Water

Water is renewable resource which is essential for sustenance of life. It covers 3/4th of the Earth's surface. Of the total water present in hydrosphere 97% is present in an ocean which is not utilizable by living beings. Only 3% water is fresh water. Among this 3%, 72.2% is stored in glaciers and ice caps (frozen), 22.4% is ground water and soil moisture. Remaining 0.36% is found in lakes, rivers, streams and swamps.

Water resources can be classified into two types:

1. Fresh Water Resources: It consists of glaciers, rain water, ponds, lakes, large rivers. It can be recycled. It is essential for life on Earth as well as for survival.

2. Salt Water Resources: It consists of oceans, seas etc. It cannot be used by living beings for drinking.

(1) Properties of Water:

• Water is a compound made up of hydrogen and oxygen and it is found in all three states i.e. solid, liquid and gas.

• **Density of water is maximum at 4°C.**

• Pure water is transparent, colorless, odourless and tasteless.

• Water has no definite shape as mostly it is present in liquid form.

• By heat water evaporates and it is converted into gaseous form from liquid form. Cloud formation usually takes place by the process of **evaporation.** In summer season, wet clothes dries easily as water is easily lost from the clothes because of process of evaporation. Evaporation takes at all temperature.

• **On cooling water below O° C freezing starts to take place.** When due to decrease in temperature gaseous and vapor form of water converts into liquid. The process is called **condensation.**

• **Water is a universal solvent.** It has capacity to dissolve variety of different substances of all the known liquid water is the best solvent.

• Things that have density more than water will sink in water and things that have lesser density than water will float on the water. e.g. wooden boat, iron ship, empty plastic bottle, empty bowl, ice and soap with soap case will float in water, Whereas bowl filled with pebbles, iron, nail, needle, spoon, bottle full of water, soap cake etc. will sink in a water.

• Lemon and egg when placed in pure water will sink in water, but when same lemon and egg are placed in water in which good amount of salt is present will float in water. This phenomenon can be explained by **density.**

• Water is also converted into gaseous form by process of **boiling.** Boiling takes place at very specific temperature. It occurs in the whole water mass while evaporation took on the exposed water surface.

• For boiling external energy source i.e. extra heat is required while evaporation does not need any external source of energy, atmospheric heat is sufficient for evaporation.

Types of Water On The Basis of Mineral Content:

a) Hard Water: The water with naturally present minerals like magnesium and calcium with detectable amount is called hard water.

• It is rich in minerals

• No foam and lather from soaps.

• Sometimes preferred drinking water

• Hair and skin become dry

• Example: Groundwater like deep wells.

b) Soft Water: It is treated water, salty in taste. It is left with only cations and that is sodium.

• Contains very few elements

• Soap is easily effective

• Contains sodium ion

• Sometimes not preferred drinking water

• Hair and skin becomes soft

• Example: Rainwater

(2) Uses of Water

Our human body is made up of 70 – 80% of water. Water is the main constituent of our cell, tissues blood and it plays very important role in metabolic activities of the body.

• Water is consumed by the plant and during process of photosynthesis plants breaks water to provide oxygen. Water helps in transportation of nutrient and mineral in plants, helps in maintaining the normal shape of plant cell and promote its growth.

• Water is used nearly in all industries in some form or other. e.g., textile paper, chemical, pharmaceutical and food processing industries etc.

• Water plays an important role in agriculture, livestock management. Water can be also used for electricity generation and transportation.

• Water is used in aquarium. In aquarium, a pore is provided on the top surface, through which air can enter but in some aquarium air pumps is also seen. Air pumps oxygen into aquarium.

• Water is considered very sacred and it has great importance in traditional and religious customs. River like Ganga is worshipped and water of river Ganga is used in religious customs and traditions.

KEY FACTS:

How Salt is made from Sea Water?

The sea water is collected in Shallow beds dug in the sand. Water is allowed to dry in the sun and after the water dried salts remained on the ground.

During movement for Independence, Gandhiji went on Dandi March to make a salt at the sea coast. During that time, law did not allowed Indian people to make salt themselves and law also put heavy taxation on salt. In order to protest against this law, **Gandhiji went on Dandi March in year 1930.**

Dead Sea

All ocean and sea have salty water. The saltiest of all is the dead sea Approximately 300 grams of salt are present in one liter of water. Even if a person who does not know how to swim will not drown in this sea, person will float as if lying down on it.

(3) Water Pollution

Water pollution is defined as contamination of water and water bodies. This contamination is caused by presence of any unwanted compound in the water.

