Science Booster 6

1 The Wonderful World of Science

ANSWERS

✧ Introductory chapter, so there are no questions in this chapter.

2 Diversity in the Living World

ANSWERS

CHECK POINT 1

1. (T) **2.** (F) **3.** (F) **4.** (T)

CHECK POINT 2

1. Submerged **2.** Caudal **3.** Earthworm/Snake **4.** Floating **5.** Camels

PRACTICE TIME

A. **1.** (b) **2.** (d) **3.** (d) **4.** (c) **5.** (b)

B. **1.** (b) **2.** (d) **3.** (c) **4.** (d)

C. **1.** (b) **2.** (e) **3.** (d) **4.** (a) **5.** (c)

D. **1.** The variety of living organisms found on the earth or in a particular area is termed as biodiversity.

2. Banana, maize

3. Based on lifespan, plants are grouped into annual, biennial and perennial plants.

4. Permanent changes in the structure of organisms to survive successfully in a new habitat are called adaptations.

5. Plants can be grouped based on the roots found in them and also on the basis of habitat they live in.

E. **1.** Difference between parallel and reticulate venation

Parallel Venation	Reticulate Venation
In parallel venation, veins run parallel to the midrib.	In reticulate venation, veins form a network in the leaf blade.

2. Plants that have only one cotyledon in their seeds are called monocotyledons while those having two cotyledons in their seeds are called dicotyledons.

3. Plants having only one cotyledon in their seed have parallel venation in their leaves and possess fibrous roots. On the other hand, plants having two cotyledons in their seeds have reticulate venation in their leaves and possess tap root.

4. Camels have following adaptations to walk in desert:

- Large and padded feet
- Long eyelashes and ear hair to protect eyes and ears from sand

5. Adaptations in fish to live in water:

(a) Streamlined body

(b) Gills to breathe in water

(c) Fins to help swim in water

(d) Caudal fin to change direction while swimming.

6. Ways to protect biodiversity are as follows:
- Cutting of trees should be prevented.
- Poaching of wild animals should be prohibited.
- Forest fires should be prevented.
- Illegal trading of wild products should be stopped.

F. 1. (a) Features of terrestrial habitat are:
- Terrestrial habitat shows great variation in climatic conditions.
- Desert habitat is dry and has very less vegetation and animals.
- Forest habitat has rich variety of trees and other plants.
- Grassland habitat has mainly grasses and few small trees and bushes.
- High mountains have cold climate.

(b) Terrestrial habitat is categorised into forest habitat, grassland habitat, desert habitat and mountain habitat.

2. Adaptations found in a bird are as follows:
- Body is streamlined to fly easily in air.
- Forelimbs are modified into wings.
- Flight muscles are very strong.
- Body is covered with feathers to make it light.
- Bones are hollow and filled with air.
- Hindlimbs are meant for walking on ground, to hold tree branches, etc.

3. Adaptations found in camel of hot desert are:
- Camels have thick skin without sweat glands.
- Camels can drink a large quantity of water at one time and store it in the body for later use.
- Camels excrete thick urine.
- They store fat in their hump which can be used to provide energy when required.
- They have long legs and broad, padded feet.
- They have long eyelashes and ear hair to protect eyes and ears from sand.
- They can close their nostrils to avoid entry of sand into respiratory passage.

4.

Habitat	Example		Adaptation
(a) **Aquatic**	Animals	Whales	1. **Body streamlined** 2. **Limbs modified into paddles**
(b) Desert	Plants	**Cactus**	1. **Leaves modified into spines** 2. **Very long roots that go deep into the soil**
(c) Mountains	Plants	**Pine**	1. Cone-shaped trees 2. Needle-like leaves

5. (a) A fish does not survive outside water because it is adapted to take in oxygen dissolved in water.
(b) Camel in the desert has long legs with wide hooves to walk easily on loose and hot sand. Long legs keep its body away from hot sand while wide hooves prevent them from sinking into loose sand.
(c) In desert plants, the leaves are modified into spines so as to prevent the loss of water due to transpiration.

G. 1. Sonu can ask Raju the following questions:
(a) What kind of stem does it have?
(b) How high does it grow?
(c) How long does it survive?

2. A – Cow, Goat
B – Frog, Toad

3. The roots in the plant of seed (a) are fibrous roots and venation in the leaves is parallel. On the other hand, the roots in the plant of seed (b) are tap root and venation in leaves is reticulate venation.

3 Mindful Eating – A Path to a Healthy Body

ANSWERS

CHECK POINT 1

1. (F) **2.** (T) **3.** (F) **4.** (T) **5.** (T)

CHECK POINT 2

1. (a) K; Calcium (b) Vitamin C (c) micro
2. (a) Starch (b) Iodine solution (c) Blue-black (d) Rice and potato

CHECK POINT 3

1. Vitamins and minerals **2.** Protein **3.** Scurvy **4.** Anaemia **5.** Millets

PRACTICE TIME

A. **1.** (d) **2.** (c) **3.** (b) **4.** (b) **5.** (c) **6.** (b)

B. **1.** (c) **2.** (a) **3.** (a) **4.** (d) **5.** (b)

C. **1.** (F) **2.** (T) **3.** (F) **4.** (F) **5.** (T)

D. **1.** Vegetables, whole grains, pulses and fresh fruits. **2.** Sodium, Potassium
3. Rickets (in children), Osteoporosis (in adults) **4.** Vitamins and minerals
5. Cellulose

E. **1.** Glucose is the simplest sugar which is burned or oxidised to get energy by the cells. So, it is called instant source of energy.
2. Excess of proteins and carbohydrates are converted into fats and stored in the body. This will make us obese.
3. (a) Deficiency of iron which takes part in the formation of haemoglobin.
(b) Deficiency of vitamins B_6, B_9 and B_{12} which help in the formation and maturation of RBCs.
4. (a) Proteins form muscles, skin, hair and nails of the body.
(b) They form antibodies.
5. Marasmus is a disease of children in which their body suffers the shortage of proteins and carbohydrates. Such children are very thin and weak. Their growth stops and tissues are slowly destroyed.
6. Food is grown at the farm of a farmer. After harvesting, foodgrains are stored at a safe and dry place. After some time, these are sold in the market where flour is made by grinding the grains. This flour is packed in packets and sent to the retail shop where we purchase it for consumption. In our home, this flour is used to make chapatis (food) which is served in our plates.

F. **1.** (a) Roughage is dietary fibres that are formed of cellulose. We get it from vegetables, fresh fruits, whole grains, etc.
(b) Roughage adds bulk to the food, and helps in easy and regular movement of bowel to get rid of undigested food.

2. (a) Iron, calcium, phosphorus, sulphur, potassium, chlorine, sodium, magnesium and iodine are major minerals of our diet.

