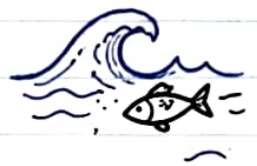


OCEANS - Class 9



Introduction: • Oceans cover 71% of Earth's surface.

Major Oceans:

- Pacific - (largest) ★ 
- Atlantic
- Indian
- Southern
- Arctic - (smallest) ❄️

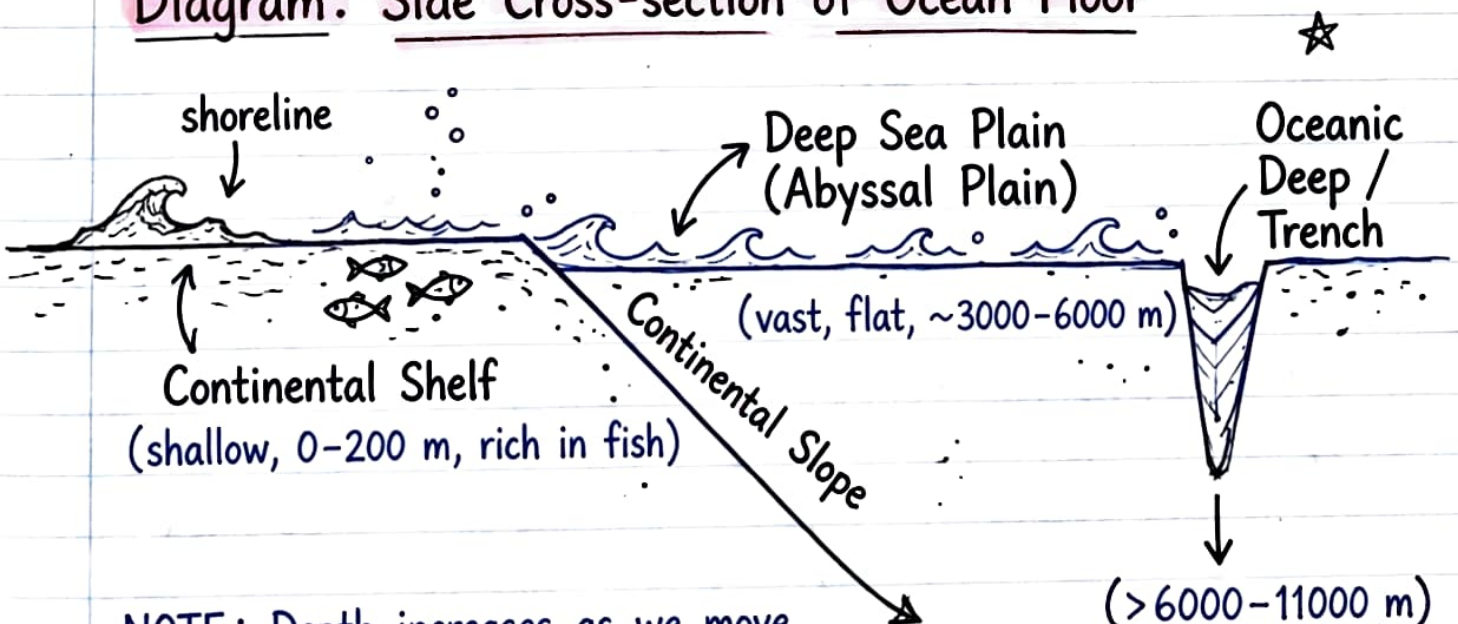
What is Ocean Floor?

- Ocean floor is not flat, it has varied relief like land.

Divide ocean floor into:

1. Continental Shelf
2. Continental Slope
3. Deep Sea Plain (Abyssal Plain)
4. Oceanic Deeps / Trenches

Diagram: Side Cross-section of Ocean Floor



NOTE: Depth increases as we move away from the shore →

Ocean Floor in Detail

- Ocean floor is divided into several major features/topographies.

1. Continental Shelf :

- shallowest part, up to 200 m deep
- sunlight reaches → supports photosynthesis, abundant marine life
- richest fishing grounds
- source of oil & gas
- Eg: Mumbai High (off Mumbai, India) - major offshore oil field

2. Continental Slope :

- steep slope between shelf and deep sea
- depth: 200 - 3000 m
- canyons present → submarine canyons cut through slope

3. Deep Sea Plain :

- flat extensive plains 3000 - 6000 m deep
- covered with fine clay & ooze (sediments)
- many seamounts present - underwater extinct volcanoes

