Chapter- 12

Our Life Support

STUDY NOTES

Let's Learn

Air:

- Living things cannot live without air.
- All living things need air to breathe.

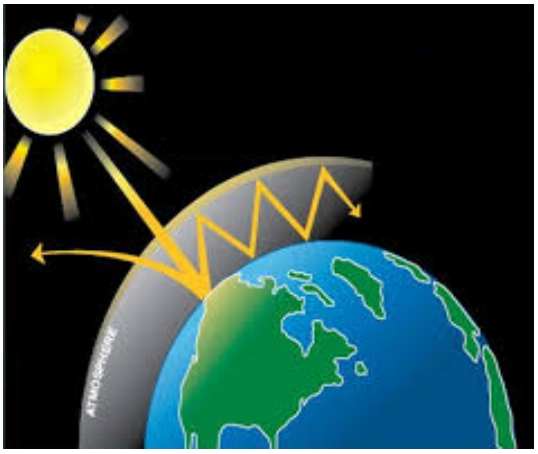
Atmosphere:

- The thick blanket of air that surrounds our planet is called atmosphere
- The atmosphere is held around the earth by the it's gravity.
- Atmosphere is a mixture of gases, water vapour and dust.

Importance of atmosphere:

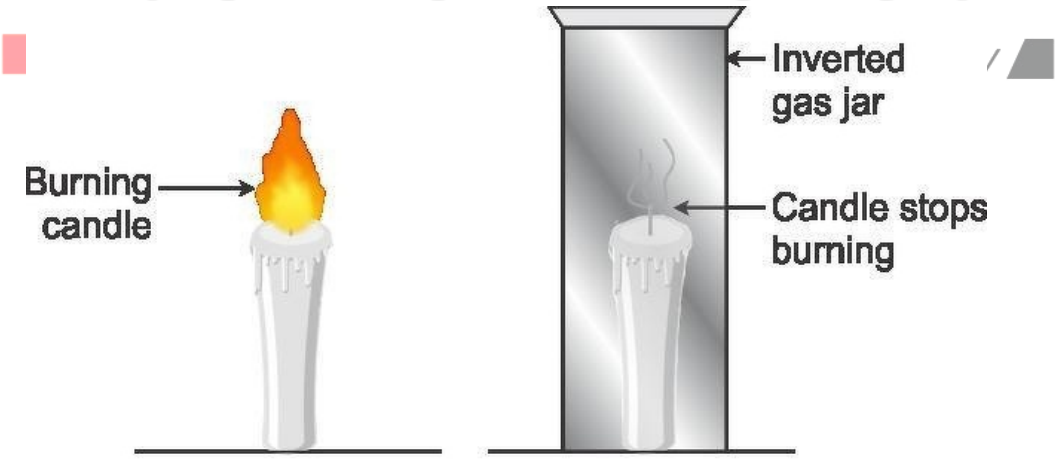
- It also retains heat and blocks out the harmful rays of the sun.
- Atmosphere also prevents meteors from hitting the surface of the earth.

- The oxygen present in the atmosphere supports life.
- Air also contains carbon dioxide which is used by the plants to prepare food.



Uses of air:

- Air is needed for breathing:
  - The fresh air we breathe in is called inhaled or inspired air.
  - The air we breathe out is called exhaled or expired air.
  - Our lungs take in the oxygen from the inhale air and mixes it with the blood and takes out carbon dioxide from the blood.
  - Exhaled air is warmer than inhaled air.
- Air is needed for burning:
  - Air contains oxygen which is needed for burning.

