

14. Water (By:- J.S. Mishra)

Introduction: Water is important to us. Without water life can not exist. While Earth has an abundant reservoir of water, covering three-fourths of its surface, Freshwater is a mere 2.6% of the total water. Water is said to be a renewable resource but the rate at which humans and animals are using water, fresh water might be a scarce resource in the recent future. Our body is also made up of 70% water and we use water for a number of reasons from cooking to cleaning and of course drinking it.

Where does water come from?

People living in different regions have different sources of the water that they use. While some draw it from wells, ponds and lakes directly, others like many of us receive water through taps via a network of pipes connected to these lakes, ponds and rivers.

Water cycle: It is circulation of water through the process of evaporation or condensation as rain or snowfall. Water cycle is like a ring. In nature, the water cycle takes place from sea to land and back to sea again.

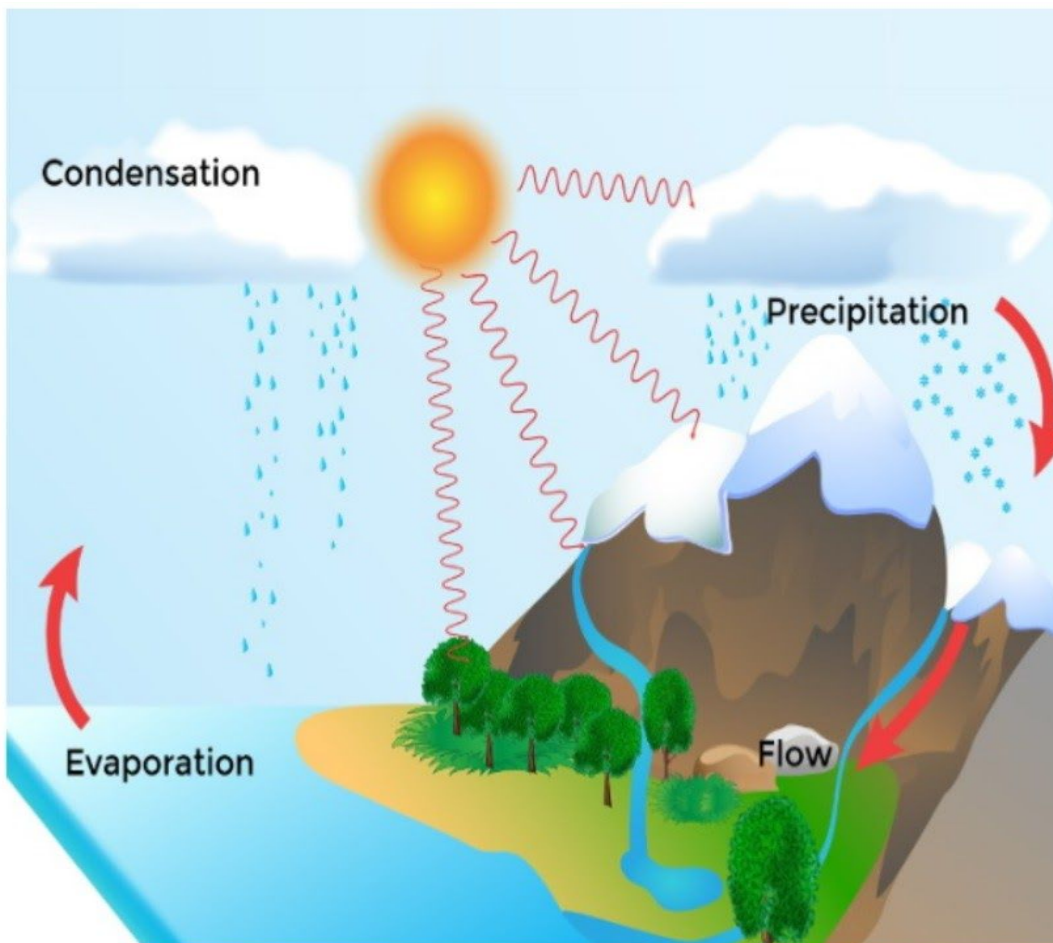


Fig- Water Cycle

Three States of Water

Water can exist in all the three states—solid, liquid and gas.

Solid state: Water turns into ice on cooling. Ice is the solid form of water.

Liquid state: The water that we use in everyday life is a liquid. It is called liquid state of water.

Gaseous state: We have learnt that on heating, water evaporates to form its vapour. Water vapour is its gaseous state.

•These three states of water are interconvertible to each other, that is, we can change it from one state to another.

Evaporation:

•The process of changing water to its vapour form is known as evaporation.

•Evaporation takes place from open surfaces of water all the time—day and night.

•Evaporation of water takes place continuously from oceans, rivers, lakes, wells and soil.

Oceans, seas, rivers, lakes, ponds and wells together are often known as water bodies.

