

Key to

Soaring Higher and Higher in

Science

4



PROGRESS PUBLISHERS

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1. Human Body: Food We Eat

Section 1

- | | | |
|-------------------------|------------------|---------------|
| A. 1. Nutrients | 2. Fats | 3. Iron |
| 4. Roughage | 5. Balanced diet | |
| B. 1. carbohydrates | 2. fat | 3. protective |
| 4. Roughage | 5. Drying | |
| C. 1. proteins | 2. calcium | 3. Vitamin A |
| 4. canning and bottling | | 5. water |

Section 2

- A. 1. The substances present in the food which are essential for the body are called nutrients.

They are important for our body because they make our body strong and healthy.

2. The major components of food are carbohydrates, proteins' fats, vitamins, minerals, roughage, and water.

3. A diet that contains right amounts of all the nutrients together with roughage and water is called a balanced diet. It is important to have a balanced diet for healthy growth and development of our body.

4. Vitamin D is essential for building strong bones and teeth. Eggs and milk are two food items rich in Vitamin D.

5. A method of slowing down the spoilage of food is called food preservation.

It is needed because food gets spoiled if it is not stored properly.

- B. 1. Carbohydrates are the nutrients that provide energy to our body.

Fruits and cereals are the two rich sources of carbohydrates.

2. Fats are the nutrients that provide more energy than carbohydrates.

Oil and nuts are the two rich sources of fats.

3. Vitamins and minerals are the nutrients that protect us from infections, diseases, and promote our health.

Green leafy vegetables and milk are the two rich sources of vitamins and minerals.

4. Roughage adds bulk to our food. It helps to get rid of the undigested food and waste out of the body.

Water helps to digest food and absorb nutrients properly. It also helps to maintain body temperature and eliminate from our body.

5. Five measures to avoid wastage of food are as follows:
 - a. Cook only the required quantity of food.
 - b. Distribute the surplus food among the needy.
 - c. Store cooked food, and raw fruits and vegetables in a refrigerator.
 - d. Avoid exposure of cut fruits and vegetables to air for a long time.
 - e. Take only that much food in your plate which you can eat.
6. Three methods of food preservation are as follows:
 - a. **Pickling:** Pickling is the process of adding preservatives such as salt, oil, and Vinegar to certain food items to slow down the growth of germs.
 - b. **Drying:** Drying is the process of removing moisture from the food to prevent the growth of germs.
 - c. **Canning and Bottling:** Canning and bottling is the process of preserving fruits and vegetables in tin cans and glass bottles.

Think and Answer

1.
 - a. A growing child needs more protein-rich foods in his diet as his body is still developing.
 - b. A farmer needs more carbohydrate-rich foods in his diet as he needs instant energy to do work.

Picture Study

1.
 - a. Cooked rice
 - b. Egg
 - c. Carrot
 - d. Spinach

2. Human Body: The Teeth

Section 1

- | | | |
|---------------|-----------------|------------|
| A. 1. Teeth | 2. Crown | 3. Enamel |
| 4. Milk teeth | 5. Incisors | |
| B. 1. gums | 2. wisdom teeth | 3. calcium |
| 4. Enamel | 5. toothbrush | |
| C. 1. floss | 2. canines | 3. plaque |
| 4. pulp | 5. root | |
| D. 1. F | 2. T | 3. T |
| 4. F | 5. F | |

Section 2

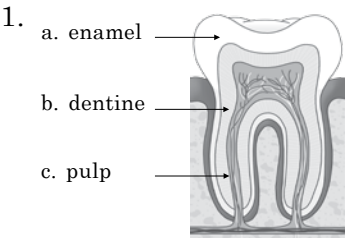
- A. 1. The three uses of teeth are as follows:
- Teeth help us to bite and chew the food.
 - They support the muscles around the mouth and give shape and appearance to the face.
 - They help us to speak clearly.
2. Humans have two sets of teeth in their lifetime, temporary teeth and permanent teeth.
3. Children have three types of teeth- incisors, canines, and molars.
4. The two different parts of a tooth are the crown and the root.
5. A sticky yellow deposit of germs on the teeth is called plaque. Plaque releases an acid that destroys the enamel leading to cavities and tooth decay.
- B. 1. Permanent teeth are 32 and temporary teeth are about 20 in numbers. Temporary teeth falls one by one when the child reaches about 6 years. Permanent teeth grows in their place.
2. The shapes and functions of different types of teeth are as follows:
- Incisors:** They are flat and have sharp edges. These teeth help to bite the food.
 - Canines:** They are pointed and sharp. These teeth help to tear the food.

- c. **Premolars:** They are flat and broad in shape. These teeth help to crush and grind the food.
 - d. **Molars:** They are broader than premolars. These teeth help to chew and grind the food.
3. A tooth is made up of three main layers- enamel, dentine, and pulp.
 - a. Enamel is the outermost layer of the tooth. It is the hardest part of the tooth. It is generally white in colour.
 - b. Dentine is the layer present beneath the enamel. It supports the enamel on the tooth. It is generally yellow in colour.
 - c. Pulp is the central layer of the tooth. It is made up of soft tissues, and contains nerves and blood vessels.
4. When we do not clean our teeth properly, food particles may get trapped between teeth leading to growth of germs. These germs form a sticky yellow deposit on the teeth called plaque that destroys the enamel leading to cavities and tooth decay.
5. Five healthy dental care habits are as follows:
 - a. Brush the teeth twice a day- once in the morning and once at night.
 - b. Use a soft, small bristle brush with rounded ends to avoid injuries.
 - c. Never share toothbrush with anyone.
 - d. Massage the gums regularly.
 - e. Rinse the mouth well after each meal.
6. Eating a balanced diet promotes healthy teeth and gums. We should include fruits, raw vegetables and calcium-rich foods in our diet.

