LESSON 5

Air and Water

Learning Outcomes

After completing this chapter, students will be able to:

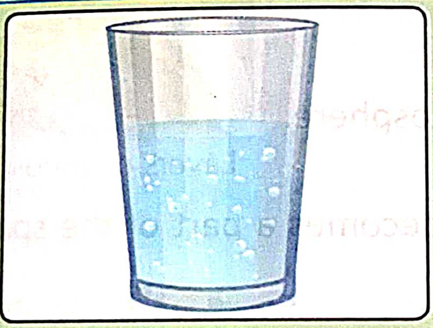
- define atmosphere, atmospheric pressure and distilled water
- name the layers of atmosphere
- describe the importance of atmosphere
- describe different methods to purify water
- describe the composition of air
- list the properties of air

Inside the Chapter

- ★ Atmosphere
- ★ Importance of Air
- ★ Composition of Air
- ★ Properties of Air

Let's Do

Tick (✓) the things that need air to move.

1. 
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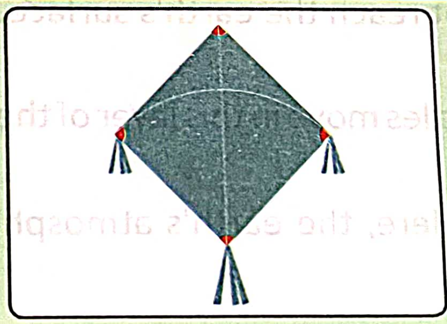
2. 
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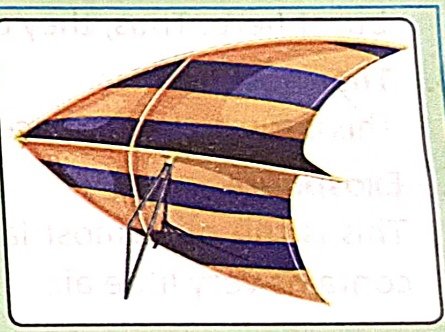
3. 
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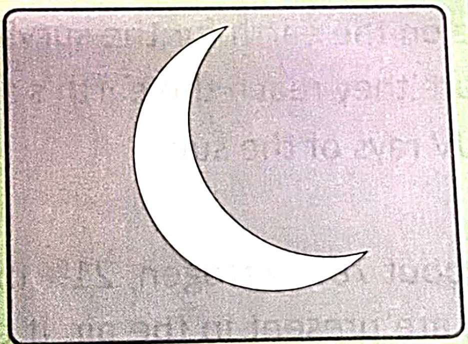
5. 
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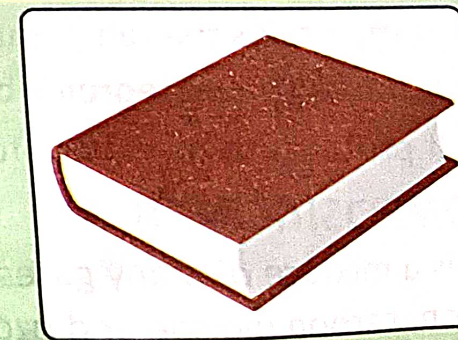
6. 
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As the air from the glass escapes, water starts entering the glass. This shows that the glass which appears to be empty to you is actually filled with air. So, it proves that air occupies space.]

Multiple Choice Questions

Tick (✓) the correct answers: *(Remembering, Understanding)*

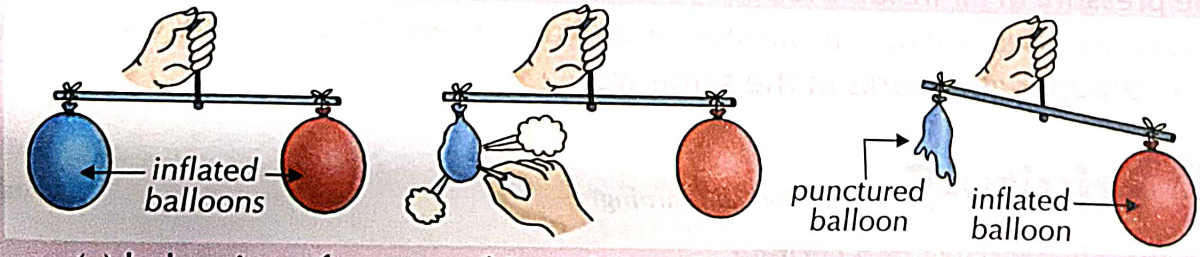
1. The blanket of air around the earth is called
   (a) mesosphere ○ (b) atmosphere ✓ (c) exosphere ○
2. Jet planes fly in the
   (a) stratosphere ✓ (b) troposphere ○ (c) mesosphere ○
3. Why does air inflate things?
   (a) because air occupies space ✓ (b) because air supports burning of things ○
   (c) because air is present all around us ○