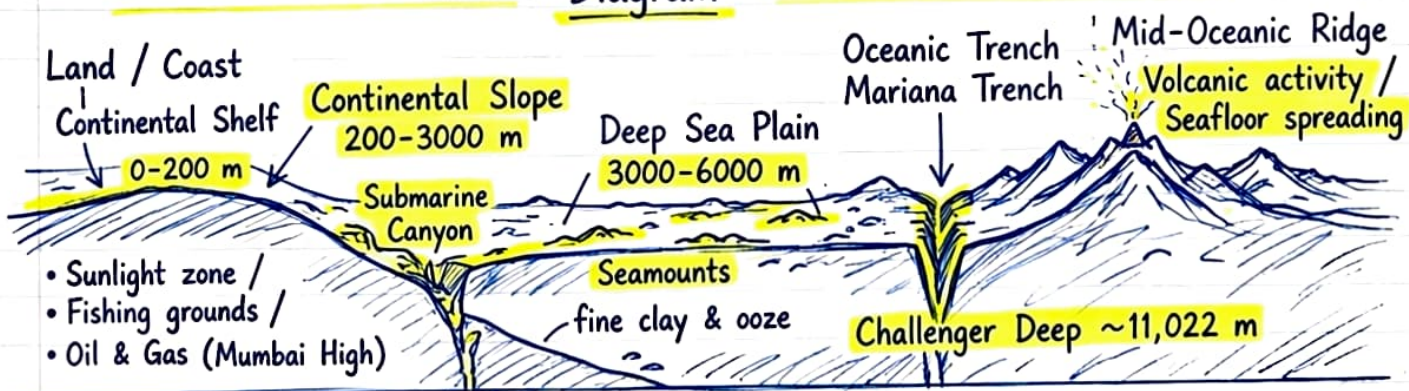
4. Oceanic Deeps / Trenches :

- deepest, narrow, steep-sided trenches
- e.g., Mariana Trench (Pacific Ocean)
- Challenger Deep ~ 11,022 m - deepest point on Earth

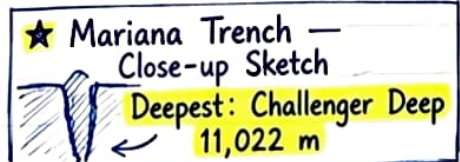
5. Mid-Oceanic Ridges :

- underwater mountain chains, longest mountain range on Earth
- volcanic activity, seafloor spreading, new crust formed
- e.g., Mid-Atlantic Ridge - runs through Atlantic Ocean

Diagram



* Not to scale - for study purpose



Page 3: Movements of Ocean Water - TYPES

Three main movements: • Waves • Tides • Ocean Currents

1. WAVES:

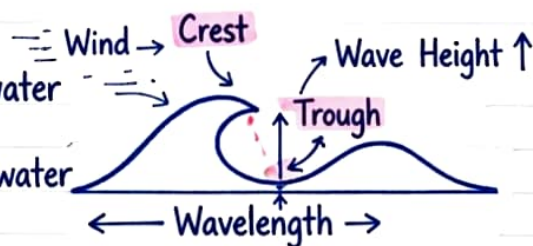
- Definition: waves are oscillatory movements of water caused by wind.
- Characteristics:
 - Crest (top) - the highest point of the wave
 - Trough (bottom) - the lowest point of the wave
 - Wavelength - horizontal distance between two crests or two troughs
 - Wave Height - vertical distance between crest & trough
- Formation: Wind rubs surface → energy transferred to water → creates waves

Types:

- Wind waves - formed by wind blowing over water surface (most common)
- Tsunami - caused by earthquake/volcano underwater

Importance:

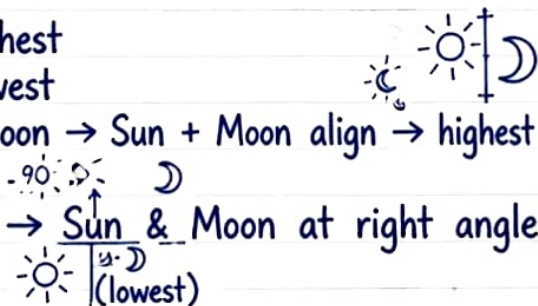
- causes erosion of coastlines
- helps in surfing & recreation
- wave energy can be used for power generation



(Diagram: Wave structure)

2. TIDES:

- Definition: periodic rise and fall of sea water, occurs usually twice a day caused by gravitational pull of Moon & Sun on Earth's water
- Types:
 - High Tide - water level is at its highest
 - Low Tide - water level is at its lowest
- Spring Tide: occurs at New & Full Moon → Sun + Moon align → highest tide (highest)
- Neap Tide: occurs at Quarter Moon → Sun & Moon at right angle → lowest tide



Importance:

- helps in navigation & port activities
- aids fishing (tides bring nutrients)
- used for tidal electricity generation

3. OCEAN CURRENTS:

- Continuous, directed flow of seawater in oceans
- caused by wind, temperature differences, Earth's rotation, density
- examples: Warm currents, Cold currents
- influence climate, marine life, navigation

* Note: All three movements are important for ocean ecosystems & climate regulation.*

Ocean Currents

★ **Definition:** Ocean currents are like rivers flowing in ocean, large streams of water moving continuously in definite direction.