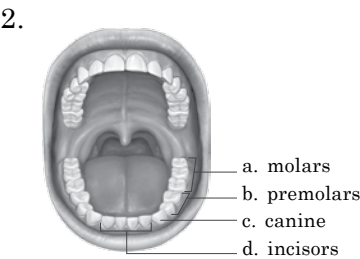
Think and Answer

1.
 - a. Incisors
 - b. Premolars
 - c. Canines
 - d. Molars
2. Because they become less effective in cleaning teeth and prone to bacterial growth. Worn out bristles can cause gum bleeding.

Picture Study



- i. Enamel
- ii. Pulp
- iii. Dentine



- i. Incisors
- ii. Premolars
- iii. Canines

3. Human Body: Digestive and Excretory Systems

Section 1

- | | | |
|------------------------|------------|------------|
| A. 1. Excretory system | 2. Stomach | 3. Ureters |
| 4. Saliva | 5. Anus | |
| B. 1. mouth | 2. Water | 3. Chewing |
| 4. Urine | 5. Urethra | |
| C. 1. small intestine | 2. liver | 3. faeces |
| 4. excretion | 5. kidneys | |
| D. 1. F | 2. T | 3. T |
| 4. F | | |

Section 2

- A. 1. The process by which food is broken down into a simpler form that can be easily absorbed by the body is called digestion.

2. A watery liquid produced in the mouth is called saliva. It contains enzymes that help in digestion.
 3. Liver and pancreas produce digestive juices that help to digest food in the small intestine.
 4. Regular bowel movement is important to remove the waste material and toxins from our body.
 5. It is not advisable to drink water while eating because it dilutes the digestive juices used to break down the food.
- B. 1. The various organs of the digestive system are as follows:
- Mouth:** Digestion begins in the mouth. The teeth help to crush and chew the food. The chewed food mixes with the saliva. The tongue helps to push the food down into the food pipe.
- Food pipe:** It is a tube-like structure that carries food from the mouth to stomach.
- Stomach:** It is a hollow, sac-like organ that stores the food. Food is further broken down here. The partially digested food passes slowly into the small intestine.
- Liver and Pancreas:** Liver and pancreas produce digestive juices that help to digest food in the small intestine.
- Small intestine:** It is a long, hollow tube-like structure. Partially digested food is further digested here. The undigested food moves into the large intestine.
- Large intestine:** It is a tube-like structure that is shorter but wider than the small intestine. The walls of the large intestine absorb water from the undigested food and forms faeces.
- Rectum:** It stores faeces for a short period. Faeces are then passed to the anus.
- Anus:** Faeces from the body are removed through anus.
2. It is important to chew the food well because chewing breaks down large particles of food into smaller particles. As the food is chewed, saliva is released. Saliva contains enzymes that help in digestion. Mixing of food with saliva also makes the food softer and easier to digest.
 3. Water is essential for a healthy digestive system because it helps in the absorption of food and nutrients in the

intestine. Without sufficient water, the undigested food material will dry up in the intestine and can cause improper bowel movement.

4. The various organs of the excretory system are as follows:

Kidneys: Kidneys are a pair of reddish brown, bean-shaped organs. They filter the blood and form urine.

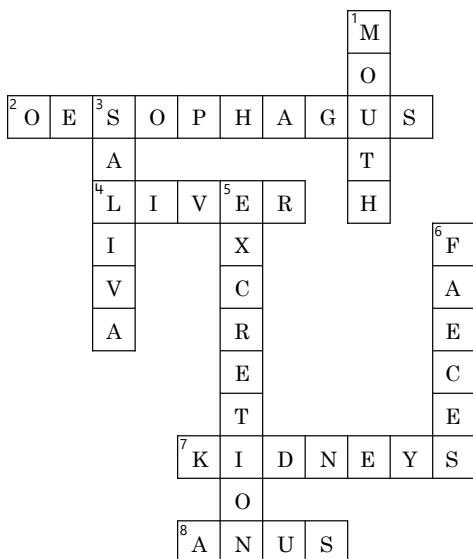
Ureters: Ureters are a pair of thin tubes. They carry urine from kidneys to the urinary bladder.

Urinary bladder: Urinary bladder is a hollow elastic organ. It stores urine before passing it out to urethra.

Urethra: Urethra is a thin tube that allows urine to pass outside the body.

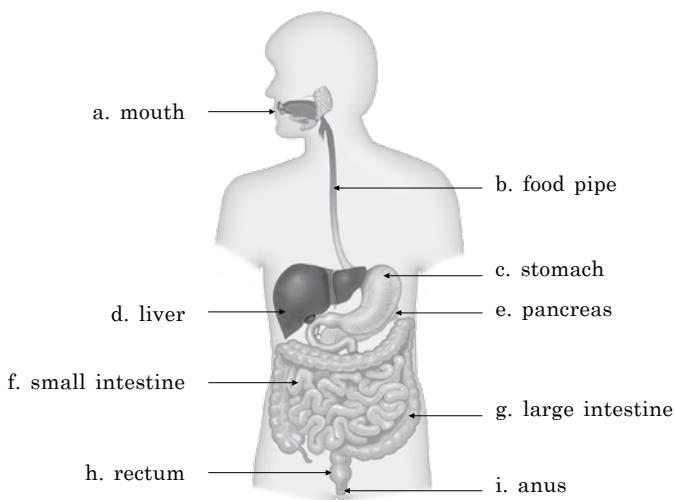
5. Five healthy eating habits that help in proper digestion and excretion are as follows:
- Drink plenty of water everyday.
 - Avoid drinking water while eating.
 - Prefer fibre-rich diet.
 - Always eat a balanced diet.
 - Eat slowly and chew the food well.

Think and Answer



Picture Study

1.



