TENDER HEART HIGH SCHOOL

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TIDES AND OCEAN CURRENTS

(1) Introduction

→ Hydrosphere refers to the mass of water that occupies the greatest part of our Earth's surface.

→ Hydrosphere occupies 71% of Earth's surface and the rest 29% is occupied by Lithosphere

→ It includes oceans, rivers, ponds, lakes, Glaciers etc.

→ Major oceans of Hydrosphere are Pacific Ocean, Atlantic Ocean, Indian Ocean, Southern Ocean and Arctic Ocean.

→ Major Seas of Hydrosphere are Mediterranean Sea, Caspian Sea, North Sea, Beaufort Sea, Red Sea, Dead Sea, South China Sea, Arabian Sea etc.

→ Hydrosphere has more presence in Southern part of Earth and less presence in Northern part of Earth

→ Hydrosphere is also characterised by various types of relief features Suchas Ocean trenches, mid oceanic ridge, deep sea plains, submarine canyons etc.

* Oceanography is the study of Physical, Chemical and Biological features of the ocean, including its ancient history, current condition and future.
* It is also known as Oceanology, Sea science, Ocean Science and Marine Science.

(2) Significance or Importance of Ocean

→ Oceans are the source of moisture that helps to cause rain.

→ Oceans helps to create maritime climate in coastal areas by maintaining favorable type of temperature throughout the year.

→ Ocean current blowing over oceans modifies the temperature and humidity of affected areas. Say, the warm ocean current increases the temperature and humidity while the cold ocean current decreases the temperature of the affected area.

→ Ocean acts as routes for trade and travel.

→ Oceans are the storehouse of Petroleum and Natural Gas.

→ Oceans are major source of Salt.

→ Oceanic plants and animals are used to make medicines.

→ Oceans are the biggest source of Marine food like fish, crab, lobster, Oyster etc.

→ Ocean helps to generate electricity with the help of Ocean Tides.

→ Oceans also acts as recreational centres.

(3) Types of Regular Movement of Oceanic Water

(a) Horizontal Movement :

The Horizontal Movement of Ocean Water is caused due to Ocean Currents and Winds.

(b) Vertical Movement :

The Vertical Movement of Ocean Water is caused due to rising of bottom water and sinking of surface water.

(4) Ocean Currents

Ocean currents are defined as regular movement of water from one region to another in a fixed direction on the surface water of Oceans.

(5) Types of Ocean Currents

(a) Warm Ocean Current:

→ These currents flow from warm tropical zones to cold temperate zones.

→ These currents flow away from equator.

(b) Cold Ocean Current:

→ These currents flow from cold Polar Region to Warmer Regions of the world.

→ These currents flow towards the equator.

(6) Causes of Ocean Currents

(a) Planetary Winds:

→ These winds blows regularly in a fixed direction throughout the year between particular latitudes and compels the surface water of the ocean to flow in a particular direction.

(b) Difference in Temperature of Ocean Water:

→ There is unequal heating of water in oceans. So the water present in Equatorial and Sub-tropical regions are warm and the water present in sub-polar and polar regions are cold.

→ Due to this reason, warm water near the equator becomes light and flows towards the cold Polar region. On the other hand, cold water of the Polar Region becomes heavy and sinks and also moves towards the equator in the form of Sub-Surface Current.

(c) Difference in Salinity of Ocean Water:

→ Ocean water having more salinity will have more density of water. On the other hand, ocean water having less salinity will have less density of water.

→ So due to this reason, ocean water having less salinity flows as surface current towards more saline region as it is less dense. On the other hand, ocean water having more salinity flows as sub-surface current towards less saline region as it is more dense.

Atlantic Ocean (less saline and less dense)	Mediterranean Sea (more saline and more dense)

(d) Coriolis Effect:

→ The rotation of the earth on its axis causes Coriolis Effect on Earth.

→ So due to this, Ocean Currents are deflected in Clockwise direction in Northern Hemisphere and Anti-clockwise in southern Hemisphere.

(e) Configuration of Coastlines:

→ It helps to deflect the moving water in a circular pattern, which is known as Gyre.

(7) Effects of Ocean Currents:

→ Ocean Current modifies the Climate of the Coastal Region

→ The winds passing over warm ocean currents picks up moisture and helps in bringing rain to the adjoining areas. On the other hand, winds passing over cold Ocean currents brings cooling effect to the adjoining areas.

→ Ocean currents influences the routes of Cyclonic Storms.

→ Ocean currents helps ships to sail faster.

→ The mixing of warm and cold Ocean current helps to promote temperature that is good for the growth of fish.

→ The mixing of warm and cold Ocean Current also creates dense fog that is dangerous for ships in oceans.