(b) The insufficient amount of calcium in diet hampers the health of bones and teeth. Its deficiency causes rickets in children in which their bones and teeth are poorly developed, and in adults, it causes osteoporosis which makes their bones weak and fragile.

The deficiency of iodine causes goitre in which thyroid gland enlarges and affects the production of thyroxine hormone.

3. (a) Taking diet which has shortage of one or more nutrients is called malnutrition.

(b) If the children do not get sufficient amount of mother's milk during the early years, they suffer from protein malnutrition.

(c) A child suffering from kwashiorkor has stunted growth, large pot-like belly, swollen face, thin legs, mental retardation, and cracked and scaly skin.

4. Obesity in children has become a common problem due to excessive taking of junk food like pizzas, chocolates, soft drinks, etc., by them. Instead of involving in any physical activity, playing games on computer and watching TV for long hours is another cause of obesity in children.

5. (a) Undernutrition refers to a condition in which body gets less amount of nutrients than required from a diet even if it is balanced, whereas malnutrition is taking an unbalanced diet lacking one or more nutrients.

(b) Saturated fats are obtained from animals. These are butter, ghee, milk cream, meat, egg-yolk, cheese, etc., while unsaturated fats are obtained from plants, e.g., mustard oil, groundnut oil, coconut oil, etc.

G. 1. (a) Mehar is suffering from night blindness.

(b) Vitamin A

(c) She should include carrots, tomatoes, egg yolk, milk and dairy products in her diet.

2. I will prefer roasted chana because it is a good source of protein, dietary fibres, vitamins and minerals. Other food items are junk food.

3. Mohit experiences stomach ache and constipation because he does not get sufficient dietary fibres. He should include green vegetables, whole grains and fresh fruits in his diet and should avoid eating too much namkeen, biscuits and pasta.

Passage/Case-based Questions

1. Taking too much high-energy food results in obesity.

2. Fruits and raw vegetables have low energy and provide vitamins, minerals and dietary fibres.

3. When the body is healthy and free from any malfunctioning, mind gets sufficient nutrients and works well.

H. 1. OBESITY **2.** RICKETS, ROUGHAGE **3.** VITAMINS **4.** CARBOHYDRATES **5.** RICE **6.** OIL **7.** CALCIUM **8.** MINERALS **9.** EGG **10.** GOITRE **11.** PROTEIN **12.** FATS

4 Exploring Magnets

ANSWERS

CHECK POINT 1

1. magnetite, lodestone **2.** magnetic **3.** magnet **4.** Magnesia

CHECK POINT 2

1. (T) **2.** (T) **3.** (F) **4.** (T)

CHECK POINT 3

1. Directive property **2.** North pole **3.** Magnetic compass **4.** Keepers

PRACTICE TIME

A. **1.** (d) **2.** (d) **3.** (c) **4.** (a) **5.** (d)

B. **1.** (c) **2.** (a) **3.** (d) **4.** (b) **5.** (a)

C. **1.** (c) **2.** (d) **3.** (e) **4.** (b) **5.** (a)

D. **1.** A magnet is a substance that has the property of attracting objects made of iron, nickel, cobalt and their alloys.

2. Materials such as iron, nickel, cobalt and their alloys are attracted by the magnet. Such materials are called magnetic materials.

3. Materials such as wood, plastic, rubber, paper, brass, cotton, glass, copper, aluminium, stainless steel, etc., are not attracted by the magnet. They are called nonmagnetic materials.

4. A freely suspended magnet rests in the north-south direction.

5. When like poles of two magnets are brought close to each other, the two magnets repel each other.

6. When a magnet loses its power, it is called demagnetised.

E. **1.** Magnets made from the pieces of iron are known as artificial magnets.
Artificial magnets are made in rectangular, cylindrical, dumb bell shape horseshoe shape, ring shape and in needle shape.

2. The poles of a magnet always exist in a pair. If we break a magnet into two parts, each part will behave like a magnet, i.e., it will again have a north pole and a south pole.

3. When the magnetic compass is placed on a horizontal surface and the needle is allowed to come to rest, the needle aligns itself along north-south direction. The north pole of needle points towards the north and the south pole points towards the south. So the directions can be located easily with the help of a magnetic compass.

4. Precautions to be taken while handling magnets are:

- Never hit or beat a magnet with anything.
- Do not throw a magnet or let it fall on the floor.
- Do not heat a magnet.

5. A magnet loses its power when it is dropped frequently or hammered or brought in contact with other magnets repeatedly or heated to a certain temperature.

6. The attractive property of a magnet is used to separate magnetic materials from nonmagnetic materials such as removing iron pieces from junk, adulteration of iron dust from tea leaves, etc.

F. 1. An iron bar can be magnetised by following procedure:

Lay an iron bar on a table. Hold a bar magnet vertically at one end of the iron bar, so that one of the poles of the magnet (say N-pole) touches the iron bar. Rub the magnet along the length of the iron bar, till you reach its other end. Lift the magnet from the other end vertically and bring it back in the direction, so that the same pole touches the iron bar again.

Repeat the process for at least 40–50 times, until the iron bar gets magnetised.

Now, test it for magnetic property by bringing small iron pins near it.

2. Repulsion is the sure test of magnetism. It can be proved by performing the following activity:

Suspend a bar magnet and bring any end of the object to be tested close to both the poles of the suspended magnet one-by-one.

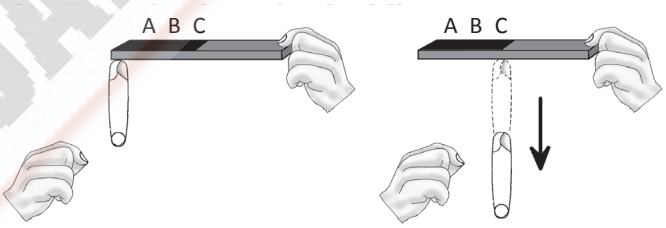
If the end of the object is attracted by both the poles, then it is simply a magnetic substance and if the end of the object is repelled by one of the poles of the suspended magnet, then it is a magnet.

3. A magnetic compass consists of a small and lightweight magnetic needle pivoted at its mid-point so that it can freely rotate in a horizontal plane. The needle is enclosed in a flat circular aluminium box with a glass plate at the top. At the base of the box, the four main directions the north (N), south (S), east (E) and west (W) and four subdirections, north-east (N-E), north-west (N-W), south-east (S-E) and south-west (S-W) are marked. Generally, the north pole of the magnetic needle is painted red and the south pole blue or black.

Uses: A magnetic compass is used by sailors, navigators, pilots, soldiers, mountaineers, etc., to find the directions. It is also used by students in performing scientific experiments.

