CHAPTER THREE

WATER, SOLUTION AND SOLUBILITY

Water: This is the commonest substance on earth, which covers about 70% of the earth's surface.

Properties of water:

-It boils at 100^{0C}.

- It freezes at 0^{0C}.

- It has no colour.

- It has no taste or scent.

Purification of Water:

- Water from natural sources such as rivers, streams and lakes may be very dangerous to be used by man, even though they may look very clean. - They may contain very dangerous germs and chemicals, which can have very serious effects on the health of man. - For this reason, water from these sources must first be purified before it is used by man.
- Water purification is the process in which the germs and other dangerous substances are removed from the water, in order to make it safe enough to be used by man.
- During the purification of water, the germs within it are killed, and the solid particles as well as the dangerous substances within it are removed. - The purification of water is as follows:

(1) Water is first collected in a reservoir for a number of days, and exposed to sunlight for the mud it contains to settle.
(2) The water is then passed or pumped into a storage tank, and the addition of a chemical called alum to it, causes any suspended particle in it to settle at the bottom of the tank.
(3) From the storage tank, the water is filtered using sand as the filters, in order to remove the solid particles or impurities.

(4) The filtered water is then passed into a tank, and the addition of chlorine to it kills the germs within it.
(5) The purified water is then piped or pumped to places where it is needed, such as our homes.

WATER CONSERVATION:

Because treated or purified water is expensive, it is important that we conserve it and use it wisely. Water conservation is the method in which treated water is put to good use, in order to make it available especially during the dry season. Some of the methods used in the conservation of domestic water supply, include the following:

(1) Polytank:

- In this method, the water is stored in tanks made of rubber, and since the rubber cannot rust the water is good for drinking.

(2) Metallic tank:

- In this method, the water is stored in tanks made of iron.
- Rusting sometimes occurs and the water may become contaminated.

(3) Underground tank:

- The water in this case is stored in underground tanks made of cement, and the stored water can be contaminated by underground water.

Water From Well:

Water from wells located in waterlogged areas may be very bad to use. But water from deep wells which are not located in waterlogged areas is good. Also water from wells which are located very close to underground septic tanks may not be good to be used.

Hard Water: This is water which does not easily form lather with soap.

Advantages of Hard Water:

(i) The calcium found within hard water, helps to build strong teeth and bones in animals.
(ii) It has a pleasant taste.

Disadvantages of Hard Water:

(i) When it is used for washing, it wastes the soap.

(ii) It makes clothes grey when it is used in the laundry.

Soft water: This refers to water which easily forms lather with soap.

Advantages of soft water:

(i) It does not waste soap when used for washing.
(ii) It is used in making soft drink.

Disadvantages of Soft Water:

(i) It has a flat taste.
(ii) It causes lead poisoning.

Importance of Water to the Body:

- It cools the body when it becomes hot.
- It is needed for the digestion of food.
- It ensures the even distribution of heat within the body.

The Water Cycle:

- This occurs in the following manner:

(1) Water from water bodies such as the ocean, rivers and lakes is evaporated into the sky by the sun, when it shines on them.
(2) On reaching the cooler part of the atmosphere, it condenses and falls as rain into these water bodies.
(3) The sun once again causes the water from these water bodies to evaporate into the atmosphere, and the whole cycle is repeated.

Test for Water:

- If the given liquid when added to anhydrous copper II sulphate , changes its colour from white to blue and it has a freezing point of 0^0C , as well as a boiling point of 100^0C , then it is good water which is safe and can be used by man .

Test for the Presence of Water within a Substance:

- Add some of the substance to anhydrous copper II sulphate.
– If the colour of the anhydrous copper II sulphate changes from white to blue, then the substance contains water.

SOLUTION:

- This is formed when a solute dissolves in a solvent.
- For example a solution is formed when as solute such as salt, is dissolved in a solvent such as water.