• Water has been polluted because of many natural activities like volcanic activity, draining of large river with sediment into the ocean etc.

• River water has been contaminated because sewage from city, towns are drained into it without being treated.

• Many domestic waste and wastes from animal houses are thrown into water bodies. These domestic wastes cause pollution of water.

• Wastes from the industries contain various types of chemicals.

• Water bodies have been polluted due to over use of fertilizer and manure in the agricultural field.

• Water has been polluted because of various human activities like washing clothes, utensils, bathing animals, construction, industrialization and urban mismanagement etc.

• Pollution also takes place due to acid rain. **Acid rain** is the rain, in which acidic compounds like Nitric acid (HNO_3) and Sulphuric acid (H_2SO_4) is present. Compounds like nitric oxide and sulphuric oxide are present in air, when these compound mixes water it forms acid: so when rainfall takes place, nitric and sulphuric oxide form acids and fall on the Earth along with rain.

• Water pollution can cause kidney diseases, liver diseases, mercury poisoning, heavy metal poisoning, stomach infection, bacterial infection etc.

(a) Prevention of Pollution of Water:

• To prevent the pollution of river and other water bodies no domestic waste should be thrown into rivers and water bodies.

• Human activities like washing of clothes and utensils, bathing, and bathing of animals should be stopped in the water bodies.

• To prevent pollution of river – sewage coming from municipal drain should be treated before draining into the river, water from the sewage should be recycled for other purpose like irrigation etc. but only after

treatment in sewage plant.

• Industrial waste containing different chemicals and compounds should be thoroughly processed and waste water should be recycled.

Drinking Water Purification:

To make water pure and safe for drinking – Alum is used. Alum cleans the water from small impurities. It causes the setting of impurities in bottom by aggregating them. Ozone, UV rays, ultrafiltration and chlorine are also used for water purification.

(b) Conservation of Water

• In the area, where there was scarcity of water lake, johads, wells baulis (steep well) were made. Houses had the system to collect the rainwater, rainfall that fell on the roof were stored in the underground tank. These techniques of conservation were done collectively by society and conserved water was used by everyone in society.

• It is important to recycle the water, means reusing the used water.

• Afforestation is being promoted because tree helps

• In retaining the ground water and excess water during flood, it helps in maintaining water cycle and also controls erosion of soil.

• Various co – operative societies and non – governmental organizations are coming forward and they are helping in construction of new lakes and johads and are also repairing, rebuilding the old ones. **Tarun Bharat Sangh** is one such group, which helped villagers in Alwar district in constructing a lake. Tarun Bharat Sangh is headed by Rajindra Singh; he is also called as **Jal Purush.**

(c) Water Born Diseases: Many diseases spread through consumption of impure water. Diseases spread because water acts as a carrier of the organism which causes diseases. Few of the diseases which are spread by water are: hepatitis, diarrhea, stomach infection, typhoid, malaria, dengue, Chikungunya, cholera, jaundice etc. water borne diseases are caused by pathogenic micro – organism that is transmitted through contaminated water.

• Infection can result by consuming infected water. Washing and bathing in infected water can damage skin and cause allergy.

• Water provides the breeding place for mosquitoes and these mosquitoes can cause malaria, dengue and Chikungunya.

• Treating the water is only effective way of controlling diseases like hepatitis, jaundice, diarrhea etc. and preventing the breeding of mosquitoes is important in controlling diseases like malaria, Chikungunya and dengue.

• Breeding takes place in clean water, so in order to prevent breeding of mosquitoes

1. Do not allow water to collect around house.

2. Do not keep stagnant water for long time in any water pots, cooler, tanks etc. cover the stored water and clean them regularly.

3. Kerosene should be added in the collected water as kerosene will spread on top of water surface and it will not allow mosquitoes to breed.

4. Mosquito net should be used to prevent the mosquitoes bite.

KEY FACTS:

Malaria:

• The disease is found in area where lot of rain and humidity is.

• Scientists named Ronald Ross discovered that malaria is caused by mosquito and he was awarded Nobel Prize for his work in 1905.

• He found the kind of mosquito that was actually responsible for causing malaria. He concluded that the female Anopheles mosquitoes spread the disease. This disease is characterized by high fever with shivering and followed by sweating.

• For detection of disease, blood testing is done, parasite is present in RBC and then medicines are prescribed for remedy. From early times, **the dried and powdered bark of cinchona tree was used to make a medicine for malaria.**

• Earlier people used to boil the bark powder and strain the water which was given to patients. Now tablets made from cinchona are used as medicines.