•During the day time, sunlight falls on the water in oceans, rivers, lakes. The fields, roads, rooftops and other land areas also receive sunlight. The sunlight also carries heat with it. As a result, water from oceans, rivers, lakes and the soil, and other land areas gets continuously changed into vapour.

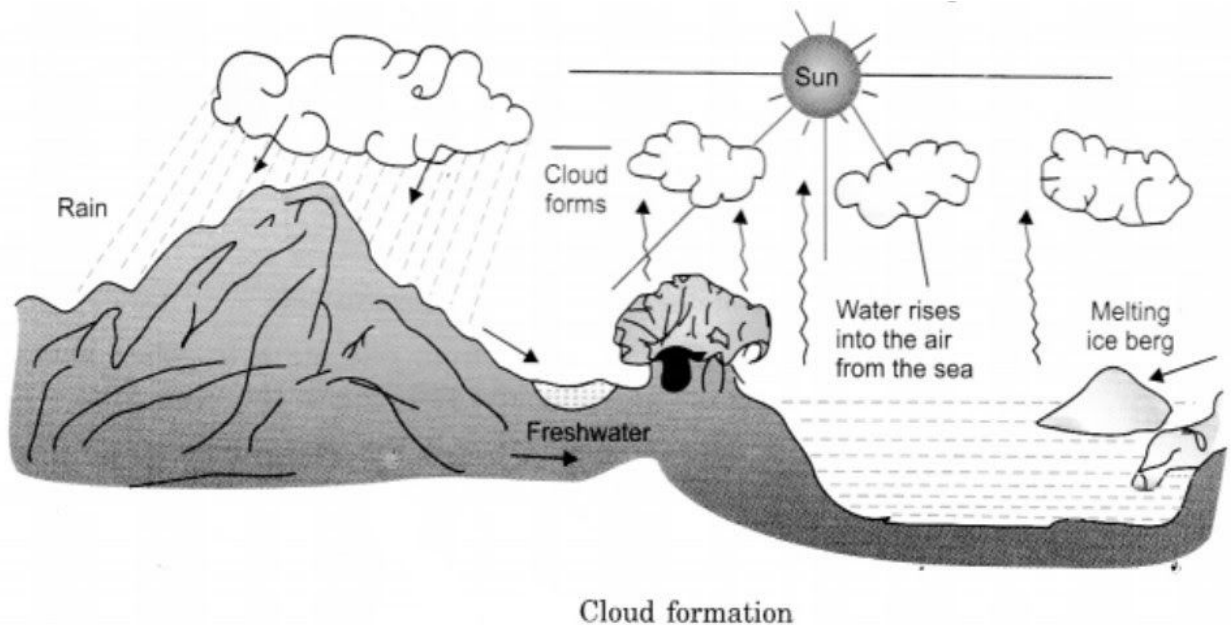
•Thus, water vapour gets continuously added to air due to evaporation.

Condensation:

The process of conversion of vapour into liquid form of water is called condensation.

•The process of condensation is opposite to evaporation.

Cloud formation: The climate close to the earth's surface is warm. It gets cooled as one goes up in atmosphere. Water vapour being lighter, rises up in the atmosphere. At the upper layer of atmosphere, where the temperature is lower, the vapour gets condensed into tiny water droplets and forms clouds.



Transpiration:

It is the loss of water from the leaves of plants in the form of vapour.

•Every plant, whether it is in a crop field, a forest, on the roadside or in a kitchen garden, transpires to give off water vapour. The amount of water vapour that goes into air through the process of transpiration is very huge.

Precipitation:

Clouds carry small droplets of water in them. It may so happen that many droplets of water come together to form larger sized drops of water. Such drops of water may become so heavy that they begin to fall. Falling of water drops is called precipitation.

Rain: If the water during precipitation remains liquid till it reaches the surface of the earth, we have rains.

Hail/Snow: Sometimes precipitation may be in the form of hail or snow. Water in a hail or snow is in its frozen or solid form.

Dew: Many times, especially during winter nights, the air near the surface becomes quite cool. As a result, the water vapour present in it condenses to form water droplets. These water droplets appear as dew.

Water Back to Ocean

The water that falls on the land as rain and snow sooner or later goes back to oceans. This may happen in many ways.

Uses of Water:

- ★ It is needed for drinking, bathing, washing, cleaning of vessels, toilets, flushing, etc.
 - ★ Our body contains about 70 per cent of water. Therefore, water is essential for our life.
 - ★ Water helps animals and plants to cool.
- Water is essential for the germination of seeds.
- ★ Water is required for irrigation of the crops.
 - ★ Water is used to generate electricity.
 - ★ Water wheel is used to run flour mills.
 - ★ Water is used in many industries, like paper, rayon, petroleum refining, fertilizers, dyes, drugs and other chemical industries.
 - ★ Water is used in car radiators to keep the engine cool.
 - ★ In cold countries, people use water to warm their houses.
 - ★ Water is used to keep the things cool.