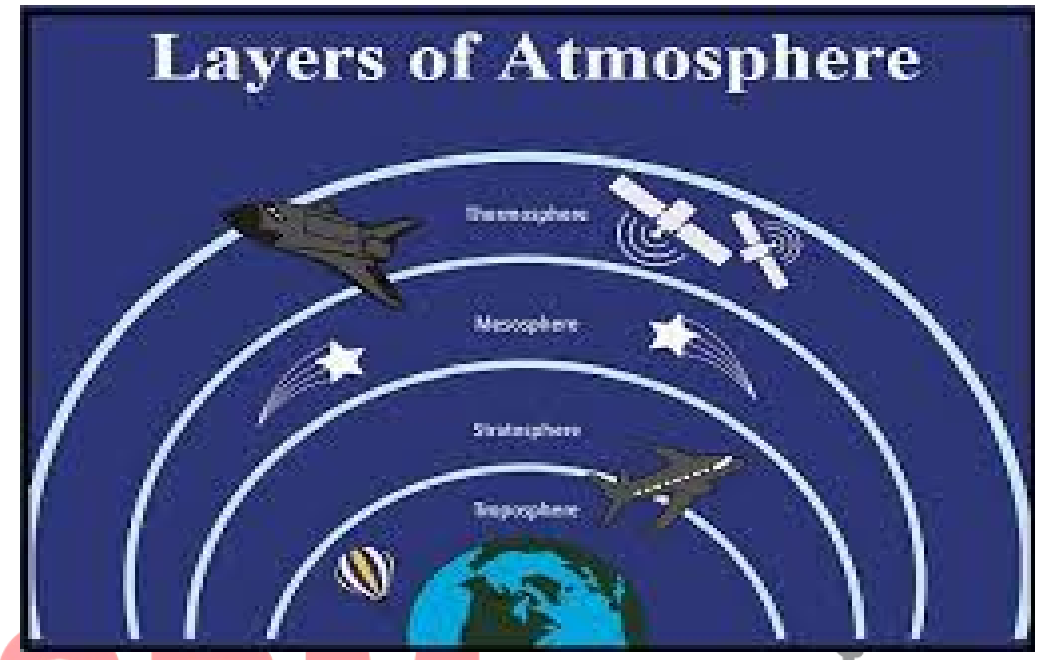


- Moving air can support parachutes, gliders and kites.
- It is used to inflate footballs and tubes of vehicles.
- It can also push sailboats, turn the blades of windmills, to draw water or generate electricity.

Layers of air:

Atmosphere is divided into 5 layers. They are as follows:

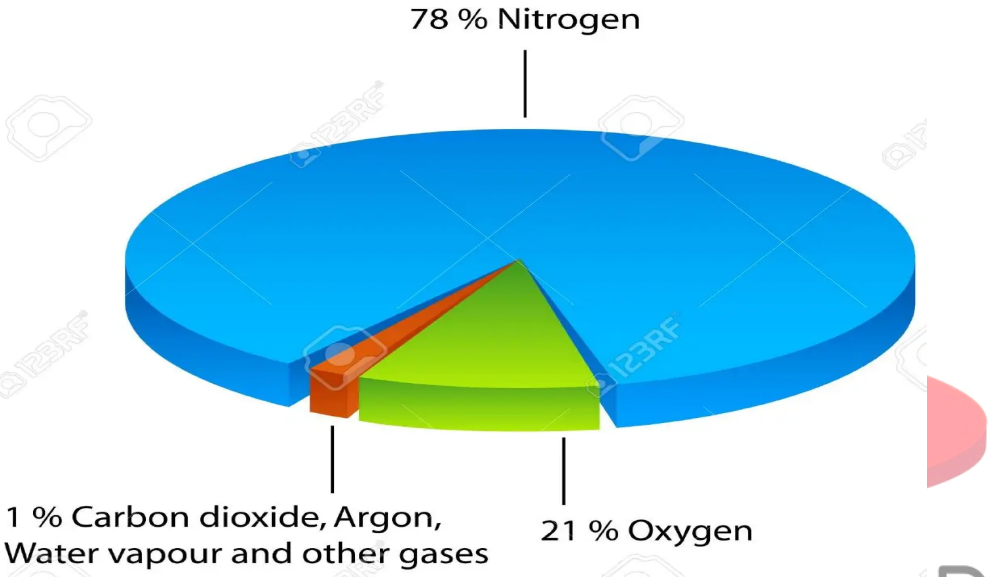
- **Troposphere:**
  - This is the first layer above the Earth's surface.
  - Weather changes takes place here.
- **Stratosphere:**
  - It is the second layer.
  - Here, jet aircraft fly.
  - Ozone gas is present in this layer.
  - Ozone absorbs harmful ultraviolet rays from the sun which causes skin cancer.
- **Mesosphere:**
  - This is the third layer.
  - Meteorites or small rocks moving above about in space burn out in this layer and therefore, do not reach the surface of the earth.
- **Thermosphere:**
  - It is the fourth layer.
  - Space shuttles move about in this layer.
- **Exosphere:**
  - This is the fifth layer of the atmosphere.



