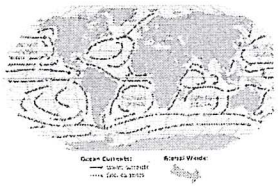
Ocean Currents

- Stream-like movements of Water
- Surface Currents —currents caused by the wind that occur at or near the surface of the ocean
    - Most reach about 100 m deep
    - Can reach thousands of km in length and stretch across oceans
    - Gulf Stream —one of strongest surface currents on Earth
    - **3 Factors that Affect Surface Currents**:

1. Continental Deflections

- When surface currents meet continents, the currents are deflected and change direction



2. Coriolis Effect

- Deflection of wind and ocean currents due to the rotation of Earth

3. Global Winds

- Different direction winds cause currents to flow in different
- Uneven heating from the sun → areas of differing pressure → wind → surface currents

Deep Currents

- Movements of ocean water far below Earth's surface
- Caused by differences in water density
- Density is affected by :
    - 1. Salinity —measure of dissolved salts/solids
        - High salinity = denser
    - 2. Temperature
        - Cold water = denser (molecules contract and move closer together)
        - Warm water = less dense = rises above cold water

Convection Currents

- Surface currents and deep currents together form convection currents—movement of water resulting from density differences.
    - Can be vertical, circular or cyclical
    - Transfers energy
        - Surface water absorbs sun's energy
        - Water cools as it is carried by currents to colder regions and sinks
        - Cold water rises as warm surface water moves away

Upwelling

- Cold, nutrient-rich water from the deep ocean rises to the surface
- Very important to ocean life
- Nutrients (like iron and nitrate) help to support the growth of phytoplankton and zooplankton
    - These tiny organisms are food for other larger organisms like fish and seabirds