Sources of Water:-

Rivers and springs: Most of the water which human beings use for drinking, washing and farming comes from rivers and springs. The river flows down the mountain side and across the land, finally flowing into a sea or an ocean.

Oceans and seas: Most of the water on the earth is found in the oceans and seas. However, the water found in the oceans and seas is not fit for drinking or agricultural purposes as it contains large amount of salt. Ocean acts as a habitat for large number of plants and animals.

Lakes and ponds: These are small reservoirs of water. These are created by Collection of rainwater in low lying areas. Seepage from the groundwater reserves also adds to the water in lakes and ponds.

Rain: The rain is a very important source of water for us. All resources of water are fed mainly by rains.

Groundwater: The ground water is actually rainwater which mainly comes from seepage of water accumulated under the ground.

Water table: If you take soil from ground, it has air as well as water. As you go down, the amount of water increases and air decreases. A level below surface, where it is only water, is called the water table.

Natural Calamities

The conditions of flooding and drought are called natural calamities.

Drought: If it does not rain for a year or more at a place, the soil will lose its water by evaporation and becomes dry. Water will also be lost through transpiration process from the plants. Rivers, ponds and wells will dry and the water table would lower down. All this will affect the humans, animals and wild plants. If it continues for one or two years consecutively, it results into drought.

Consequences of drought: The result of drought may be no crops. The availability of food and fodder will decrease. The overall consequence of such a situation will lead to loss of life of humans and animals.

Flood: In case of continuous rains, the water level of rivers, lakes and ponds will rise. The soil surface will get laden with water resulting into flood. Consequences of flood: When the soil gets too much of water, air in the soil comes out of it. Due to lack of air, the animals living inside the soil also come out of it. Heavy rainfall also results in the loss of crops due to flood.

Factors responsible for flood: A number of factors are responsible for flood. These factors can be intensity and duration of rainfall, soil condition and presence of plants or trees on the ground.

Water Conservation:

- We should take care that water should not get wasted.
- We should use water for gardening that has already been used in the kitchen for washing vegetables and fruits, etc.
- Always be careful that the water tank in your house doesn't overflow when it is being filled.
- Don't use a hose pipe to wash your car or scooter. Use a bucket instead.
- Turn off the tap while no use.

Conservation Of Water:

Conservation of water can be done by building dams, avoiding wastage of water at homes, rainwater harvesting, and preventing pollution of water.

Building Dam

A dam is a structure built to hold back water in order to prevent floods, and to provide water for irrigation and storage.

Building a dam is a solution to both drought and flood.

★Dams are also used in producing electricity. Built on rivers, a dam has high walls and has many openings or gates to both let in and hold back water.

★During heavy rainfall, when the rivers fill up, water enters the dam. When water is needed later, the gates are opened to let out water.

Avoiding Wastage at Homes:

Some ways to avoid wastage of water at homes are:-

- We should use water for gardening that has already been used in the kitchen for washing vegetables and fruits, etc.
- Always be careful that the water tank in your house doesn't overflow when it is being filled.
- Don't use a hose pipe to wash your car or scooter. Use a bucket instead.
- Turn off the tap while no use.

Rainwater Harvesting:

The process of collecting and storing rainwater from roofs or a surface catchment is called rainwater harvesting. ★Storing rainwater that collects on roofs instead of letting it go down the drain is known as rooftop rainwater harvesting. This involves collecting rainwater from rooftops

in dugout ponds, vessels, or underground tanks to store water for long periods. Another option is to allow water to go into the ground directly from the roadside drains that collect rainwater. The stored rainwater is treated before use because it may contain chemicals and other pollutants which need to be removed before use.

Preventing Water Pollution:

Another method to conserve water is to safeguard our freshwater bodies from pollution.

★Garbage and harmful chemicals pollute the water and make it unfit for use. ★Polluted water is also very bad for aquatic life. Plants and animals in and around polluted water may die or get infected. And when human beings consume contaminated fish, etc., they are also put at risk of diseases.

Some important terms:-

Saltwater: Water of the seas and oceans that has high salt content, making it unfit for drinking and irrigation, is called salt water.

Freshwater: Water found in rivers, lakes, and ponds used for domestic and commercial purposes is called fresh water.

Irrigation: Watering crops by artificial means is called irrigation.

Potable water: Water fit for human consumption is called potable water.

Famine: Lack of food in a region for a long period is called famine.

Epidemic: A disease affecting thousands of people at the same time is called an epidemic.

Dam: A structure built on a river to store and hold back water is called a dam.

Groundwater: The groundwater is actually rainwater which mainly comes from seepage of water, accumulated under the ground.

Hail: Sometimes during precipitation of water droplets, water freezes, and takes the form of hail.