4. The power of a magnet is concentrated at its]

Hold a magnet in one hand and a safety pin in the other hand. Bring both things close to each other. See that one of the poles of the magnet picks up the pin. Remove the safety pin from this pole and try to stick it to point A, slightly away from the pole, as shown in the figure. Similarly, try to stick the pin at point B of the magnet. The safety pin again goes back to the nearest pole.



Now, remove the safety pin from the pole and try to stick it to the centre of the bar magnet at point C. The magnet does not hold the safety pin at its centre.

This shows that the power of a magnet is the maximum at its poles and the minimum or negligible at its centre.

5. The magnetic behaviour of the earth is due to the movement of magnetic materials (iron and nickel) found in the molten state in the earth's core.

G. 1. We can use a magnet to find out iron pins and screws easily because these are made of magnetic material.

2. A freely suspended bar magnet rests in north-south direction. The pole of bar magnet pointing in north direction is North pole and that which points in south direction is South pole.

3. Polarities of ends 1 to 7 are as follows:

1–South 2–North 3–South 4–North 5–South 6–North 7–South

4. On a ship, a magnetic compass is used to find the directions. Yes, a magnetic compass can be useful to everyone because it helps to find the directions at some unknown place.

Passage/Case-based Questions

1. Substances that get attracted towards magnets are called magnetic substances, for example, iron nail.
2. (a) A magnet attracts an iron object.
   (b) A magnet has two poles–north pole and south pole.

5 Measurement of Length and Motion

ANSWERS

CHECK POINT 1

1. Unit **2.** Foot **3.** Metre **4.** Temperature

CHECK POINT 2

1. Cubit **2.** Fundamental quantity **3.** K (kelvin) **4.** s **5.** Metric system

CHECK POINT 3

1. (T) **2.** (F) **3.** (F) **4.** (T) **5.** (F)

PRACTICE TIME

A. **1.** (b) **2.** (a) **3.** (a) **4.** (c) **5.** (d)

B. **1.** (c) **2.** (a) **3.** (a) **4.** (b) **5.** (d)

C. **1.** angul **2.** fundamental **3.** multiples **4.** rectilinear **5.** oscillatory **6.** periodic

D. **1.** Measurement is the comparison of an unknown quantity with some known fixed quantity of the same kind.

2. The length between the tip of the middle finger and the elbow of one's arm is known as a cubit.

3. Multiples of kilogram are quintal and metric tonne while it submultiples are hectogram, decagram and gram.

4. When an object changes its position with respect to a fixed point with time, it is said to be in motion.

5. In a hilly area, a moving bus has curvilinear motion.

E. **1.** In 1790, a committee of French Academy devised a decimal system of units for measurement which is called the metric system of units. In this system, the length is measured in centimetre, mass in gram and time in second (CGS).

2. Quantities which do not depend on other quantities are called fundamental quantities. The seven fundamental quantities are: mass, length, time, electric current, temperature, luminous intensity and amount of substance.

3. In CGS system, length is measured in centimetre, mass is measured in gram while in MKS, they are measured in metre and kilogram respectively. However, time is measured in second in both the systems.

4. An object in a to-and-fro motion about a fixed point is said to be in oscillatory motion. For example, motion of a pendulum of a clock, motion of a swing, etc.

5. Some examples of multiple motions are:

(i) A moving car has translatory motion as a whole, but its wheels show rotatory motion.

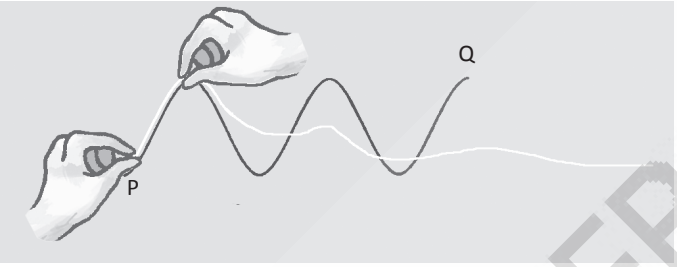
(ii) A rolling ball has rotatory as well as translatory motions.

(iii) The earth has rotatory motion on its axis and revolutionary motion around the sun.

(iv) A drill machine while using has rectilinear as well as rotatory motions.

F. 1. The units of seven fundamental quantities and their derived units are called SI units. The SI unit of length is metre (m), of mass is kilogram (kg), of time is second (s) and that of temperature is kelvin (K).

2. To measure the length of a curved line, say PQ, by using a thread, tie a knot at its one end. Place this knot at one end of the curved line (P). Carefully, move the thread along the length of the curved line, holding the thread at small distances between your thumb and first finger. Continue until you reach the other end of the curved line (Q). Put a mark on the thread using a pen, where it touches the end point. Now, stretch the thread along a metre scale. The length of the thread between the knot and the pen mark is equal to the length of the curved line.



Measuring the length of a curved line by using a thread

3. If a body moves on the whole from one place to another, so that all its body parts move the same distance in a given time, it is said to be in a translatory motion. Translatory motion is of two types:

- Rectilinear motion: When an object, on a whole, moves along a straight path, it is said to be in rectilinear motion, e.g., a car moving on a straight road shows rectilinear motion.
- Curvilinear motion: When an object, on a whole, moves along a curved path, it is said to be in curvilinear motion, e.g., a car moving on a curved road shows curvilinear motion.

4. A ball rolling on an inclined surface has multiple motions. When the ball moves down, it shows translatory (rectilinear) motion. At the same time, it is rolling about its centre-point (say, axis) which shows that it is in rotatory motion too.

5. The motions which repeat after a fixed interval of time are called periodic motions. For example, the earth completes its one rotation in 24 hours and one revolution in 365.25 days and the pendulum of a clock completes one oscillation in 1 second.

Some motions which repeat themselves but not after a fixed interval of time are called nonperiodic motions. For example, beating of a drum or the heart beat of a sick person.

G. 1. Do yourself.

2. Do yourself.

3. (a) Virat's height is 117 cm.

(b) 117 cm = 1 m 17 cm

or = 1.17 m (∵ 1 m = 100 cm)

117 cm = 46 inches (∵ 1 inch = 2.54 cm)

(c) A height of 150 cm can be measured with this scale.

I. 1. She should not accept the rate in terms of cubit because cubit is not a standard unit.

2. Sheetal has scientific temper and knowledge of units.

3. Yes. Foot, centimetre, inch, etc., are some other reliable units of measurement.

6 Materials Around Us

ANSWERS

CHECK POINT 1

1. The grouping of things on the basis of some criteria is called classification.
2. Nail, Hammer, Pressure Cooker
3. The basis to identify an object is its material and shape.