- i. Digestive system
- ii. Large intestine
- iii. Small intestine

4. Adaptations in Animals

Section 1

- | | | |
|-----------------------|----------------|----------------|
| A. 1. Habitat | 2. Carnivores | 3. Hibernation |
| 4. Amphibians | 5. Arboreal | |
| B. 1. lungs | 2. amphibians | 3. Carnivorous |
| 4. desert | 5. streamlined | |
| C. 1. aquatic animals | 2. aestivation | 3. herbivores |
| 4. adaptations | 5. omnivores | |
| D. 1. T | 2. T | 3. F |
| 4. T | 5. F | |
| E. 1. Lion, Tiger | | |
| 2. Fish, Turtles | | |
| 3. Birds, Bats | | |
| 4. Cow, Goat | | |
| 5. Camel, Blackbuck | | |

Section 2

- A. 1. The certain features that enable the animals to survive in their habitat are called adaptations.

There is a need for adaptation in animals because the natural environment on Earth is changing gradually with time.

2. Camels have thick broad pads of fat under their feet that prevent their feet from sinking into the sand. They drink lots of water at a time and can stay without water for many days.
3. Two adaptations shown by frogs and toads to live both on land and in water are as follows:
 - a. They have webbed feet that help them to swim in water.
 - b. They have moist skin to breathe in water and lungs to breathe on land.
4. Two adaptations shown by aerial animals are as follows:
 - a. They have wings which give them the ability to fly.
 - b. They have streamlined body that cuts through the air and helps in flying.
5. Two adaptations shown by arboreal animals are as follows:
 - a. They have sharp and strong claws to climb up and down the branches.
 - b. They have strong muscular limbs and a tail for holding on to branches.

- B. 1. Animals that live on land are called terrestrial animals.

There adaptations are as follows:

- a. They have thick fur on their bodies which keep them warm.
 - b. They have a thick layer of fat, called blubber, under their skin to keep them warm.
 - c. They become inactive and go into a long sleep during winter.
2. Animals that live in water are called aquatic animals.
- Adaptations shown by aquatic animals are as follows:
- a. Fish have streamlined body to move easily and quickly through water.

- b. Most aquatic animals have gills to breathe in water.
 - c. Most aquatic animals have fins or flippers that enable them to swim.
3. On the basis of their food habits, animals are classified as herbivores, carnivores, and omnivores.

Herbivores: Animals that eat only plants are called herbivores. Most herbivores have sharp front teeth and strong grinding teeth. For eg. Cow, horse, and deer.

Carnivores: Animals that eat flesh of other animals are called carnivores. Most carnivores have a pair of long pointed sharp front teeth. For eg. Lion and tiger. Carnivores birds have sharp beaks and claws to capture, kill, and carry their prey.

Omnivores: Animals that eat plants as well as flesh of other animals are called omnivores. They have a combination of sharp front teeth and broad back teeth. For eg. Bear and dog.

4. Four adaptations shown by animals to protect themselves from danger are as follows:
- a. Animals like turtle and snail have a hard shell. On sensing danger, they hide in their shell.
 - b. Animals like deer and kangaroo have strong legs that help them to run very fast to escape from enemies.
 - c. Animals like wasps and scorpions protect themselves by using their poisonous stings.
 - d. Porcupines have sharp and pointed quills which protect them from their enemies.
5. We can take care of pets and farm animals in the following ways:
- a. Provide them hygienic food and clean water for drinking.
 - b. Provide them clean and cosy shelter.
 - c. Give them a bath regularly.
 - d. Get them vaccinated on time.
 - e. Take them to veterinary doctor when they fall sick.

1. a.

b.

c.

d.

Soaring Higher and Higher in Science-4

5. Adaptations in Plants

Section 1

- A. 1. Terrestrial plants 2. Mountains
3. Desert 4. Insectivorous plants
5. Underwater plants
- B. 1. floating 2. Non-green 3. Mangroves
4. coastal 5. underwater
- C. 1. habitat 2. fixed aquatic plants
3. sea coasts
4. remain green throughout the year.
5. flexible stems that bend easily with waves.
- D. 1. T 2. F 3. T
4. T 5. T
- E. 1. Pine, Deodar
2. Lotus, Water lily
3. Venus flytrap, Pitcher plant
4. Cactus, Kikar
5. Indian pipe, Phantom orchid

Section 2

- A. 1. Adaptations are special features that allow a plant to live in a particular habitat.
Adaptations in plants is needed in order to survive itself in local climatic conditions.
2. Two adaptations shown by plants that grow on mountains are as follows:
a. They are usually tall, straight, and cone shaped.
b. They are usually flowerless and bear cones with seeds.
3. Two adaptations shown by plants that grow in coastal areas are as follows:
a. They have thick leaves to protect them from dehydration, and exposure to sun and salt.
b. The fruits and seeds of coastal plants are generally scattered by water to far off places.

4. Trees that do not shed their leaves in dry season and remain green throughout the year are called evergreen trees. For example, jackfruit tree and sapota tree.

Trees that shed their leaves during the dry season are called deciduous trees. For example, sandal wood tree and teak tree.

5. Plants that grow in water are called aquatic plants.

Three types of aquatic plants are- floating plants, fixed plants and underwater plants.

- B. 1. Deserts are large areas of dry land and receive very little rainfall. Three adaptations shown by desert plants are as follows:

- a. Plants in desert areas have thick and fleshy stems that store water.
- b. Most plants have leaves modified to spines or are small in size to prevent the loss of water.
- c. The roots of these plants go deep down into the soil and spread out wide to absorb as much ground water as possible.

2. Mangroves have roots that grow out of the marshy area to help the plant to take in air. These breathing roots help to absorb water and minerals needed to carry out photosynthesis.

3. a. Two adaptations shown by lotus plants are as follows:

- i. The leaves are flat and broad which help them to float easily on the surface of water.
- ii. The leaves have waxy coating which prevent these plants from decaying in water.

- b. Two adaptations shown by tape grass are as follows:

- i. The leaves of these plants are thin and narrow.
- ii. The stems have small air spaces which help these plants to breathe.

- c. Two adaptations shown by water hyacinth are as follows:

- i. The stems of these plants are light and spongy which help them to float on water.
- ii. The roots of these plants are not fixed and hang loosely in water.