2. Air has Weight

Activity-3 *(Experiential Learning)*

(NEP Guidelines)

- Inflate two balloons of the same size. Tie a piece of a string in the middle of a stick. Tie both the balloons to the ends of the stick. Balance the stick by shifting the positions of the balloons [Fig. (a)].
  When the stick is balanced, the weight on both the ends of the stick is equal.
- Now, take a needle or pin and prick one of the balloons. Air escapes from the balloon [Fig. (b)].
- The stick tilts towards the side of the air-filled balloon. This happens because the inflated balloon has air in it whereas the punctured balloon has nothing. This shows that air has weight [Fig. (c)].



(a) balancing of inflated balloons (b) pricking of one balloon (c) unbalanced stick

3. Air can be Compressed

Since the molecules of gases in air are far apart from each other, air can be compressed and pushed into small spaces.

4. Air Expands on Heating and Contracts on Cooling

When air is warmed, it expands and takes up more space. On the other hand, when air is cooled, it shrinks and occupies less space.

WATER

After air, the second most essential thing for our life is water. All living things need water. Three-fourths of our earth's surface is covered with water. Only 3% of total water can be used for drinking. About 97% of water is in the oceans and contains salts.

How we get Water

We get water from rivers, ponds, lakes and rain. We also get water from ground by using wells and hand pumps. The water in rivers, ponds and lakes is not pure. Many things like dirt, mud and germs are mixed with water and make the water unfit for use. **The substances that make the water unfit for use are called impurities.** Impurities are of two types– soluble and insoluble.

1. **Soluble impurities:** All those impurities that dissolve in water are called soluble impurities. For example, salts of potassium and sodium.
2. **Insoluble impurities:** All those impurities that do not dissolve in water are called insoluble impurities. For example, sand, mud and salts of calcium.

Activity-6 *(Experiential Learning)* (NEP GUIDELINES)

Take a beaker half-filled with water. Dissolve one spoon of common salt to it. Strain the water and common salt mixture in another beaker. Are you able to separate the common salt and water? Repeat this with sugar, sand, tea leaves, chalk powder and milk. Now, list these as soluble impurities and insoluble impurities.

Multiple Choice Questions

Tick (✓) the correct answers: *(Remembering, Understanding)*

1. What per cent of the total water on the earth's surface is used for drinking?
   (a) 3% ✓ (b) 10% ○ (c) 97% ○
2. Ocean and sea water is not fit for drinking because
   (a) many ships and boats move on it ○
   (b) it has many dissolved impurities ✓
   (c) it is used to get minerals ○

REMOVAL OF IMPURITIES FROM WATER

1. Removal of Insoluble Impurities

Insoluble impurities like sand can be removed by using the following methods:

(a) **Sedimentation:** In this method, a mixture of water and insoluble impurities is allowed to stand undisturbed in a container for some time. The heavy insoluble impurities settle down at the bottom of the container. This layer of impurities is called **sediment**. When the impurities settle down, clear water is left above the layer of impurities. This process is called **sedimentation.**

B Science Riddles: *(Problem Solving)*

1. I am light as a feather and all around you, sometimes I am gentle, sometimes I gust through. I fill up your lungs, helping you breathe. What am I? Air
2. I surround you all day, I am made of different gases in a special way. Plants breathe me in, and so do you. What am I? Air
3. I can make a sailboat glide, I am in the ocean, deep and wide. I can also be a refreshing mist. What am I? Water

C Multiple Choice Questions:

Tick (✓) the correct options: *(Remembering, Understanding, Applying)*

1. The gas necessary for burning is _____ .
   - (a) oxygen ✓
   - (b) carbon dioxide
   - (c) nitrogen
2. Which one of the following substances forms a layer of sediment in water?
   - (a) sand ✓ (b) sugar (c) salt
3. Why does air exert pressure?
   - (a) because air occupies space
   - (b) because air has weight ✓
   - (c) because air is a mixture of gases
4. A soluble solid substance is dissolved in water. How do you get it back from water?
   - (a) by the process of distillation
   - (b) by the process of evaporation ✓
   - (c) by the process of sedimentation
5. You want to make a glass of ice-cold water on a hot day. Which of the following steps will help you achieve that?
   - (a) Boil the water
   - (b) Put the glass in the freezer ✓
   - (c) Add sugar to the water

D Case/Source based Questions: -

Read the situation given below and choose the correct answer: *(Reasoning)*

Water from deep springs and deep wells is generally free from insoluble impurities.