CHECK POINT 2

1. Lustre is the shining property of an object. For example, all metals.
2. The roughness and smoothness of a material of an object is called its texture. For example, sandpaper has rough surface, while glazed paper has smooth surface.
3. The property of a hard or a soft material is called hardness.

CHECK POINT 3

1. Transparent materials are those which allow light to pass through them. Examples: Glass, water, etc.
Translucent materials are those which allow light to pass through them partially. Examples: Butter paper, etc.
Opaque materials are those which do not allow light to pass through them. Examples: Wood, rubber, etc.
2. Ice, cork and wax
3. Book, cardboard

PRACTICE TIME

A. **1.** (a) **2.** (d) **3.** (c) **4.** (c) **5.** (c)
B. **1.** (a) **2.** (a) **3.** (d) **4.** (c) **5.** (c)
C. **1.** (e) **2.** (d) **3.** (a) **4.** (c) **5.** (b)
D. **1.** Objects which have shiny surfaces are called lustrous objects, e.g., gold, silver, copper, etc.
2. Wood and rubber are nonlustrous objects.
3. Materials which can be compressed are said to be soft, e.g., eraser, sponge, etc.
4. Materials which cannot be compressed are said to be hard, e.g., metal spoon, glass, etc.
5. The property of dissolving a substance in water is called solubility.
E. **1.** In order to choose a material to make an object, the following objectives should be kept in mind:
- The purpose for which the object is to be used.
- The properties of the material.

2. The cooking utensils should have the property of heat conduction but wood does not have such property. Also, if wooden pot would be heated, it would catch fire. Hence, utensils are not made of wood.

3. The following properties are crucial for identifying a matter:

(a) Mass

(b) Volume (space occupied by it)

4. Commonly, the following properties are used to group the objects:

- Appearance (lustrous or nonlustrous)
- Texture (rough or smooth)
- Solubility (soluble or insoluble in water)
- Ability to float or sink in water
- Transparency (transparent, translucent or opaque)

5. Transparency is the property of a material of an object which tells whether we can see through the object or not. On the basis of this property, objects are categorised as transparent, translucent and opaque objects.

F. 1. The process of grouping things on the basis of some criteria is known as classification.

Classification of objects is necessary because:

- it makes it convenient to locate objects, and
- it makes it easier to study the properties of objects. If we know the properties of one member of a group, it can give an idea about the properties of other members belonging to the same group.

2. To group objects on the basis of their solubility in water, perform the following activity.

Materials Required: Sugar, chalk powder, baking powder, talcum powder, vinegar, mustard oil, corn flour, milk, wax, turmeric powder, coconut oil, lemon juice and honey

Procedure: Add small amounts of each one of these to a glass tumbler of half-filled water. Stir well. Identify the soluble or insoluble materials in water.

Observation: Group the materials and write them in the given table.

Conclusion: Some materials are soluble in water while some are insoluble.

3. I would not prefer to hide behind a glass window while playing hide-and-seek because glass is a transparent material and will allow to see clearly through it, and hence to be caught easily.

A window made of wood is suitable to hide behind it because wood is an opaque material and it does not allow light to pass through it and will not allow to be seen clearly.

4. (a) Lustrous objects have shiny surfaces. They are generally made up of metals like, gold, silver, copper, aluminium, etc.

Nonlustrous objects do not have shiny surfaces. They are commonly made up of nonmetals like wood, rubber, etc.

(b) The objects which can be attracted by a magnet are called magnetic objects. They are made up of iron, nickel, cobalt, etc.

The objects which cannot be attracted by a magnet are called nonmagnetic objects. These objects are made of other kind of metals and nonmetals.

(c)
- Objects through which we are able to see very clearly are called transparent objects.
- Objects through which we are able to see, but not clearly are called translucent objects.
- Objects through which we are not able to see at all are called opaque objects.

G. 1. (a) Sponge

(b) Air

(c) Opaque object

2. (a) On the basis of texture because some of them are rough and some are smooth.

(b) On the basis of solubility because sugar, salt and biscuit are soluble in water while others are not.

Passage/Case-based Questions

1. Sugar and salt both are still present in lemonade and hence, give their taste. They just disappeared because they are soluble in water.

2. Salt and sugar disappear in the spaces found between water molecules.

3. Sand and chalk powder.

H. 1. NITROGEN **2.** INSULATOR **3.** SOFT **4.** TRANSLUCENT **5.** HARD **6.** SOLUBLE **7.** OPAQUE **8.** TRANSPARENT **9.** INSOLUBLE

K. (a) Suresh has values like curiosity, kindness and care for others.

(b) Earthen pots remain cool during summer.

(c) Plastic and glass materials can also be used to make a bird bath.

7 Temperature and Its Measurement

ANSWERS

CHECK POINT 1

1. (T) **2.** (T) **3.** (F) **4.** (F) **5.** (T)

CHECK POINT 2

1. (T) **2.** (F) **3.** (T) **4.** (F) **5.** (T)

PRACTICE TIME

A. **1.** (a) **2.** (b) **3.** (b) **4.** (d) **5.** (a)

B. **1.** (d) **2.** (c) **3.** (b) **4.** (d)

C. **1.** mercury **2.** Anders Celsius **3.** 32 **4.** clinical

D. **1.** Heat is a form of energy which can be transformed into other forms of energy like electrical energy, light energy, mechanical energy, etc.

2. It is 102 degrees on Fahrenheit scale.

3. The thermometer which is used to measure the body temperature of humans is called clinical thermometer.

4. A laboratory thermometer is generally used to measure temperatures ranging from –10°C to 110°C.

5. The temperature shown is 45°C or 113°F.

E. **1.** We feel hot after rubbing our palms together because in doing so our muscular energy is transformed into heat energy.

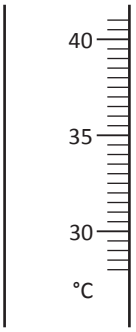
2. The temperature is a measure of the degree of hotness or coldness of a body. The device used for measuring the temperature of a body is called thermometer.

3. It is convenient to use digital thermometer because it measures temperature accurately using thermistor instead of mercury and shows the reading in the form of digits.

4. If a thermometer falls or breaks while giving jerks and the mercury spills in the form of small droplets, then take a small ball of kneaded wheat flour and roll it over the mercury droplets to pick them all. Put this contaminated wheat flour ball in a polythene bag, give it a tight knot and hand it over to your nearest pharmacy to dispose it off.

5. We have different scales for measuring temperature because we have to measure temperatures of various things. The same scale may not be convenient everywhere. For example, in scientific experiments, temperature is generally measured on Kelvin scale for its accuracy.