4. Venus flytrap - The leaves of venus flytrap plant are in the form of boxes with hinges. There are hair along the edges on their leaves. When an insect touches the tiny hair on the leaf, the leaf snaps shut and the insect gets trapped.
Pitcher plant - The leaves of pitcher plant are hollow, and filled with nectar. When an insect comes to drink the liquid, the lid closes and the insect gets trapped.

Think and Answer

1. In cactus, leaves are modified to spines to prevent lose of water.
Plants in coastal areas have thick leaves to prevent excessive dehydration and exposure to sun and salt.
The roots of mangroves can grow out of the soil which help them to take in air.
2. If a coconut is planted in the desert, it would not be able to grow because it requires heavy rainfall and salty water.

Picture Study

1.

Name	Habitat	Main adaptation
Cactus plant	Desert	They have thick and fleshy stems to prevent loss of water.

2.

Name	Habitat	Main adaptation
Lotus	Water	The stems are thin, long and hollow which help these plants to reach the surface of water.

6. Plants in the Surroundings and Environment

Section 1

- | | | |
|---------------|------------------|-----------|
| A. 1. Roots | 2. Trunk | |
| 3. Leaf blade | 4. Stomata | |
| B. 1. shoot | 2. Leaves | 3. starch |
| 4. Stem | 5. Transpiration | |

- | | | |
|---------------|------------------|-----------------|
| C. 1. midrib | 2. stem | 3. fibrous root |
| 4. leaf stalk | 5. transpiration | |
| D. 1. T | 2. F | 3. T |
| 4. F | 5. T | |

Section 2

- A. 1. Leaves appear green in colour due to the presence of a green pigment called chlorophyll.
2. The process by which green plants make their own food using carbon dioxide, water, and minerals in the presence of sunlight and chlorophyll is called photosynthesis.
3. The process by which plants give off water in the form of water vapour through pores (stomata) present on the lower surface of the leaves is called transpiration.
4. Plants store extra food in the form of starch in their roots, stems, leaves, or fruits.

For example turnip plant stores extra food in its roots, ginger plant stores extra food in its stem.

- B. 1. Different parts of a plant are as follows:

Stem: The stem gives support to the plant. It holds the plant upright.

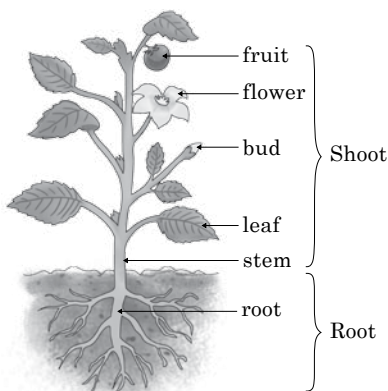
Leaf: Leaves are usually green in colour. They differ in shapes and sizes.

Flower: Most flowers turn into fruits.

Fruit: Most fruits contain seeds.

A fruit may have one few, or many seeds.

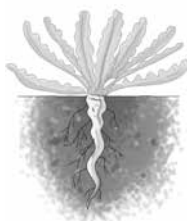
Root: It grows below the soil and keeps the plant anchored in soil.



Parts of a plant

2. There are two types of roots-

a. **Taproot:** A taproot has one thick main root with many thin roots at its sides.



Taproot

b. **Fibrous root:** A fibrous root has many thin and bushy roots growing from the base of the stem.



Fibrous root

3. a. Two functions of leaves are as follows:

- i. Leaves prepare food for the plant with the help of water, minerals, carbon dioxide, chlorophyll, and sunlight.
- ii. Leaves have stomata that help the plant to take in carbon dioxide and release oxygen during photosynthesis.

b. Two functions of stem are as follows:

- i. A stem carries water and minerals from the roots to the leaves for making food.
- ii. Strong stems keep the plants straight and upright.

c. Two functions of roots are as follows:

- i. Roots hold the plant firmly to the soil.
- ii. Roots absorb water and minerals from the soil and transport them to the upper parts of the plant.

4. **Aim:** To show that green leaves need sunlight to prepare food.

Materials required: A potted plant, beaker, burner, test tube, petri dish, forceps, dropper, some water, spirit, and iodine solution.

Procedure:

1. Keep the potted plant in a dark room for two or three days. Water the plant regularly.
2. Pluck a leaf from the plant and put it in the beaker containing water. Boil it for a minute to make it soft.
3. Gently take out the leaf with the help of forceps and put it in a test tube containing spirit. Place this test tube inside the beaker filled with water.

4. Place the beaker on the flame. Boil it until the leaf becomes colourless.
5. Take out the leaf and wash it with cold water.
6. Place the leaf in a petri dish and add a few drops of iodine solution over it using the dropper.

Observation: You will observe that the colour of the does not change. This shows that starch is not formed in the leaf due to the absence of sunlight. (starch turns blue-black in the presence of iodine.)

Conclusion: Green leaves need sunlight to prepare food.

5. Different parts of a leaf are as follows:

Leaf blade: The flat part of a leaf is called the leaf blade or lamina. It is usually green in colour.

Midrib: A long tube-like structure running through the middle of the leaf blade is called the midrib.

Leaf stalk: The part that attaches the leaf to a branch or stem is called the leaf stalk or petiole.

Stomata: The tiny pores usually present on the lower surface of a leaf are called stomata.

6. We obtain various products from plants. Some of them are:

Food items: Cereals, pulses, vegetables, fruits, and nuts.

Spices: Cloves, pepper, cardamoms, cumins, cinnamon, and chilli.

Oil: Groundnut oil, mustard oil, olive oil and coconut oil.

Beverages: Tea leaves, coffee beans and sugarcane.

Medicines: Neem, tulsi, and turmeric.

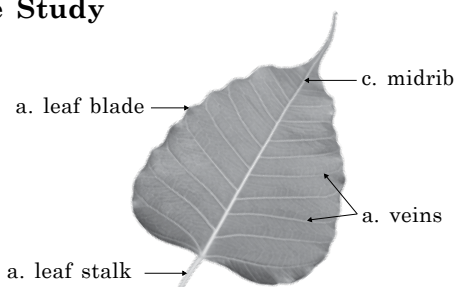
Paper: Bamboo and eucalyptus plants.

