Chapter Three

Water, solution and solubility:

Water: - This is the most common substance, which can be found on earth.

Properties of water:

- Water which is good will have the following properties:
 - (i) It will boil when its temperature is 100^{0c}.
 - (ii) It will freeze or turn into ice when its temperature becomes 0^{0C} .
 - (iii) It will have no colour.
 - (iv) It will have 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 germs or poisonous chemicals, which can make us sick if we drink them.

- For this reason, water from these sources must first be purified before it is used by man.

- Water purification is a process in which we remove the germs and the poisonous chemicals from the water.

- By so doing, the water is made 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 chemicals are removed from it.

- The purification of water is as follows:
 - (1) Water from a natural source is first collected in a reservoir for a number of days.
- The sun is then made to shine on the water, and the mud within the water settles at the bottom of the reservoir.
 - (2) The water is then passed or pumped into a storage tank, and a chemical called alum is added to it.
- This chemical will cause any suspended particle within the water to settle at the bottom of the tank.
 - (3) From the storage tank, the water is filtered or undergoes filtration.
- This will remove the undissolved particles or impurities from the water.
- (4) The filtered water is then pumped into a tank.
- Chlorine is then added to the water in order to kill any germ within the water.
 - (5) The water which is now referred to as purified or treated water, is then piped or pumped to places where it is needed such as our homes.

Water conservation:

- Water conservation is the method in which treated or purified water is put to good use or used wisely, in order to make it available especially during the dry season.

- Some of the methods used in the conservation of treated or purified water include:

(1) Polytank:

- In this method, the water is stored or kept in tanks made of rubber.

- 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.

- The iron can sometimes rust, causing the water to become contaminated or polluted.

(3) Underground water tank:

- The water in this case is stored in underground tanks made of cement.

- The stored water can be contaminated by underground water.

Hard water:

- This refers to the water which does not easily form or lather with soap.

Soft water:

- This refers to water which easily forms lather with soap.

The importance of water to the body:

- Our bodies need water or water is important to the human body, because_of the following reasons:

- (i) It is used to cool the body when it becomes hot.
- (ii) It is needed for the digestion of the food we eat.

The water cycle:

- This occurs in the following manner:
 - (1) Water from water bodies such as the ocean, rivers and the lakes are 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 to evaporate into the atmosphere, and the whole cycle is repeated.

Solution:

- This is formed when a solute dissolves in a solvent.

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

- In the given example, the liquid in which the solid which is the salt dissolves is called the solvent.

- Also the solid or the salt which dissolves in the solvent is called the solute.

- A solute such as sugar is said to dissolve in water, when its particles separate and evenly spread out in the water.

- These particles must be so small that they must not be seen with the eye, causing the solution to be clear.

Solubility:

- This refers to the ability of a solute to dissolve in a given solvent.

Conditions affecting solubility:

- These conditions are stirring and temperature.

- Solubility increases when the temperature increases.

- Therefore the amount of solute which dissolves in a solvent increases as the temperature increases.

- Also when the rate of stirring increases, solubility also increases.

- For this reason, if a solute is placed in a solvent and stirring is done slowly, then just a small amount of the solute will dissolve in the solvent.

- But if stirring is done very fast, then a greater amount of the solute will dissolve in the solvent.

Questions:

- (1) List two properties of good water. Ans:
- It boils at 100^{0c}.
- It freezes at 0^{0c}.
- (2) List two natural sources of water. Ans:
- These are rivers and lakes.
- (3) What do we mean by water purification?
 - Ans:
- It is a process in which the germs, solid particles and poisonous chemicals are removed from polluted water.
- (4) Explain why chlorine is used in water purification. Ans:
- Because it kills the germs found in the water.
- (5) What is water conservation?

Ans:

- It refers to the method in which treated or purified water is put to good use, in order to make it available especially during the dry season.