Composition of air:

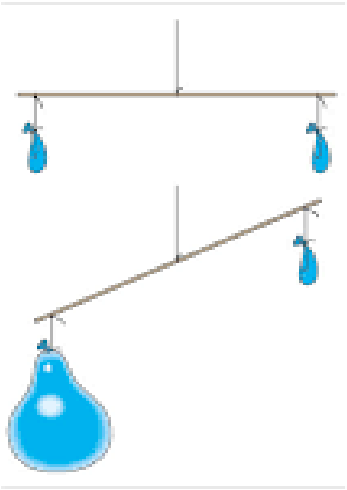
- The air we breathe contains various gases.
- Air consists of 78% nitrogen, 21% oxygen and less than 1% of argon, carbon dioxide and other gases.
- Air also contains water vapor, dust and smoke.
- **Oxygen:**
  - It is the most important gas for the survival of living beings.
  - All living things need oxygen.
  - It is also needed for burning.
- **Nitrogen:**
  - Living things do not use nitrogen directly from the air.
  - Nitrogen is used by the plants with the help of bacteria in the soil.
  - Nitrogen is also added to the soil by using chemical fertilizers.
  - Animals get nitrogen from plants, meat and fish.
- **Carbon dioxide:**
  - Carbon dioxide is very important for plants.
  - Plants prepare their food with the help of carbon dioxide water and sunlight by the process called photosynthesis.
- **Other gases:**
  - Other gases such as hydrogen, ozone, helium, neon, argon and krypton are also present in the air.
  - Neon and argon are used in electric lights to produce the colorful glow in the glass tube.
- **Water vapour:**

- Water vapour is also a part of air.
- Water vapour is formed because of the evaporation of water from the surface of water bodies.
- Water vapour in the air can cause changes in the weather.
- It condenses to form clouds, rain, fog and snow.
- The amount of water vapor present in the air is called humidity.
- High humidity makes us feel uncomfortable as our sweat does not evaporate easily.



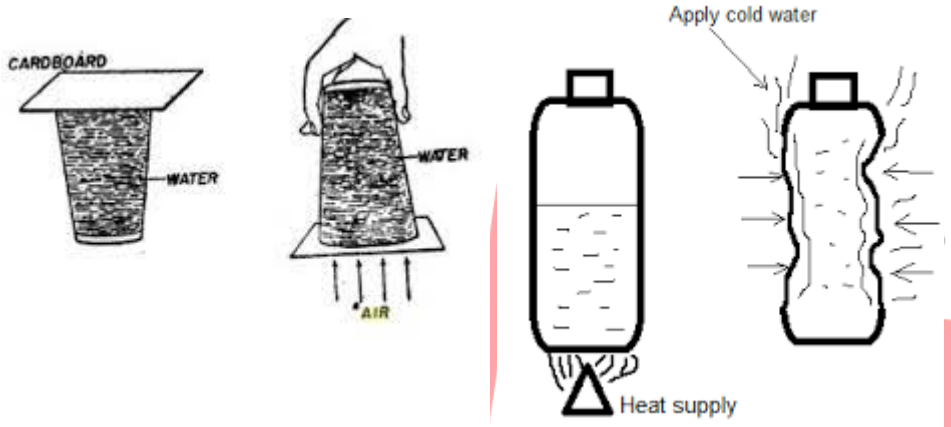
Properties of air:

- Air has weight.



- Air takes up space.

- Air exerts pressure in all directions.



Water too supports life:

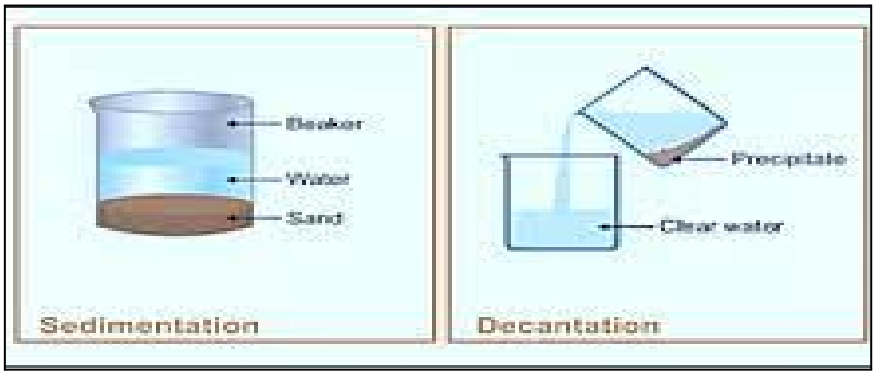
- Water is as important as air for survival.
- We need water to drink.
- All living things need water to survive.
- We also need water for cooking, bathing, working and construction work.