Think and Answer

1. We feel cool under the shade of a tree because trees release water into the atmosphere from their leaves via transpiration. The water that is releasing in its vapour form has a cooling effect on the surrounding air.
2. Stomata usually present on the lower surface of a leaf to control water loss from evaporation.

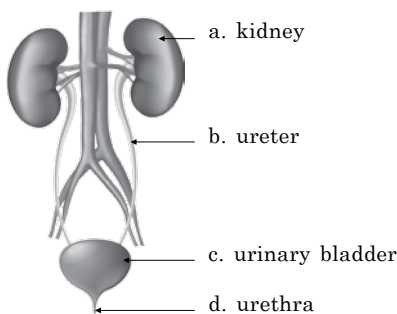
Picture Study

1.



Model Test Paper 1

- | | | |
|------------------------|------------------|----------------|
| A. 1. Iron | 2. Crown | 3. Hibernation |
| 4. underwater plants | | 5. Trunk |
| B. 1. Transpiration | 2. underwater | 3. streamlined |
| 4. water | 5. enamel | |
| C. 1. proteins | 2. plaque | 3. kidneys |
| 4. adaptations | 5. fibrous roots | |
| D. 1. F | 2. T | 3. T |
| 4. F | 5. F | |
| E. 1. Excretory system | | |
| 2. kidneys | | |
| 3. urinary bladder | | |



- F. 1. The two different parts of a tooth are the crown and the root.
2. Leaves appear green in colour due to the presence of a green pigment called chlorophyll.

3. Regular bowel movement is important to remove the waste material and toxins from our body.
4. The substances present in the food which are essential for the body are called nutrients.

They are important for our body because they make our body strong and healthy.

5. Two adaptations shown by plants that grow in coastal areas are as follows:
 - a. They have thick leaves to protect them from dehydration, and exposure to sun and salt.
 - b. The fruits and seeds of coastal plants are generally scattered by water to far off places.

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Stomata: The tiny pores usually present on the lower surface of a leaf are called stomata.

2. Five measures to avoid wastage of food are as follows:
 - a. Cook only the required quantity of food.
 - b. Distribute the surplus food among the needy.
 - c. Store cooked food, and raw fruits and vegetables in a refrigerator.
 - d. Avoid exposure of cut fruits and vegetables to air for a long time.
 - e. Take only that much food in your plate which you can eat.
3. The various organs of the digestive system are as follows:

Mouth: Digestion begins in the mouth. The teeth help to crush and chew the food. The chewed food mixes with the saliva. The tongue helps to push the food down into the food pipe.

Food pipe: It is a tube-like structure that carries food from the mouth to stomach.

Stomach: It is a hollow, sac-like organ that stores the food. Food is further broken down here. The partially digested food passes slowly into the small intestine.

Liver and Pancreas: Liver and pancreas produce digestive juices that help to digest food in the small intestine.

Small intestine: It is a long, hollow tube-like structure. Partially digested food is further digested here. The undigested food moves into the large intestine.

Large intestine: It is a tube-like structure that is shorter but wider than the small intestine. The walls of the large intestine absorb water from the undigested food and forms faeces.

Rectum: It stores faeces for a short period. Faeces are then passed to the anus.

Anus: Faeces from the body are removed through anus.

4. Eating a balanced diet promotes healthy teeth and gums. We should include fruits, raw vegetables and calcium-rich foods in our diet.
5. On the basis of their food habits, animals are classified as herbivores, carnivores, and omnivores.

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Omnivores: Animals that eat plants as well as flesh of other animals are called omnivores. They have a combination of sharp front teeth and broad back teeth. For eg. Bear and dog.

7. Air

Section 1

- | | | |
|--------------|------------------|--------------|
| A. 1. Matter | 2. Breeze | 3. Pollution |
| 4. Breathing | 5. Gas | |
| B. 1. solids | 2. Smoke | 3. shape |
| 4. burning | 5. moves | |
| C. 1. soild | 2. inhalation | 3. spiracles |
| 4. wind | 5. air pollution | |
| D. 1. T | 2. F | 3. F |
| 4. T | 5. T | |

Section 2

- A. 1. The three uses of air are as follows:
- a. All living things need air to breathe.
 - b. Air is needed for burning.
 - c. Air enables insects, birds, and bats to fly.
2. The football filled with air is heavier than the football. This shows that air has weight.
3. A burning candle extinguishes when we cover it with a glass jar because air supply gets finished and air is necessary for burning.
4. The process of breathing in air through the nose or mouth is called inhalation. The process of breathing out air through the nose or mouth is called exhalation.
5. Mixing of impurities in air is called air pollution.
- B. 1.

Solids	Liquids	Gases
a. Solid is composed of tightly packed particles.	a. Liquid is composed of loosely packed particles.	a. Gas is composed of very loosely packed particles.

b. The particles in solids do not move around.	b. The particles in liquids have some space to move around.	b. The particles in gases have large empty spaces between them and move freely in all directions.
c. Solids are hard and have a fixed shape.	c. Liquids do not have a fixed shape.	c. Gases do not have shape or size of their own.
d. Examples: Laptop and table	d. Examples: Water and milk	d. Examples: oxygen and carbondioxide.

2. Properties of air are as follows:
 - a. Air occupies space.
Air occupies every free space, however small.
 - b. Air has weight.
All materials that occupy space have weight.
 - c. Air expands on heating.
When air gets heated, its particles move freely away from each other and expand.
3. The various components of air are as follows:
 - a. Air is a mixture of various gases. The two major gases that make up the air are nitrogen (78%) and oxygen (21%).
 - b. Air contains smoke, dust, and germs. Smoke is produced when something burns. Dust is made up of fine particles of solid matter. Germ is a very small organism that can cause disease.
4. The causes of air pollution are as follows:
 - a. Harmful gases released from burning of wood, coal, and kerosene.
 - b. Smoke and harmful gases released from automobiles such as cars, buses, and trucks.
 - c. Smoke, dust, soot, and other harmful gases released by industries.