1. It is because
   - (a) water occurs naturally
   - (b) the layers of soil filter the water ✓
   - (c) insoluble impurities cannot reach there

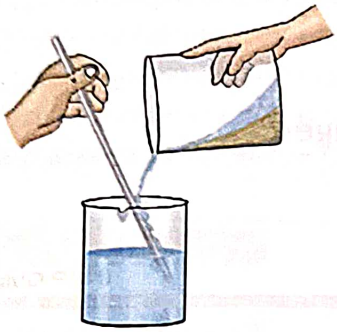
2. This process is called

(a) sedimentation ◯ (b) decantation ◯ (c) filtration ✓

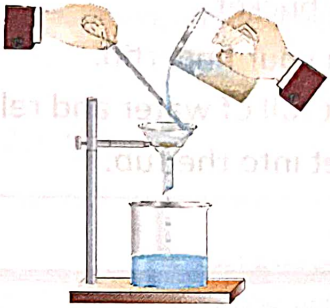
E **Fill in the blanks:** *(Remembering)*

1. A mixture of sand and water can be separated by Filtration. (distillation/filtration)
2. We add Chlorine tablets in water to kill germs. (chlorine/magnesium)
3. Salt is a/an Soluble impurity. (soluble/insoluble)
4. During the process of evaporation, the water is lost. (impurity/water)

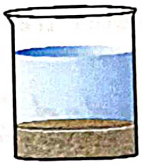
F **Observe the processes in the given pictures and write their names in the blanks provided:** *(Remembering)*



1. Sedimen Decantation



2. Filtration



3. Sedimentation

SECTION - B

A **Very Short Answer Questions:** *(Remembering, Critical Thinking)*

1. What is the percentage of oxygen in the atmosphere?
2. Name the instrument that is used to measure atmospheric pressure.
3. If there is no air, will you be able to cook food?

B **Short Answer Questions:** *(Remembering, Understanding, Analysing)*

1. What is chlorination?
2. What is loading?
3. List three ways to keep the drinking water clean in our homes.
4. Why is the stratosphere necessary for living beings? Give two reasons.
5. Differentiate between boiled and filtered water.

C **Long Answer Questions:** *(Understanding, Analysing)*

1. Explain filtration with the help of a diagram.
2. How do you separate a mixture of chalk powder and water?
3. Priya covers a burning *diya* with a glass bowl to see its flame. But the flame goes out. Why does this happen? What do you conclude from this activity?

Class — V
Ch - 5 (Air and Waters)

Section — B

A. Very Short Answer Questions:

1. What is the percentage of oxygen in the atmosphere.

Ans There are 21% of oxygen in the atmosphere.

2. Name the instrument that is used to measure atmospheric pressure.

Ans A barometer can be used to measure atmospheric pressure.

3. If there is no air, will you be able to cook food?

Ans No, we will not be able to cook the food in the absence of air because oxygen present in air is necessary for burning fire.

B Short Answer Questions:-

1. What is Chlorination?

Ans Addition of chlorine tablets in water to kill germs and to make the water pure is called chlorination

2. What is loading?

Ans Improving and increasing the rate of sedimentation by adding chemical like alum is known as loading.

3. List three ways to keep the drinking water clean in our homes.

Ans The three steps

(i) Boiling
(ii) Chlorination
(iii) using water purifiers.

4. Why is the Stratosphere necessary for living beings? Give two reasons.

Ans (a) Ozone gas is present in this layer that absorbs the harmful UV rays coming from the Sun.

(b) Jet planes fly in this layer.

5. Differentiate between boiled and filtered water.

Boiled	Filtered water
(i) Boiled water do not contain germs	(i) Filtered water may contain germs as only insoluble impurities are removed
(ii) Boiled water is pure and fit for drinking.	(ii) Filtered water is not pure and fit for drinking.

C. Long Answer Questions

1. Explain filtration with the help of a diagram.

Ans. (i) Filtration is a method used to separate water from insoluble impurities by using a filter paper.

(ii) We make a cone of filter paper and keep it inside a funnel.

(iii) The mixture is poured into the funnel. The sand does not pass through the filter paper.

(iv) Remain behind on the filter paper.

(v) The clear water comes out of the filter paper and is collected in the flask below the funnel this is called filtrate.

2. How do you separate a mixture of chalk powder and water?

Ans. We can separate a mixture of chalk powder and water by sedimentation, decantation and filtration.

(i) The mixture is allowed to stand undisturbed so that chalk powder settle down and water is left above.

(ii) The water is then smothly poured into a separate container. The water is then filtered using filter paper to separate the remaining impurities.

3. Priya covers a burning diya with a glass bowl to see its flame. But the flame goes out. Why does this happen? What do you concluded from this activity?

Ans. The flame goes out because of the absence of the limited amount of air available to support the burning. After the flame uses all the available oxygen it goes out we concluded that "oxygen is necessary for the burning."