Impurities in water:

- When some unwanted substances mix in water, then the water becomes impure.
- There are many types of impurities:
  - Insoluble impurities
  - Soluble impurities
  - Disease-causing germs

Removal of insoluble impurities:

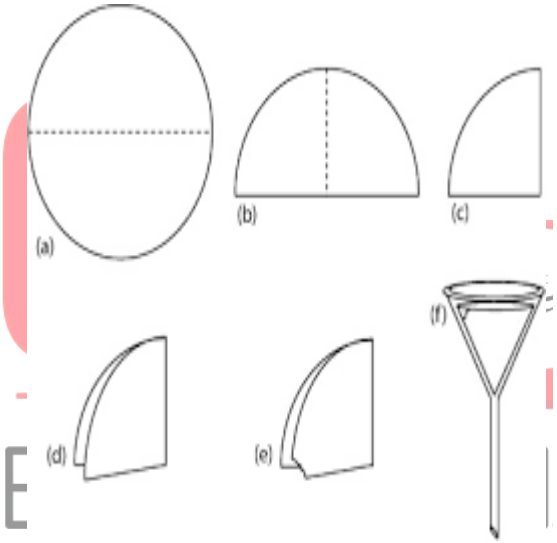
- When the impurities are not soluble in water, they are said to be insoluble impurities.
- Insoluble impurities can be removed by sedimentation, decantation and filtration.
- The process of settling down of heavy particles present in water is called sedimentation.
- The process of separation of clear liquid into another container is called decantation.

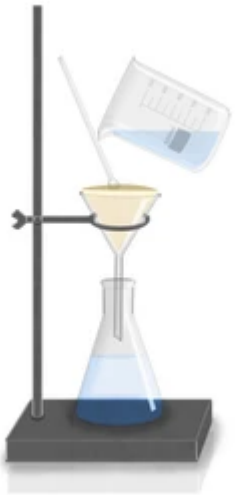


- The process in which solid particles in a liquid are removed by the use of a filter is called filtration.

  Activity to perform filtration:

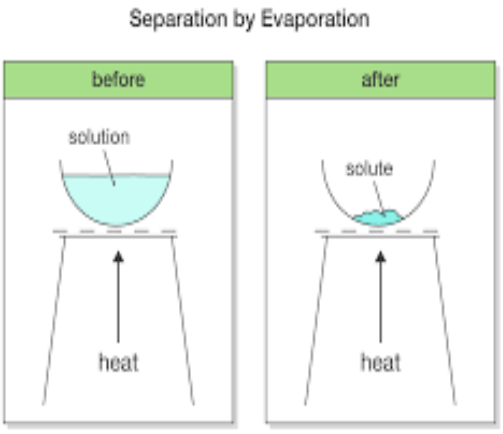
  - A circular piece of filter paper is taken and a cone is made out of it.
  - The cone is placed inside a funnel.
  - The funnel is placed on the mouth of a conical beaker.
  - The mixture of soil and water is poured over the filter paper by using a glass rod.
  - Drops of clear water will trickle into the beaker and gets collected as filtrate.
  - Soil particles will be left on the filter paper.

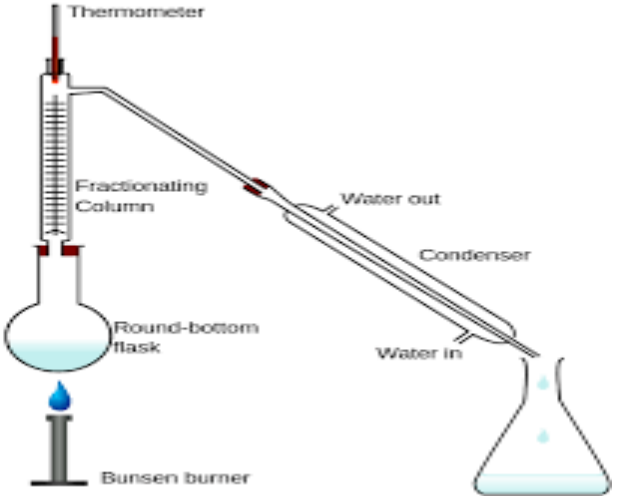




Removal of soluble impurities:

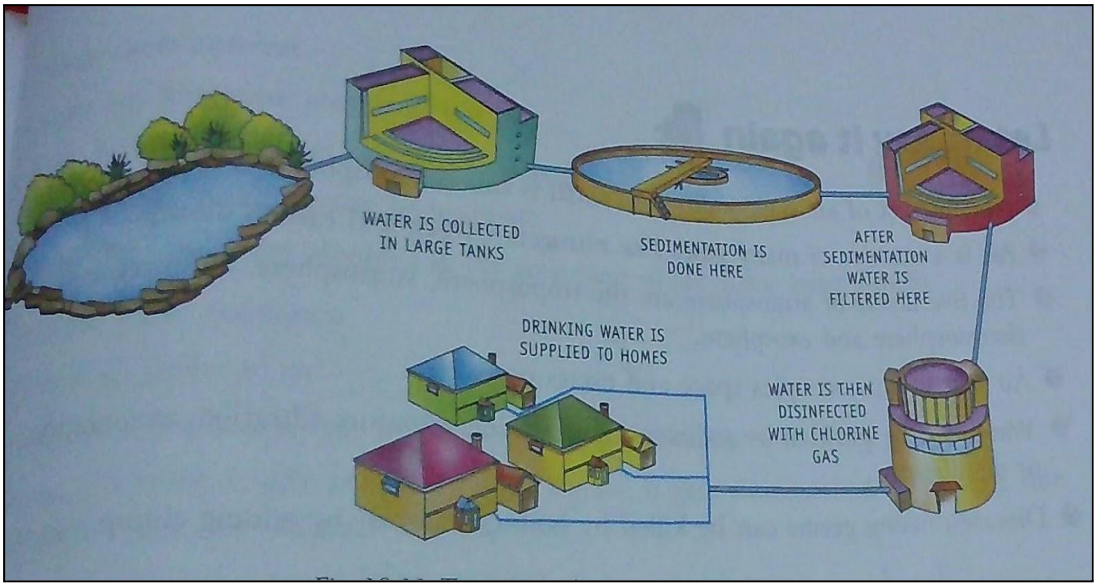
- When the impurities are soluble in water, they are set to be soluble impurities.
- Soluble impurities can be removed by evaporation and by distillation.
- The process of changing of water or any other liquid to vapor by heating is called evaporation.
- The purification of liquid by changing it into vapor by heating and then condensing it into a pure liquid by cooling is called distillation.
- Distilled water is the purest form of water which do not contain any impurities or minerals.
- It is used in car batteries, science experiments and in medicines.