F. 1. The scale of thermometer between 30°C to 40°C. It has two small divisions for 1°C temperature, so the value of each small division will be 0.5°C. Hence, its smallest division can read a temperature of 0.5°C



2. Structure of a clinical thermometer: A clinical thermometer is formed of a long and narrow glass tube with a bulb at its one end. This bulb is filled with mercury. The glass tube encloses a thin capillary tube. The capillary tube has a kink just a little above the bulb. Two scales, i.e., Celsius and Fahrenheit scales are shown on the thermometer. The range of Celsius scale on the clinical thermometer is 35°C to 42°C and that of Fahrenheit scale is 94°F to 108°F.

Using a clinical thermometer: Wash and dry the thermometer. Then give it one or two jerks and make sure that the mercury in the capillary tube has fallen well below 35°C. Put the bulb of the thermometer under the tongue for one minute. Take it out and read the temperature.

Precautions to be taken while using a clinical thermometer:

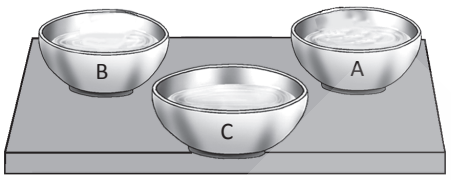
- The thermometer should be washed with an antiseptic lotion or with clean water and dried with a clean dry cloth before and after every use.
- The thermometer should be given two or three soft jerks to bring the mercury in the capillary, well below 35°C.
- While giving jerks, care should be taken that the thermometer does not hit any object, otherwise its delicate bulb is likely to break.
- Thermometer should not be held by the bulb while reading it.
- While the thermometer is inside mouth, one should not laugh or talk or yawn or make any other action.
- Note the reading in clear light. The thermometer can be given small rotations to make the capillary and the level of mercury clearly visible.
- Keep the level of mercury along the line of sight while reading the thermometer.

3. Precautions to be taken while using a laboratory thermometer:

- While the laboratory temperature is being taken, the bulb of the thermometer should be kept vertical and in contact with the object whose temperature is to be measured. It should not touch the bottom or the sides of the container.
- The reading of temperature should be taken without removing the thermometer from its position.
- The eye of the observer and the mercury in the capillary tube should be at the same level.
- The thermometer should not be used to measure temperatures below its lowest marking or above its highest marking.

4. Our sense of touch is not a reliable method to measure the temperature. This can be proved by performing following activity.

Procedure: Take three bowls and label them A, B and C.



Half fill each of the bowls with ice-cold water, bearable hot water and lukewarm water respectively. Now, put your left hand in bowl A and right hand in bowl B simultaneously. Keep your hands in the two bowls for about 1 minute. Then, remove both the hands and put them together in bowl C.

Observation: The left hand feels that the water in bowl C is hot whereas the right hand feels that the water in bowl C is cold.

As the right and left hands do not give same feeling of either hotness or coldness of the water in bowl C, we cannot always rely on our sense of touch.

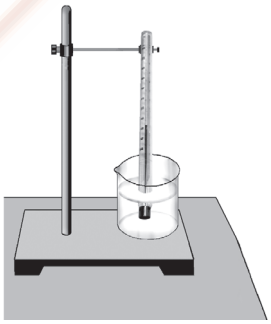
5. The three scales to measure temperature are:

- **Celsius scale (°C):** On this scale, the freezing point of water is 0°C and boiling point is 100°C.
- **Fahrenheit scale (°F):** On this scale, the freezing point of water is 32°F and boiling point is 212°F.
- **Kelvin scale (K):** On this scale, the freezing point of water is 273 K and boiling point is 373 K.

Interconversion of Scales:

- **Interconversion of °C and °F scales:** $°C = \frac{5}{9}(°F - 32)$, $°F = \frac{9}{5}°C + 32$
- **Interconversion of °C and K: K =** °C + 273, °C = K – 273
- **Conversion of 50°C into °F:** $°F = \frac{9}{5} \times 50 + 32 = 9 \times 10 + 32 = 122$ °F

6. A laboratory thermometer consists of a very thin capillary tube of glass, which is surrounded by thick and supportive glass walls. The upper end of the capillary is closed after evacuation and the lower end is drawn into a delicate bulb-like shape, with a thin glass wall. The bulb is filled with mercury. The stem of the thermometer has marks as horizontal lines to read a particular temperature. These marks are known as calibrations. A laboratory thermometer is generally used to measure temperatures ranging from –10°C to 110°C.



The temperature of water can be measured using a laboratory thermometer as follows:

Take a beaker and fill it a little more than half with tap water. Hang a laboratory thermometer on an iron stand such that its bulb is completely dipped in water.

Observe till the mercury thread in the capillary tube becomes steady and read the level of mercury. This reading gives the temperature of tap water taken in the beaker.

7. Differences between Clinical Thermometer and Laboratory Thermometer

Clinical Thermometer	Laboratory Thermometer
1. A clinical thermometer is shorter than a laboratory thermometer.	1. A laboratory thermometer is much longer than a clinical thermometer.
2. The range of temperature for a clinical thermometer is 35°C to 42°C.	2. The range of temperature that can be measured with a laboratory thermometer is –10°C to 110°C.
3. The clinical thermometer is removed from the body to note down the temperature.	3. The laboratory thermometer is read while its bulb is in close contact with the object whose temperature is to be measured.
4. The capillary of a clinical thermometer has a kink, just above its bulb.	4. The laboratory thermometer has a straight capillary.

G. 1. Human beings have little variations is their body temperatures. Actually, the normal body temperature, i.e., 37°C is the average value of body temperatures of a large number of healthy persons.

2. It is not convenient to use a laboratory thermometer for measuring human body temperature because we have to take the thermometer out of mouth to note the reading. If we use laboratory thermometer, on taking it out of mouth, the mercury will start falling down in the absence of kink in the capillary tube. Therefore, it is not used to measure human body temperature.

3. The temperature of our body does not fall below 35°C or rise above 42°C. That is why the range of clinical thermometer is from 35°C to 42°C.

4. The thermometer given in the middle can be used to measure a temperature of –3.5°C because it has the smallest division which can measure a temperature of 0.5°C.

Passage/Case-based Questions

1. Mercury

2. 32°C to 42°C (or 94°F to 108°F)

J. (a) Kink does not allow mercury to go down into the bulb and helps to take correct reading.

(b) One should not laugh, cough or chew while using a clinical thermometer in the mouth.

(c) Sakshi has scientific temper and sympathy.