- d. Smoke and harmful gases released from burning of garbage.
 - e. Poisonous fumes released from heaps of unattended rotting garbage, open drains, and sewage.
5. The effects of air pollution are as follows:
- a. Breathing in polluted air causes respiratory diseases like bronchitis, asthma, and lung cancer.
 - b. Exposure to polluted air causes irritation to eyes and skin.
 - c. Polluted air damages the organs of animals.
 - d. Polluted air causes acid rain.
 - e. Polluted air damages the surface of buildings, statues, and monuments.
6. Five ways to prevent air pollution are as follows:
- a. Industries should be located away from the residential areas.
 - b. Vehicles must be checked regularly for pollution.
 - c. Garbage should not be burned in open.
 - d. More plants and trees must be grown to keep the air fresh and clean.
 - e. Public transport should be used instead of personal transport wherever possible.

Think and Answer

1. If the amount of water vapour in the air increases, the relative humidity increases.
2. We should cover our mouth while sneezing or coughing to prevent germs spread into the air.

Picture Study

1. a. The air is polluted.
- b. The traffic policeman wearing a mask to prevent breathing polluted air as it can cause lung diseases.
- c. Two measures that can improve the situation of the place are as follows:
 - i. Vehicles must be checked regularly for pollution
 - ii. More plants and trees must be grown to keep the air fresh and clean.

8. Materials and Solutions

Section 1

- | | | |
|--------------------|-------------------|--------------|
| A. 1. Melting | 2. Solvent | 3. Oxygen |
| 4. Coconut oil | 5. Sedimentation | |
| B. 1. Water | 2. Ice | 3. insoluble |
| 4. solute | 5. soluble | |
| C. 1. condensation | 2. solidification | |
| 3. decantation | 4. evaporation | 5. solution |
| D. 1. F | 2. F | 3. T |
| 4. T | 5. F | |

Section 2

- A. 1. Water is called a universal solvent because it can dissolve a number of substances to make solutions.
2. A solute and a solvent together form a solution. Salt is the solute and water is the solvent in the salt water solution.
3. Substances that easily dissolve in a liquid are called soluble substances such as salt and milk.
- Substances that do not dissolve in a liquid are called insoluble substances such as sand and wood.
4. Soluble substances can be separated from a solution by the method of evaporation. In this process, the solution is heated until the solvent evaporates leaving behind the solute.
5. We can separate sand from water by the method of filtration.
- B. 1. Matter can change its form from one state to another on heating or cooling. A solid can change into a liquid, and a liquid can change into a gas. These changes occur as the temperature increases. Similarly, a gas can change into a liquid, and a liquid can change into a solid. These changes occur as the temperature decreases. Thus, we can say that the three states of matter are interchangeable.
2. a. The process by which a solid changes into a liquid on heating is called melting. For example, ice (solid) changes into water (liquid) on heating.
- The process by which a liquid changes into a solid on cooling is called solidification or freezing. For example, water (liquid) changes into ice (solid) on freezing.

- b. The process by which a liquid changes into a gas on heating is called evaporation. For example, water (liquid) changes into water vapour (gas) on heating. The process by which a gas changes into a liquid on cooling is called condensation. For example, water vapour (gas) changes into water (liquid) on cooling.
3. Heating or cooling affects the movement of particles in solids, liquids, and gases. On heating, the particles in matter start moving faster and take up more space. On cooling, the particles in matter slow down their movement and take less space.
4. Filtration is a method for separating an insoluble solid from a liquid.

Let us separate sand from water to understand the process of filtration.

Take a filter paper and fold it twice to make the shape of a cone. Fix this cone filter in the funnel and place a beaker under it. Now, pour the mixture of sand and water into the funnel. The clear liquid gets collected in the beaker, whereas the insoluble sand particles are left behind on the filter paper.

5. Take muddy water in a container. Leave the container undisturbed for sometime. The insoluble substances (impurities) settle down at the bottom of the container and clear water stays above them. The process in which insoluble impurities settle down is known as sedimentation. Now, gently pour out clear water into another container without disturbing the impurities. Let the settled sediments remain in the first container. The process in which the water is gently poured out after sedimentation is called decantation.

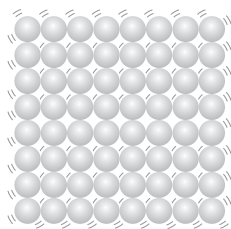
Think and Answer

- a. Salt and small amounts of minerals.
b. Water
- Water in the air changes into gases form due to evaporation and then these vapour again liquifies upon cooling into liquid form by the process of condensation which leads to the formation of clouds.

Picture Study

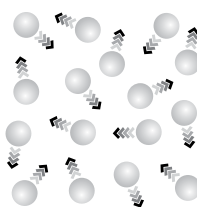
1. Can A is taken out from the refrigerator. Water droplets have formed on the outer surface of the can. This is because of the process of condensation. The air containing water vapour reacted with the surface to form the water droplets.
2. Solute, Solvent, Solute, Solution, Solution, Solute
3. The state of matter is changing from solid to liquid state.

