# Geography Unit-3

## Hydrologic Cycle

Dear Students

Warm Greetings, now we are going to learn about ***– Precipitation, Forms of Precipitation.***

**Precipitation**

Precipitation refers to all forms of water that fall from clouds and reaches the earth's surface. For the occurrence of precipitation, cloud droplets or ice crystals must grow heavy enough to fall through the air. When the droplets grow large in size, they tend to fall. While moving down, by collecting some small droplets, they become heavy enough to fall out of the cloud as raindrops.

**Forms of Precipitation**

The form of precipitation in a region depends on the kind of weather or the climate of the region. The precipitation in the warmer parts of the world is always in the form of rain or drizzle. In colder regions, precipitation may fall as snow or ice. Common types of precipitation include rain, sleet, freezing rain, hail and snow.

**Rain:** The most common kind of precipitation is rain. The precipitation in the form of water droplets is called rain. The precipitation in which the size of rain drops are <0.5 mm in diameter is known as drizzle and the rain drops with >0.5 mm in diameter is known as rain. Generally drizzle takes place from stratus clouds.

**Sleet:** The precipitation which takes place in the form of mixture of water droplets and tiny particles of ice(5mm in diameter) is known as sleet. Sometimes raindrops fall through a layer of air below 0°C, the freezing point of water. As they fall, the raindrops freeze into solid particles of ice. So, the mixture of water droplets and ice particles would fall on the earth surface.

**Freezing Rain:** At other times raindrops falling through cold air near the ground do not freeze in the air. Instead, the raindrops freeze when they touch a cold surface. This is called freezing rain and the drops of water are usually greater than 0.5 mm in diameter.

**Hail:**

The precipitation which consists of round pellets of ice which are larger than 5 mm in diameter is called hail or hailstones. Hail forms only in cumulonimbus clouds during thunderstorms. A hailstone starts as an ice pellet inside a cold region of a cloud. Strong updrafts in the cloud carry the hailstone up and down through the cold region many times.

**Snow:**

Often water vapour in a cloud is converted directly into snow pieces due to lowering of temperature. It appears like a powdery mass of ice. The precipitation in the form of powdery mass of ice is known as snowfall. It is common in the polar and high mountainous regions.

**Infiltration**

Water entering the soil at the surface of the ground is termed as infiltration. Infiltration allows the soil temporarily to store water, making it available for plants use and organisms in the soil. Infiltration is an important process where rain water soaks into the ground, through the soil and underlying rock layers. Some of this water ultimately returns to the surface through springs or low spots down hills. Some of the water remains underground and is called groundwater. The rate of infiltration is influenced by the physical characteristics of the soil, vegetative cover, moisture content of the soil, soil temperature and rainfall intensity. The terms infiltration and percolation are often used interchangeably.

Percolation is the downward movement of infiltrated water through soil and rock layers. Infiltration occurs near the surface of the soil and delivers water from the surface into the soil and plant root zones. Percolation moves the infiltrated water through the soil profile and rock layers which leads to the formation of ground water or become a part of sub-surface run-off process. Thus, the percolation process represents the flow of water from unsaturated zone to the saturated zone.

**Runoff**

Runoff is the water that is pulled by gravity across land's surface. It replenishes groundwater and surface water as it percolates into an aquifer (it is an underground layer of water-bearing rock) or moves into a river, stream or watershed. It comes from unabsorbed water from rain, snowmelt, irrigation or other sources, comprising a significant element in the water cycle as well as the water supply when it drains into a watershed.

Runoff is also a major contributor to the erosion which carves out canyons, gorges and related landforms. The amount of runoff that can happen depends on the amount of rainfall, porosity of soil, vegetation and slope. Only about 35% of precipitation ends up in the sea or ocean and the other 65% is absorbed into the soil.

**Types of Runoff**

Based on the time interval between the instance of rainfall and generation of runoff, the runoff may be classified into following three types

- **Surface Runoff:** It is the portion of rainfall, which enters the stream immediately after the rainfall. It occurs, when the rainfall is longer, heavier and exceeds the rate of infiltration. In this condition the excess water makes a head over the ground surface, which tends to move from one place to another following land gradient and is known as overland flow. When the overland flow joins the streams, channels or oceans, it is termed as surface runoff or surface flow.

- **Sub-Surface Runoff:** The water that has entered the subsoil and moves laterally without joining the water-table to the streams, rivers or oceans is known as sub-surface runoff. The sub-surface runoff is usually referred as interflow.

- **Base Flow:** It is a flow of underground water from a saturated ground water zone to a water channel. It usually appears at a downstream location where the channel elevation is lower than the groundwater table. Groundwater provides the stream flow during dry periods of small or no precipitation.

***Units of the Measurement pertaining to Hydrology***

- *Evaporation /interception - inches (or) cm*
- *Infiltration - inches (or) cm / hour*
- *Precipitation - inches (or) mm ( or) cm*
- *Run off - inches (or) mm (or) cm*
- *Run off rate - cubic feet per second*
- *Run off volume - acre feet (or) cubic feet*
- *Storage - cubic feet (or) acre feet*