8 A Journey through States of Water

ANSWERS

CHECK POINT 1

1. three-fourths **2.** three **3.** water vapour **4.** ice **5.** evaporation

CHECK POINT 2

1. temperatures **2.** condenses **3.** hail, snow **4.** water vapour **5.** melting

PRACTICE TIME

A. **1.** (c) **2.** (c) **3.** (b) **4.** (d) **5.** (d)

B. **1.** (b) **2.** (d) **3.** (c)

C. **1.** (F) **2.** (F) **3.** (T) **4.** (F)

D. **1.** Evaporation is the process of converting water into water vapour.

2. Conversion of water vapour into water on cooling is called condensation.

3. Liquids that evaporate just like water are acetone and sanitiser.

4. The water vapour that evaporates from waterbodies mixes with the air and after rising up higher, condenses into tiny droplets of water which form clouds.

5. The gaseous state of water is colourless and adourless. It is also lighter than air.

E. **1.** Keeping the harvested grains in open under the sun helps to remove moisture (water) from the grains by the process of evaporation. When there is no moisture in grains, microbes like fungi do no grow on them and hence grains are saved from spoilage/wastage.

2. The three states of water are solid, liquid and gas.

- The solid state of water is ice. On heating, it changes into liquid state.
- On heating, the water in liquid state changes into water vapour.
- On cooling, the water vapour changes back into water.
- On freezing, the liquid water changes into ice.

$$\underset{\text{(Ice)}}{\text{Solid}} \underset{\text{Cool}}{\overset{\text{Heat}}{\rightleftharpoons}} \underset{\text{(Water)}}{\text{Liquid}} \underset{\text{Cool}}{\overset{\text{Heat}}{\rightleftharpoons}} \underset{\text{(Water vapour)}}{\text{Gas}}$$

3. Rainwater is the purest form of water, whereas sea water contains a lot of salts. Therefore, sea water is saline.

4. As tea is hot, water in tea changes into water vapour and rises up. When this water vapour touches cold surface of coaster, it cools down and changes into water droplets. Thus, evaporation and condensation are responsible for this change.

5. We shall conserve water because the population of the world is increasing day-by-day and so is the demand for water. We cannot use water from all the sources directly. So, we must use water wisely and avoid its wastage.

F. 1. The continuous circulation of water from the earth's surface to the air and from the air back to the earth's surface is called water cycle.

Water as water vapour enters the air from seas, oceans and other waterbodies, plants and animals through evaporation, transpiration and respiration respectively. This water vapour rises up higher and higher and condenses into tiny droplets of water and forms clouds in the sky. In the clouds, tiny droplets join together to form larger drops which fall down on the earth in the form of rain. The rainwater fills back the rivers, lakes and ponds, and also seeps under the ground.

In this way, the water cycle is completed.

2. Uses of water can be classified as:

- Domestic use: We use water for drinking, cooking, washing, bathing, flushing the lavatory, brushing teeth, sweeping the floor, filling the swimming pools, etc.
- Agricultural use: Plants also need water. Water is required for germination of seeds, transporting nutrients to various parts, completing the process of photosynthesis, etc.
- Industrial use: In industries like paper, chemicals, food, etc., water is mainly used as a solvent, for washing, cooling and disposal of waste.
- Other uses: Water helps in
  - maintaining the body temperature, digesting food, excreting waste materials from the living body.
  - providing habitat for aquatic animals and plants.
  - generating electricity in hydroelectric power plants.
  - extinguishing fire.
  - giving medium for the transport of ships, boats, etc.

3. Wet shoes dry due to the evaporation of water from them. When wet shoes are kept under the fan, the moving air removes water vapour that evaporates from the shoes and hence, shoes dry faster.

If the shoes are kept in the balcony, they will dry slowly as there is no movement of air, but when the sunlight is falling directly on the shoes kept in balcony, they will dry faster as sunlight heats them up making evaporation of water faster.

4. When the temperature is high, rate of evaporation increases and hence, high temperature favours evaporation.

Wet clothes are spread in the sunlight to dry them faster. The heat of sunlight increases the temperature of clothes and hence, that of water present in them. The rate of evaporation becomes more and clothes dry faster in the sunlight.

5. Water can be conserved by following ways:

- Use minimum amount of water for bathing. Use a bucket instead of a shower.
- Never drain the water when there may be another use for it, for example, washing vegetables, watering plants, etc.
- Do not let water run while brushing, shaving or washing your hands or face.
- Repair the leaky taps.
- Avoid flushing the toilets unnecessarily.
- Turn off the taps immediately after use.
- Adopt rainwater harvesting.

6. When the hot milk is poured from a narrow glass into a wide bowl, then the surface area of milk exposed to air becomes more. As area of surface exposed to air has direct impact on the process of evaporation, i.e., when exposed surface area is more, the rate of evaporation is also more. So, pouring milk in wide bowl increases its surface area and hence, evaporation occurs faster. When evaporation occurs, it causes cooling effect on the surface and so, the milk cools faster and now Neha is able to drink it easily.

7. As evaporation occurs, the molecules of liquid absorb heat from the surrounding environment, i.e., from the surface or bulk of the liquid. This reduces the heat of the surface or the surroundings. When heat of surroundings becomes less, it feels cooler than before. Hence, evaporation causes cooling effect. When we pour some sanitiser on our palm and leave it for some time, it disappears and our palm feels cooler than before. It is due to the cooling effect of evaporation.

8. (a) Seawater is saline, i.e., contains much salts in it, so it cannot be used directly for drinking and agricultural purposes.

(b) The storage tank must have a tight cover to prevent the contamination of water and also to prevent breeding of mosquitoes.

(c) Proper balance of water is important for the growth of plant because if soil has excess water, the roots of the plant rot and the plant droops or wilts as it cannot get enough oxygen from the soil. On the other hand, if soil is deficient in water, the nutrients needed for the proper growth of plant cannot be absorbed by it.

(d) Due to insufficient availability of water in the soil, plants do not get required amount of nutrients from the soil. Hence, they do not grow well.

G. 1. Sea water contains a lot of salts in it which make it saline. Saline water is not good for the growth of plants as it will kill their roots and also not suitable for drinking by animals as it will cause various problems by disturbing salt-water balance of the body.

Rainwater is considered as the purest form of naturally occurring water. Therefore, it can be used for the purposes like growth of plants, drinking by animals, etc.

2. Water collected in puddles on roads and playgrounds gets heated when the sun shines and evaporates, so the puddles dry up soon.

3. Water cycle is a continuous process which keeps the amount of water constant on the earth's surface. The amount of water that evaporates from various waterbodies on the surface of earth comes back in the form of rain or snow.

Passage/Case-based Questions

1. Water gets polluted from the discharge of factories, domestic waste, run-off chemicals from the fields, etc.

2. A contaminant enters a food chain along with food or water that small animals consume.

3. Rivers are thought to be sacred in our country because they are the main source of drinking water in most of the cities. The bitter reality is that urbanisation, industrialisation and modern lifestyle have polluted most of the rivers in our country.