Particles in the ice cream when it is frozen



Solids

Particles in the ice cream after it has melted



Liquids

9. Light

Section 1

1. Luminous objects
 2. Transparent objects
 3. Sun
 4. Jellyfish
 5. Artificial sources of light
1. straight line
 2. splitting
 3. shadow
 4. opaque
 5. opposite
1. reflection of light
 2. 3,00,000 km/s
 3. translucent objects
 4. non-luminous objects
 5. shadow

- | | | |
|---------|------|------|
| D. 1. T | 2. T | 3. F |
| 4. T | 5. F | |

Section 2

- A. 1. Light is a form of energy that makes it possible for us to see the things around. Three natural sources of light are Sun, stars, and moon.
2. We are able to see the objects, when the reflected rays of light reach our eyes.
3. When light passes through a prism, it can split light in all the seven colours.
4. A pencil appears to be bent when immersed partially in water because light changes its direction when it passes from one medium to another.
5. The sun rays are slanting in the morning and evening whereas at noon the sun is just above our head. A shadow is longer if the source of light is far away. It is shorter when the source of light is nearer.
- B. 1. Five properties of light are as follows:
- a. Light always travels in a straight line.
 - b. Light travels in all directions from its source.
 - c. Light bounces back when it falls on the surface of an opaque object.
 - d. Light changes its direction when it passes from one medium to another.
 - e. Light travels at a speed of about 3,00,000 kilometres per second (km/s).
2. Two different sources of light are as follows:
- a. **Natural sources of light:** Objects that exist in nature and emit light of their own are called natural sources of light.
 - b. **Artificial sources of light:** Man-made objects that emit light are called artificial sources of light.

3. a.

Luminous Objects	Non-luminous Objects
i. Objects that emit light of their own are called luminous objects.	i. Objects that do not emit light of their own are called non-luminous objects.
ii. Examples: Sun, electric lights, and candles.	ii. Examples: Earth, moon and pencils.

b.

Reflection of light	Refraction of light
Light bounces back when it falls on the surface of an opaque object. This is known as reflection of light.	Light changes its direction when it passes from one medium to another. This bending of light is known as refraction of light.

4. Different types of objects are as follows:

Transparent objects: Objects that allow light to pass through them completely are called transparent objects. Clear water, cellophane, clear glass, and clear air are some transparent objects.

Translucent objects: Objects that allow only a part of light to pass through them are called translucent objects. Butter paper, ground glass, and frosted glass are some translucent objects.

Opaque objects: Objects that do not allow any light to pass through them are called opaque objects. Stone, metal, and wood are some opaque objects.

5. A shadow is a dark area formed when light from a light source is blocked by an opaque object. A shadow is always formed on the opposite side of the source of light.

Think and Answer

1. Student D will be able to see the candle flame clearly. The candle flame can be seen through the straight pipe but not through the bent pipe because light always travels in a straight line.
2. We cannot see the shadow of a bird flying high in the sky because the distance between the bird and the surface of the earth is too large and even though the light is obstructed by the bird's body it cannot cast its shadow due to the large distance.

Picture Study

1.



Opaque



Transparent



Opaque



Transparent



Translucent

2. Her shadow would be seen along the line B because a shadow is formed on the opposite side of the source of light.

10. Measurement

Section 1

- | | | |
|-------------------|----------------|-----------|
| A. 1. Unit | 2. Centimetres | 3. Litres |
| 4. Thermometer | 5. Gravity | |
| B. 1. Measurement | 2. Mass | 3. second |
| 4. capacity | 5. Temperature | |
| C. 1. F | 2. T | 3. F |
| 4. T | 5. T | |

- | | | |
|----------|-------|-------|
| D. 1. km | 2. kg | 3. °F |
| 4. ml | 5. cm | 6. °C |
| 7. g | 8. l | |

Section 2

- A. 1. People used handspan, cubit, and foot span to measure length of objects in ancient days.
2. Length is a measure of distance. We can measure the length of a pencil with a ruler.
3. The amount of matter an object contains is known as mass. Weighing machines and weighing balance are two devices used to measure mass of an object.
4. The amount of liquid that a container can hold is called capacity. Litre and millilitre are two standard units to measure capacity.
5. Temperature indicates how hot or cold an object is. Degree Celsius and degree Fahrenheit are two standard units to measure temperature.
- B. 1. Non-standard units did not provide exact measurements. So to avoid confusion among people, we need standard units to measure things. Standard units of length, mass, volume, time, temperature, etc. describe the exact measurements.

2.

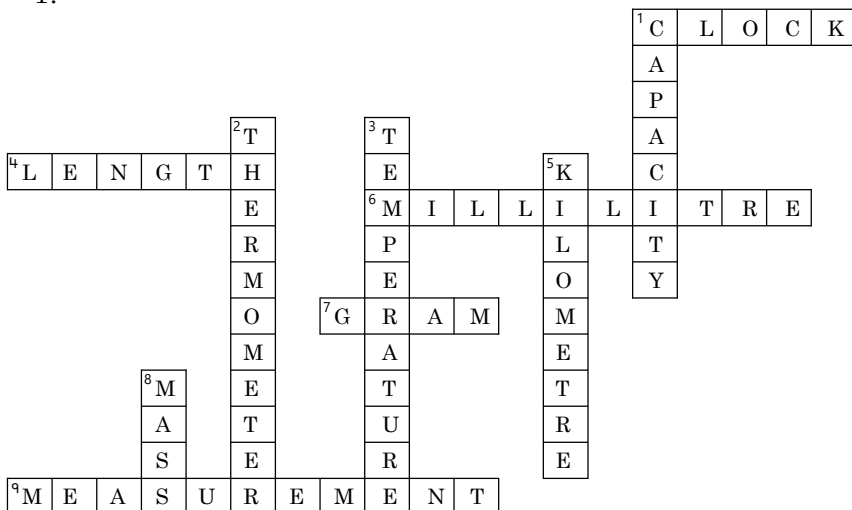
Mass	Weight
a. The mass of an object is the amount of matter it contains.	a. The weight of an object is the force of gravity on it.
b. The mass of an object is always constant.	b. The mass of an object varies according to its location.

3. Steps to measure mass of our body are as follows:
- Check that the needle of the dial on the weighing machine should coincide with the '0' mark.
 - Stand on the platform of the weighing machine without shoes.

- To use a clinical thermometer follow the given step:

- ## Think and Answer

1.