★ **Causes:**

- Planetary winds
- ~~Temperature difference~~ - Salinity difference
- Rotation of Earth (Coriolis)
- Shape of continents

★ **Types:**

↑ **Warm Currents** → flow from equator to poles, e.g., Gulf Stream, Kuroshio

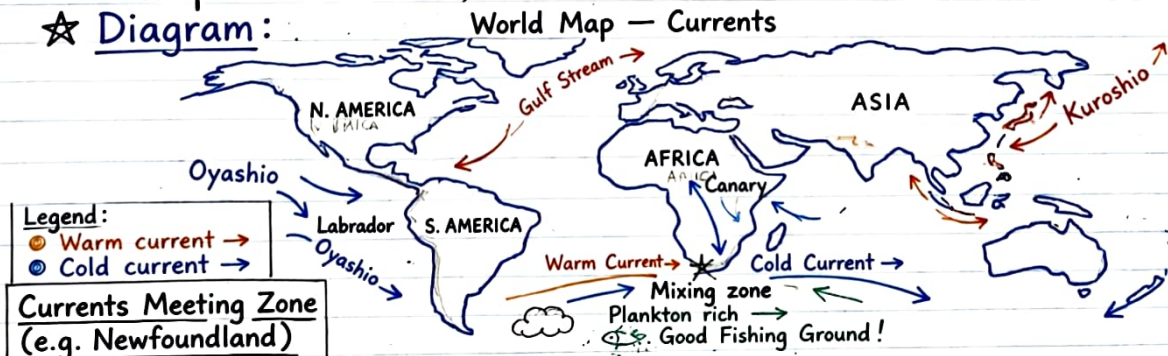
↓ **Cold Currents** → flow from poles to equator, e.g., Labrador, Canary, Oyashio.

★ **Effects:**

- affect climate of coastal areas ✓
- help in fishing (where warm & cold meet → e.g., Newfoundland)
- help navigation ✓



★ **Diagram:**



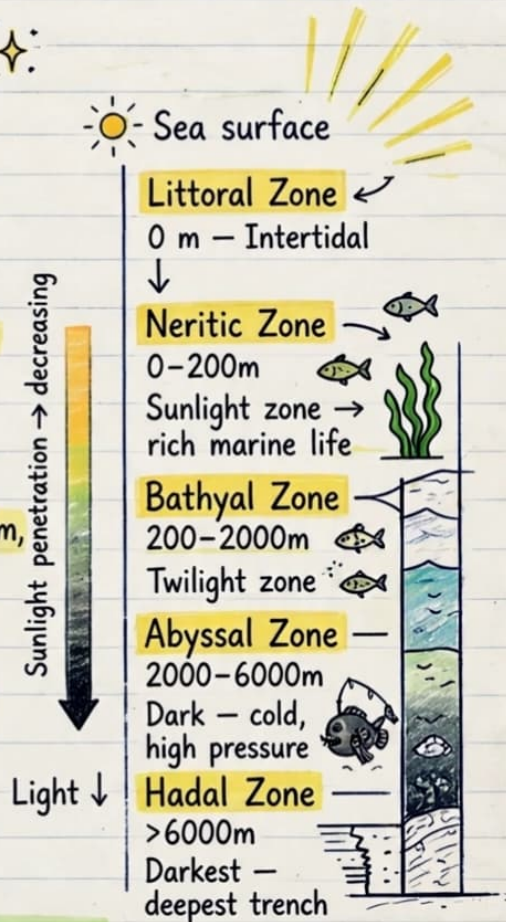
Marine Zones & Marine Resources

TOPPER'S NOTES

MARINE ZONES (based on depth):

-  **Littoral Zone** (between high & low tide, intertidal)
- Neritic Zone** — over continental shelf, up to 200m, sunlight, rich marine life
- Bathyal Zone** — over continental slope, 200–2000m, twilight
- Abyssal Zone** — deep sea plain, 2000–6000m, complete darkness, strange creatures
- Hadal Zone** — trenches >6000m

Diagram: Vertical Zonation of Ocean



MARINE RESOURCES:

Biotic Resources:

- Fish 
- Seaweeds 
- Plankton 
- Pearls 
- Corals 

Abiotic Resources:

- Minerals — common salt, potash 
- Oil & Gas — Bombay High 
- Manganese nodules — deep sea floor 

Importance:

- Food → protein source
- Medicine → compounds from marine organisms
- Minerals → industrial use
- Energy → oil & gas, renewable marine energy
- Transport → shipping routes

Threat:

- Overfishing → depletion of fish stocks
- Pollution → plastic, waste
- Oil spills → harm marine life & ecosystem

✓ Conservation needed → sustainable fishing, marine protected areas, reduce pollution, laws & monitoring

* Protect our oceans for future! *

