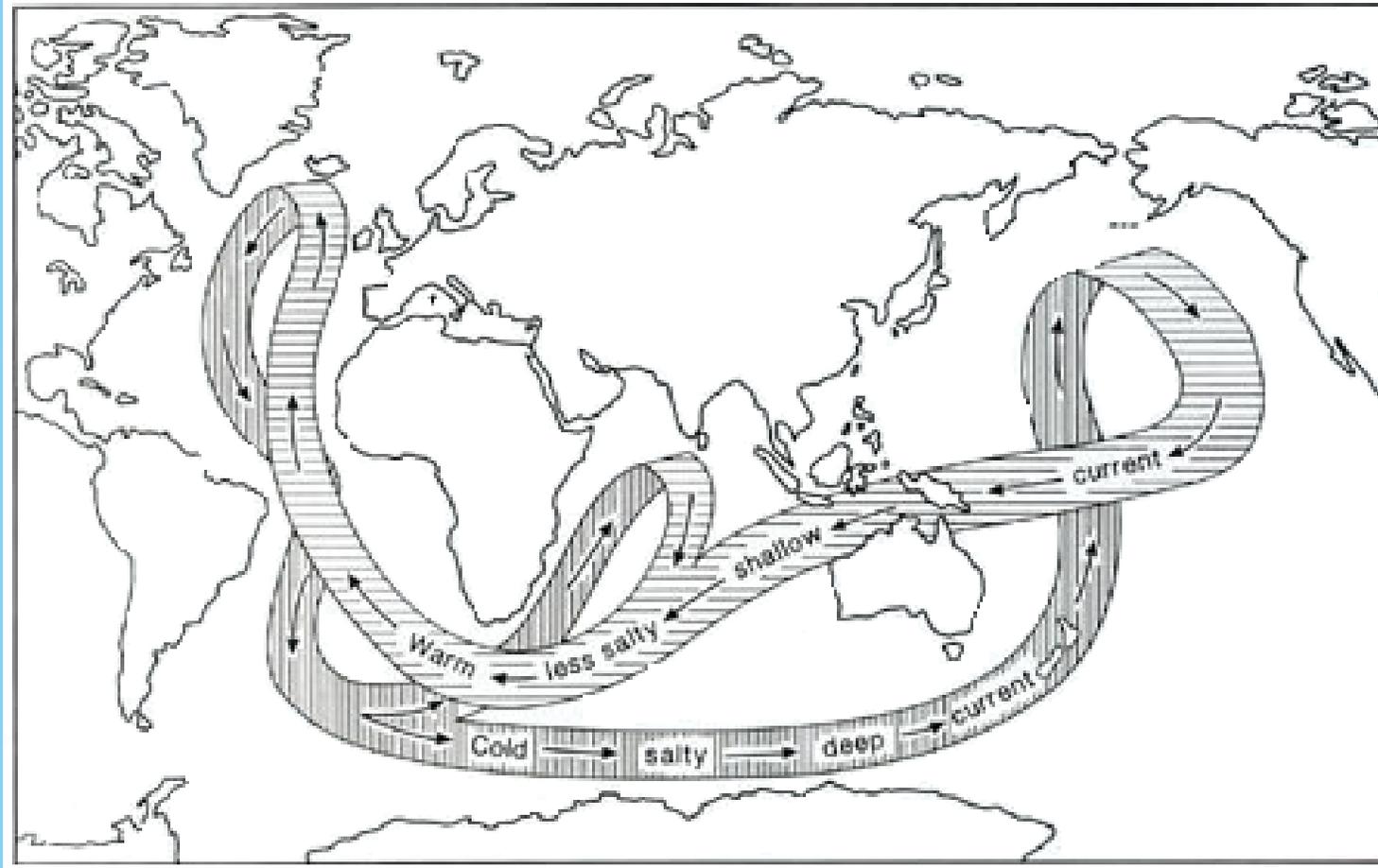
Density Currents



Currents



Label on your diagram



Waves & Currents Video

<http://studyjams.scholastic.com/studyjams/jams/science/weather-and-climate/waves-and-currents.htm>