Picture Study



kg



ml



hr



m



kg



ml

11. Push and Pull

Section 1

- | | | |
|------------------------|---------------------|-----------|
| A. 1. Force | 2. Muscular force | 3. Magnet |
| 4. Sir Issac Newton | 5. Frictional force | |
| B. 1. magnetic force | 2. muscular force | |
| 3. away | 4. iron | |
| 5. gravitational force | | |
| C. 1. T | 2. F | 3. F |
| 4. T | 5. T | |
| D. 1. pull | 2. push | 3. push |
| 4. pull | 5. push | |

Section 2

- A. 1. A push or pull on an object is called force.
2. When we throw a ball up into the air, it comes back to Earth due to the gravitational force.
3. A batsman applies force to change the direction of a ball by hitting it with his bat.
4. **Examples of push**
- a. Closing a door
 - b. Writing on a board

Examples of pull

- a. Lifting a pen
 - b. Opening a door
5. The force with which a magnet attracts the metals towards itself is called magnetic force. Iron and steel are the metals that are attracted by a magnet.
- B. 1. The effects of the force are as follows:
- a. A force can make a stationary object move.
 - b. A force can changes the shape of an object.
 - c. A force can stop a moving object.
 - d. A force can change the direction of a moving object.
2. The force exerted by the muscles of our body is called muscular force. Muscular force is required whenever any movement of body occurs. For example, running, playing, and carrying things.
3. The force that pulls every object downwards, towards the centre of Earth is called gravitational force.
- For example, an apple of a tree always falls towards the ground. This happens due to the gravitational force.
4. The force that acts when two objects come in contact with each other is called frictional force.
- For example, the friction between the wheels and brakes helps the vehicle to stop.

Think and Answer

1. a. Joy - Pull Aditi - Push
- b. The force applied on the plasticine ball will change its shape. Picture Study

Picture Study

1. a. Gravitational force
- b. Magnetic fore

12. Friction as a Force

Section 1

- | | | |
|----------------|-----------------|-----------|
| A. 1. opposite | 2. write | 3. smooth |
| 4. lubricants | 5. Ball bearing | |

- B. 1. contact force 2. stop
 3. friction 4. frictional force
- C. 1. T 2. F 3. T
 4. T 5. F
- D.



Section 2

- A. 1. A force which slows down a moving object is called a friction. Friction occurs when two surfaces come into contact with each other.
2. We sprinkle powder on a carom board before playing to make the movement of the striker and coins smooth.
3. A substance such as oil or grease that reduces friction is called lubricant.
4. The friction between our feet and the ground enables us to walk. It prevents us from slipping on the floor while walking or running.
- B. 1. Four examples of friction in our daily life are as follows:
- We can walk because there is friction between our feet and the ground.
 - We can ride a bicycle because there is friction between the cycle tyre and the ground.
 - We can write on a paper with a pencil because there is friction between the pencil tip and the paper.
 - We can write with a chalk on the green board because there is friction between the chalk and the green board.

2. Two ways to reduce friction are as under:

Using lubricants: Applying lubricants such as oil or grease on the surface of an object reduces friction. For example, we apply oil on the hinges of the door to reduce creaky noise.

Using ball bearing: Ball bearing is a device that consists of a ring of small metal balls. It is placed between the moving parts of a machine to reduce friction.

3. Four uses of friction are as follows:
- The friction between our hands and the glass enables us to hold the glass.
 - The friction between the paper and the pen enables us to write on the paper.
 - The friction between the tyre and road helps the vehicle to move.
 - The friction between the wheels and brakes helps the vehicle to stop.
4. Four harmful effects of friction are as follows:
- Due to friction, sliding a heavy box across the floor is difficult.
 - Due to friction, parts of machines get worn out.
 - Due to friction, noise is produced in machines.
 - Due to friction, soles of shoes, tyres of vehicles, and erasers wear out gradually.

Think and Answer

- Vehicle tyres have treads on them because it helps the tyres to reduce friction. They are necessary so that the tyres do not slip and hence, an accident can be avoided
- The banana peel makes the surface smooth, so the friction between our feet and ground decreases and causing us to fall.
- The friction between the tyres and road helps the vehicle to move.
 - A car engine can become warmer and can cause car to overheat due to friction.

Picture Study

1. a. These shoes have spikes at their bottom.
b. Sportsmen wear such shoes because it helps in forming grip so that they do not slip.

Model Test Paper 2

- | | | |
|------------------------|------------------|-------------------|
| A. 1. Force | 2. Thermometer | |
| 3. Transparent objects | 4. Solvent | 5. Gas |
| B. 1. Water | 2. moves | 3. Capacity |
| 4. smooth | 5. opposite | |
| C. 1. friction | 2. 3,00,000 km/s | 3. solidification |
| 4. inhalation | 5. stop | |
| D. 1. T | 2. F | 3. T |
| 4. F | 5. T | |

- E. 1. Gravitational force
2. Magnetic force

F. 1. **Examples of push**

- a. Closing a door
- b. Writing on a board

Examples of pull

- a. Lifting a pen
 - b. Opening a door
2. Substances that easily dissolve in a liquid are called soluble substances such as salt and milk.
- Substances that do not dissolve in a liquid are called insoluble substances such as sand and wood.
3. A pencil appears to be bent when immersed partially in water because light changes its direction when it passes from one medium to another. This bending of light is known as refraction of light.
4. Temperature indicates how hot or cold an object is. Degree Celsius and degree Fahrenheit are two standard units to measure temperature.

5. A burning candle extinguishes when we cover it with a glass jar because air supply gets finished and air is necessary for burning.

G. 1. Properties of air are as follows:

- a. Air occupies space.

Air occupies every free space, however small.

- b. Air has weight.

All materials that occupy space have weight.

- c. Air expands on heating.

When air gets heated, its particles move freely away from each other and expand.

2. Filtration is a method for separating an insoluble solid from a liquid.

Let us separate sand from water to understand the process of filtration.

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 - c. Due to friction, noise is produced in machines.
 - d. Due to friction, soles of shoes, tyres of vehicles, and erasers wear out gradually.
5. The force that pulls every object downwards, towards the centre of Earth is called gravitational force.

For example, an apple of a tree always falls towards the ground. This happens due to the gravitational force.