

Class 11 Geography Notes Chapter 13 Water (Oceans)

It is said that water is life. Water is an essential component of all life forms that exist over the surface of the earth.

Water is a cyclical resource. It can be used and reused in the form of a cycle. Water keeps on moving from the ocean to land and land to ocean.

The hydro logical cycle describes the movement of water on, in, and above the earth. The water cycle has been working for billions of years and all the life on earth depends on it.

The distribution of water on earth is quite uneven. Many locations have plenty of water while others have very limited quantity.

Reservoir	Volume (Million of the Total Cubic km)	Percentage of the total
Oceans	1,370	97.25
Ice Caps and Glaciers	29	2.05
Groundwater	9.5	0.68
Lakes	0.125	0.01
Soil Moisture	0.065	0.005
Atmosphere	0.013	0.001
Streams and Rivers	0.0017	0.0001
Biosphere	0.0006	0.00004

The hydro logical cycle, is the circulation of water within the earth's hydrosphere in different forms i.e, the liquid, solid and the gaseous phases.

About 71 per cent of the planetary water is found in the oceans. The remaining is held as freshwater in glaciers and ice caps, groundwater sources, lakes, soil moisture, atmosphere, streams and within life.

Nearly 59 per cent of the water that falls on land returns to the atmosphere through evaporation from over the oceans as well as from other places. The remainder runs-off on the surface, infiltrates into the ground or a part of it becomes glacier.

The geographers have divided the oceanic part of the earth into five oceans, namely the Pacific, the Atlantic, the Indian, Southern ocean and the Arctic.

The floors of the oceans are rugged with the world's largest mountain ranges, deepest trenches and the largest plains. These features are formed, like those of the continents, by the factors of tectonic, volcanic and depositional processes.

The ocean floors can be divided into four major divisions:

- the Continental Shelf;
- the Continental Slope;
- the Deep Sea Plain;
- the Oceanic Deeps.

Besides, these divisions there are also major and minor relief features in the ocean floors like ridges, hills, sea mounts, guyots, trenches, canyons, etc.

Components	Processes
Water storage in oceans	Evaporation , Evapotranspiration Sublimation
Water in the atmosphere	Condensation, Precipitation
Water storage in ice and snow	Snow melt runoff to streams
Surface runoff	Stream flow freshwater storage and infiltration
Groundwater storage	Groundwater discharge springs

The continental shelf is the extended margin of each continent occupied by relatively shallow seas and gulfs. It is the shallowest part of the ocean showing an average gradient of 1° or even less.

The Siberian shelf in the Arctic Ocean, the largest in the world, stretches to 1,500 km in width. The depth of the shelves also varies. It may be as shallow as 30 m in some areas while in some areas it is as deep as 600 m.

The continental slope connects the continental shelf and the ocean basins. It begins where the bottom of the continental shelf sharply drops off into a steep slope. The gradient of the slope region varies between 2-5°. The depth of the slope region varies between 200 and 3,000 m.

Deep sea plains are gently sloping areas of the ocean basins. These are the flattest and smoothest regions of the world. The depths vary between 3,000 and 6,000 m. These plains are covered with fine-grained sediments like clay and silt.

Oceanic Deeps or Trenches are the deepest parts of the oceans. The trenches are relatively

- steep sided, narrow basins. They are some 3-5 km deeper than the surrounding ocean floor.

A mid-oceanic ridge is composed of two chains of mountains separated by a large depression. The mountain ranges can have peaks as high as 2,500 m and some even reach above the ocean's surface. Iceland, a part of the mid- Atlantic Ridge, is an example.

The average temperature of surface water of the oceans is about 27°C and it gradually decreases from the equator towards the poles. The rate of decrease of temperature with increasing latitude is generally 0.5 CC per latitude.

The average salinity of the Indian Ocean is 35%. The low salinity trend is observed in the Bay of Bengal due to influx of river water. On the contrary, the Arabian Sea shows higher salinity due to high evaporation and low influx of fresh water.

Table 3	
Dissolved salts in sea water	gm of salt per kg of water
Chlorine	18.97
Sodium	10.47
Sulphate	2.65
Magnesium	1.28
Calcium	0.41
Potassium	0.38
Bicarbonate	0.14
Bromine	0.06
Borate	0.02
Strontium	0.01

The salinity fluctuates from 0 – 35‰, seasonally. In hot and dry' regions, where evaporation is high, the salinity sometimes reaches to 70‰. The salinity variation in the Pacific Ocean is mainly due to its shape and larger areal extent. Salinity decreases from 35‰ – 31‰ on the western parts of the northern hemisphere because of the influx of melted water from the Arctic region.

Class 11 Geography Notes Chapter 13 Important Terms:

- **Continent shelf:** The continental shelf is the extended margin of each continent occupied by relatively shallow seas and gulfs. It is the shallowest part of the ocean showing an average gradient of 1° or even less.
- **Thermocline:** The boundary region, from where there is a rapid decrease of temperature, is called the thermocline.

- **Trenches:** These areas are the deepest parts of the oceans. The trenches are relatively steep sided, narrow basins. They are some 3-5 km deeper than the surrounding ocean floor.
- **Mid-oceanic ridges:** A mid-oceanic ridge is composed of two chains of mountains separated by a large depression. The mountain ranges can have peaks as high as 2,500 m and some even reach above the ocean's surface.
- **Continental slope:** The continental slope connects the continental shelf and the ocean basins. It begins where the bottom of the continental shelf sharply drops off into a steep slope. The gradient of the slope region varies between 2-5°.
- **Seamount:** It is a mountain with pointed summits, rising from the seafloor that does not reach the surface of the ocean. Seamounts are volcanic in origin. These can be 3,000 – 4,500 m tall.
- **Shelf break:** The shelf typically ends at a very steep slope, called the shelf break.
- **Submarine canyons:** These are deep valleys, some comparable to the Grand Canyon of the Colorado river. They are sometimes found cutting across the continental shelves and slopes, often extending from the mouths of large rivers. The Hudson Canyon is the best known submarine canyon in the world.
- **Guyot:** It is a flat topped seamount. It shows evidences of gradual subsidence through stages to become flat topped submerged mountains. It is estimated that more than 10,000 seamounts and guyots exist in the Pacific Ocean alone.
- **Water cycle:** All living organisms, the atmosphere and the lithosphere maintain between them a circulation of water in solid, liquid or gaseous form referred to as the water or hydro-logic cycle.
- **Atoll:** These are low islands found in the tropical oceans consisting of coral reefs surrounding a central depression. It may be a part of the sea (lagoon), or sometimes form enclosing a body of fresh, brackish, or highly saline water.
- **Salinity:** Salinity is the term used to define the total content of dissolved salts in sea water. It is calculated as the amount of salt (in gm) dissolved in 1,000 gm (1 kg) of seawater.
- **Halocline:** It is a distinct zone where salinity increases sharply.