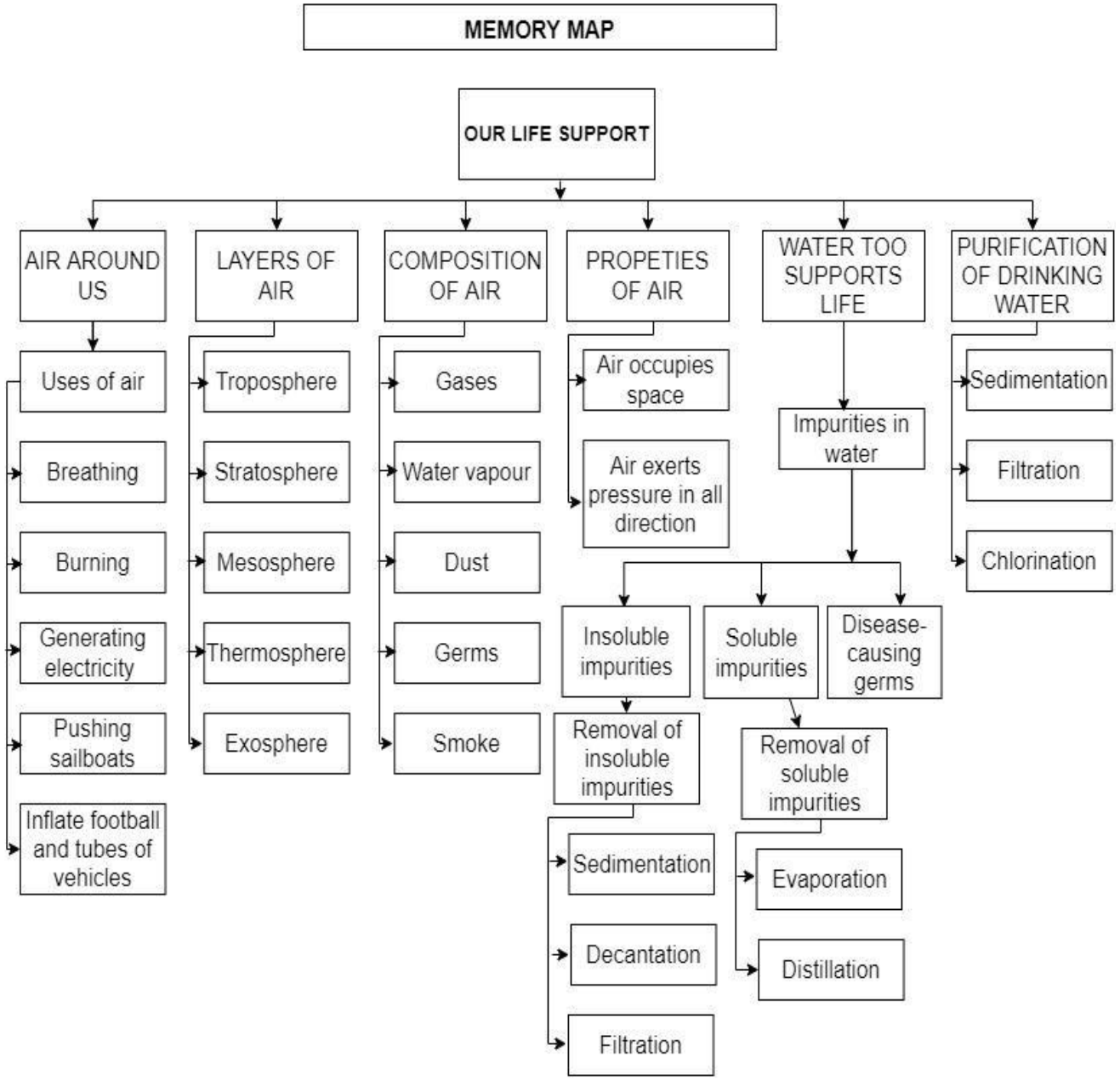
Purification of drinking water:

- Clean water is necessary for drinking and cooking.
- Impure water contains many disease-causing germs like cholera, Jaundice and dysentery.
- There are three methods mainly used for treatment of water.
- They are:
  - Sedimentation
  - Filtration
  - Chlorination
- **Sedimentation:**
  - Water is collected in large open tanks is left undisturbed for a few days.
  - This way the heavier suspended impurities sink to the bottom.
  - Air and sunlight kill many harmful bacteria.
  - Chemicals like alum are also added to purify the water.
- **Filtration:**
  - After sedimentation, the water is filtered through a clean sand bed to remove finer suspended particles.
- **Chlorination:**
  - Water is then disinfected with a very small quantity of chlorine gas to kill bacteria and make it safe for drinking.



Other methods of purification of water:

- **Boiling:**
  - Boiling water for 10 minutes kills the germs.
  - Boiled water can be strained through clean cloth and can be stored in a clean container.
- **Water filter:**
  - Water filters can be used at homes to get clean drinking water.
- **Using potassium permanganate crystals:**
  - Potassium permanganate crystals can be added to wells to clean the water and make it fit for drinking.



Let's Know More

I. Choose the correct answer.

1. Changes in weather occur in exosphere/ troposphere/ mesosphere.
2. Ozone/ Oxygen/ Argon is used to produce colourful glow in glass tubes.
3. Weather/ Air pressure/ Humidity is the amount of water vapour present in the air.
4. Exhaled air has a higher/ a lower/same percentage of carbon dioxide than inhaled air.
5. Air exerts pressure in one direction/ all directions.

Let's Do

A. Tick the correct answer.

1. This gas is present in the maximum percentage.
    a. Oxygen
    b. Carbon dioxide
    c. Nitrogen
    d. Argon
2. Which of the following changes into clouds, rain, fog and snow?
    a. Argon
    b. Water vapour
    c. Oxygen
    d. Hydrogen
3. This process is used to remove insoluble impurities from water.
    a. Sedimentation
    b. Chlorination
    c. Distillation
    d. Evaporation
4. Impure water contains many disease-causing germs like those of
    a. Cholera
    b. Jaundice
    c. Dysentery
    d. All of these
5. This water is mainly used in car batteries, science experiments and in medicines.
    a. Boiled water
    b. Distilled water
    c. Tap water
    d. Sea water

B. Fill in the blanks.

1. The thick blanket of air is held around the earth by the earth's _____.
2. Plants get nitrogen with the help of bacteria in the _____.
3. _____ is used in making colorful electric lights.
4. The air we breathe out is called _____ air.
5. When there is more water vapor in the air, we say that the air is _____.
6. The higher we go, the _____ is the air pressure.
7. When solid dissolves in a liquid, a _____ is formed.
8. _____ water is the purest form of water.