H. 1. NUTRIENTS **2.** EVAPORATION **3.** MELTING **4.** SWEATING **5.** RAINWATER **6.** ICE **7.** CONDENSATION **8.** RIVER

9 Methods of Separation in Everyday Life

ANSWERS

CHECK POINT 1

1. (c) **2.** (e) **3.** (d) **4.** (a) **5.** (b)

CHECK POINT 2

1. residue **2.** Evaporation **3.** solution **4.** filtration, evaporation

PRACTICE TIME

A. **1.** (d) **2.** (c) **3.** (d) **4.** (a) **5.** (c) **6.** (a)

B. **1.** (a) **2.** (d) **3.** (b) **4.** (c) **5.** (b)

C. **1.** (F) **2.** (T) **3.** (F) **4.** (T) **5.** (F)

D. **1.** Winnowing is the method of separating husk from grains with the help of wind.

2. Filtration

3. A method of separation in which components having magnetic properties are separated by using a magnet is called magnetic separation.

4. Winnowing.

5. In the process of filtration, the liquid that flows through the filter paper is called filtrate.

E. **1.** (a) The process used to separate grains from stalks with the help of machines, animals or manually is called threshing.

(b) The method of separating a mixture into its components by hand is called handpicking.

2. Sea water is trapped in shallow pits and is left in the sun for long to evaporate, leaving the salts behind. This mixture of salts is then purified to obtain common salt.

3. Impurities and bran are separated from flour by using the method of sieving. This is done because these impurities contaminate our food and may harm our health.

4. The components of a mixture are separated for the following reasons:

- To obtain two different but useful components of mixture.
- To remove harmful components or impurities of a mixture.
- To remove useless components of a mixture.

5. (a) The process of setting down of heavier insoluble substance (sediment) in a mixture is called sedimentation.

(b) The process of pouring out of liquid without disturbing the sediment is called decantation.

6. Filtration is a better method to separate sand from water because when a mixture of sand and water is allowed to pass through a filter paper, only water passes through it and sand does not, so components are separated.

7.

Sediment	Residue
1. The substance that settles at the bottom of a liquid is called sediment.	1. The substance that remains in the filter paper is called residue.
2. It is heavier than the liquid.	2. It may be heavier or lighter than the liquid.
3. It is separated using decantation method.	3. It is collected by filtration method.

8. The method of handpicking is used to separate only those mixtures in which the components:

- are mixed in small quantities.
- can be easily picked by hand.
- have different sizes, shapes or colours.

F. 1. We will separate the components of a mixture of sand and common salt by using the method of filtration and evaporation as follows:

Take a beaker and pour a little amount of given sample into it. Now, add a plenty of water and stir well using a glass rod. Thereafter, filter this mixture using a filter paper. Here, salt dissolved in water passes through filter paper and sand is separated as residue. Now, heat the filtrate collected in another beaker till all the water evaporates. Common salt is left in the beaker.

2. Winnowing is the method of separating husk from grains with the help of wind. In this process, the mixture of grains and husk obtained after threshing is taken in a winnowing basket. The farmer stands on a raised platform and holds the basket at his shoulder height. He then tilts the basket allowing the mixture to fall down slowly, shaking it continuously. The lighter husk particles get carried away by wind, whereas the heavier grains fall down vertically on the ground forming a heap. Thus, husk and grains are separated.

3. Sieving is a method of separating a mixture of various sized particles by passing them through a suitable sieve.

Pebbles are separated from chalk powder by using a larger sieve at a construction site to prepare a uniform mixture of sand, cement and water which is used to construct a wall with the setting of bricks.

4. To separate a mixture of chalk powder and water, take a filter paper and place it in a funnel after making its cone. Pour the mixture containing chalk powder and water over the filter paper using a glass rod. Clear water gets collected in the beaker kept below the funnel and chalk powder remains in the filter paper.

5. The mixture of cooking oil (mustard oil) and water can be separated using a separating funnel.

Pour the mixture containing mustard oil and water into a separating funnel. Allow it to stand for some time. Now, place a beaker below the separating funnel. Mustard oil and water form two separate layers. Water forms the lower layer and mustard oil forms the upper layer. Open the stopcock and allow the water to flow through it. When all the water flows down, close the stopcock. On opening the stopcock, water flows through it and gets collected in the beaker and mustard oil remains in the separating funnel, which can be collected in a separate beaker.

6. (a) Tea granules are not separated by evaporation because the useful component 'tea' will be lost.

(b) Small stones and husk are harmful components so they are separated from *dal* or rice before cooking.

(c) Pebbles are separated from sand to prepare a uniform mixture of sand, cement and water which is used to construct a wall with the setting of bricks.

(d) Handpicking is applicable when the components are mixed in small quantities and can be easily picked up. Thus, farmer is not able to apply this method for a large amount of crop.

7. (a) The method used for separating insoluble solids in liquids is filtration, whereas the method used for separating soluble solids in liquids is evaporation.

Filtration	Evaporation
1. A filter paper is used for separation.	1. Heat is used to evaporate liquid.
2. The insoluble solid remains in the filter paper.	2. The soluble solid remains in the pan.
3. The liquid is collected in a beaker (vessel).	3. The liquid gets evaporated and mixes with air. It can be get back by condensation.

(b) In the process of threshing, grains are separated from stalks while in winnowing, husk is separated from grains with the help of wind.

Threshing is done manually by using human power or by using animal power like bullocks or with the help of machines. Winnowing is carried out manually or with the help of machines.

(c) The process of settling down of sediment in a mixture is called sedimentation. The process of pouring out of liquid without disturbing the sediment is called decantation. Decantation is done after sedimentation.

G. 1. insoluble, filtration, fine, two

a–mud water, b–funnel/filter paper, c–residue, d–filtrate

2. No, as salt and sugar both are soluble in water so no residue is left on filter paper when the solution of their mixture is filtered.

Passage/Case-based Questions

1. Suraj was sieving the tea to remove tea leaves which are now of no use.

2. Sieving of wheat flour, sieving of sand at construction site, etc.

H. 1. SEDIMENT **2.** EVAPORATION **3.** FILTRATE **4.** SOLUTION **5.** CHURNING

6. RESIDUE **7.** THRESHING

K. (a) Rashmi's mother's keen observation skills can be learnt.

(b) Rashmi has scientific temper.

(c) Yes, chalk powder can also be separated from sugar solution by using sedimentation and decantation method. This method is not so effective as filtration.