Understand and Answer

C. Write short answers.

1. Name any four gases present in the air.
2. How does water vapor form in the atmosphere?

3. Why should drinking water be purified?
4. Name three processes involved in the treatment of the town water supply.

D. Answer these questions.

1. How is air useful to us?
2. How is stratosphere a very important layer of atmosphere?
3. When a burning candle is covered with a glass, it gets extinguished. Why does this happen? What does this activity show?
4. What is sedimentation and decantation?
5. Explain filtration with the help of a diagram.
6. What is distilled water? What are its uses?

Teacher's Note

- Make a model of treatment of town water supply.

Improve Your GK

- There is the same amount of water on Earth as there was when the Earth was formed.
- Water regulates the Earth's temperature.
- Most freshwater is in ice.

Answer Key

I.

1. troposphere
2. Argon
3. Humidity
4. higher
5. all directions

A.

1. c. nitrogen
2. b. water vapour
3. a. sedimentation
4. d. all of these
5. b. distilled water

B.

1. atmosphere
2. soil
3. Neon

4. exhaled
5. humid
6. lower
7. solution
8. Distilled

C.

1. Nitrogen, hydrogen, oxygen, carbon dioxide are some of the gases present in the air.
2. Water vapour is formed because of the evaporation of water from the surface of water bodies like seas rivers and lakes.
3. Drinking water should be purified to remove disease-causing germs.
4. The three processes involved in the treatment of the town water supply are:
   - Sedimentation
   - Filtration
   - Chlorination

D.

1. Air is useful to us in the following ways:
   - It is used for breathing.
   - It is used for burning.
   - Moving air can support parachutes, gliders and kites.
   - It is used to inflate footballs and tubes of vehicles.
   - It can also push sailboats.
   - It can turn the blades of windmills.
   - It is used to draw water and generate electricity.
2. Stratosphere is a very important layer of atmosphere because it contains ozone layer which absorbs ultraviolet rays from the sun which causes skin cancer.
3. When a burning candle is covered with a glass, it gets extinguished. This happens because when we cover the candle with glass then the supply of oxygen gets cut off. Therefore, the candle gets extinguished. This activity shows that air which contains oxygen is needed for burning.
4. The process of settling down of heavy particles present in water is called sedimentation.

   The process of separation of clear liquid into another container is called decantation.

5. The process in which solid particles in a liquid are removed by the use of a filter is called filtration.

   A circular piece of filter paper is taken and a cone is made out of it.
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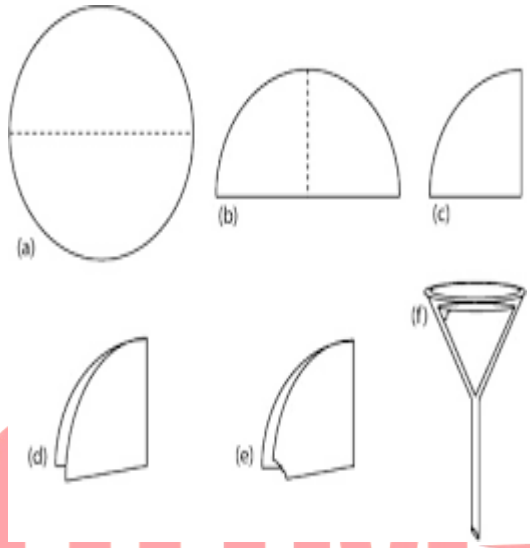

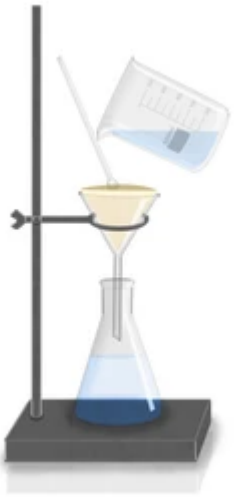

6. Distilled water is the purest form of water which do not contain any impurities or minerals.

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