10 Living Creatures – Exploring their Characteristics

ANSWERS

CHECK POINT 1

1. cells **2.** multicellular **3.** internal **4.** locomotion **5.** leaves

CHECK POINT 2

1. Energy from the sun and carbon dioxide **2.** Autotrophs **3.** Carbon dioxide
4. Gum

CHECK POINT 3

1. (T) **2.** (F) **3.** (F) **4.** (T) **5.** (T)

PRACTICE TIME

A. **1.** (b) **2.** (c) **3.** (a) **4.** (d) **5.** (c) **6.** (b)

B. **1.** (b) **2.** (a) **3.** (a) **4.** (d) **5.** (c)

C. **1.** cell **2.** lifespan **3.** stimulus **4.** excretory **5.** stomata

D. **1.** From sun **2.** Food **3.** Carbon dioxide
4. gum, resin and latex
5. By forming seeds or spores and from plant parts such as root, stem and leaf.
6. Tadpole of frog is a larval stage in the life cycle of frog which emerges from egg and looks like a fish.

E. **1.** Only green plants can make their food themselves. Therefore, they are called autotrophs. They use energy from the sun, water and carbon dioxide to make their food.
2. Animals move from one place to another by changing their position while plants do not change their position, but some of their parts move in the direction of stimulus.
3. Unicellular organisms are made of single cell such as *Amoeba,* yeast, etc., whereas multicellular organisms are made of many cells. For example, man.
4. Faeces, carbon dioxide, urine and sweat are excretory wastes produced in animals.
5. Respiration is the breakdown of food by using oxygen in the cells for getting energy and releasing carbon dioxide and water as waste while breathing is taking in fresh air to get oxygen and giving out used air to expel carbon dioxide formed during respiration.
6. Stages in the life cycle of mosquito are as follows:
Egg → Larva → Pupa → Adult
7. A tadpole does not have legs or has two small legs while a froglet has four legs. A tadpole has long tale while a froglet has a shorter tail.

F. **1.** Plants do not release carbon dioxide during the day time because carbon dioxide produced in the process of respiration is used in the process of photosynthesis.

2. All living things respond to stimuli which are changes in light, temperature, touch, moisture, etc., in the environment. For example,

- We shiver on a cold day or sweat on a hot day due to change in the temperature of surroundings.
- Lotus flowers open in the morning and close by sunset because of change in the amount of light in the environment.

3. The process of taking in fresh air and giving out used air is called breathing. Organisms breathe to get oxygen from the air which is used to burn the food for getting energy.

4. To show growth in nonliving things, make a saturated solution of sugar by mixing excess of sugar in water. Stir well and pour it into a beaker. Fill the beaker up to three-fourths and hang a small crystal of sugar in the solution with the help of a thread. Leave it undisturbed.

After a few hours, it is seen that the crystal has increased in size. This shows growth in nonliving things.

This growth is external because crystal has increased in size due to deposition of sugar on the surface of crystal from the solution.

5. Plants do not change their position, but some of their parts move in the direction of stimulus. For example,

- Shoot grows towards light.
- Roots grow towards water in the soil.
- Sunflower turns its head in the direction of the sun.
- Touch-me-not plant folds its leaves when touched.
- When a bud opens into a flower, its petals move outwards.

6. The life cycle of a plant has different stages as follows:

(a) **Seed:** A seed contains a baby plant inside it. It germinates on getting suitable conditions of air, water and warmth.

(b) **Germination:** After five or six days of sowing, a seed germinates. Its root grows downwards and shoot grows upwards.

(c) **Appearance of leaves:** After a few days of germination, leaves appear on the stem.

(d) **Appearance of flowers:** The plant grows and becomes mature. Now, it gets buds which open into flowers.

(e) **Appearance of fruits:** After the formation of flowers, fruits are formed in raw form and then become ripe. These fruits contain seeds inside them.

7. The life cycle of a frog is completed in following four distinct stages:

(a) **Egg:** Eggs are laid by a female frog in water. A large number of eggs are embedded in a jelly-like substance and are called spawn.

(b) **Tadpole:** After a week, each egg hatches into a larva called tadpole. A tadpole has a long tail and looks like a fish. It lives in water, feeds and grows in size. After 6–8 weeks, two small legs appear.

(c) **Froglet:** Tadpole grows in size and develops all four legs. Now, the tail gets reduced in size. A froglet starts spending some time on land.

(d) **Adult:** A froglet grows in size and looses its tail completely. By now, its legs become strong enough to jump on the land. Now, an adult frog is formed which starts living on land and also in water.

G. 1. Cars and buses are not living things because they do not burn fuel on their own to get energy. They move by some external force, i.e., force of engine.

2. Kerosene forms a layer on the surface of water. Larvae of mosquito breathe in air from the water surface and hence, layer of kerosene prevents them from getting oxygen. This kills mosquito larvae.

3. The water softens the hard cover (seed coat) of seed and helps the embryo of seed to grow into a seedling.

Passage/Case-based Questions

1. The removal of waste products formed in the body is called excretion.

2. Excretory products formed by plants are gum, resin, latex, etc.

3. Plants get rid of extra water by transpiration.

H. 1. AUTOTROPHS **2.** UREA **3.** RESPONSE **4.** HETEROTROPHS **5.** STIMULUS **6.** LOCOMOTION **7.** CELL

11 Nature's Treasures

ANSWERS

CHECK POINT 1

1. atmosphere **2.** rain **3.** solar energy **4.** afforestation

CHECK POINT 2

1. (F) **2.** (T) **3.** (F) **4.** (T)

PRACTICE TIME

A. **1.** (c) **2.** (d) **3.** (b) **4.** (a) **5.** (d)

B. **1.** (b) **2.** (d) **3.** (c)

C. **1.** conservation **2.** groundwater **3.** granite **4.** natural gas **5.** renewable

D. **1.** Water conservation

2. The water that is found between the layers of hard rock of the earth's crust is called groundwater.

3. Solar energy is used to dry clothes, grains, etc.

4. Minerals are natural elements or compounds that are found in the earth's crust.

5. Those resources which cannot be replenished in reasonable time, if exhausted, are called nonrenewable resources.

E. **1.** Air is useful to us as follows:

- Oxygen gas of air is used for respiration.
- Oxygen gas of air is used to burn fire.
- Moving wind is used to generate electricity using windmills.

2. Problems caused due to water scarcity are as follows:

- People do not have sufficient quantity of fresh water to drink.
- Crop yield reduces as crop plants do not grow properly.

3. We need to conserve fossil fuels because these are nonrenewable natural resources which cannot be replenished in reasonable time, if exhausted.

Fossil fuels take millions of years to form and hence, are found only in limited amounts.

4. (a) Marble is used to make statues, buildings, flooring, etc.

(b) Granite is used to make statues, monuments, kitchen slabs and for flooring.

5. Important benefits of forests are:

(a) Forests provide clean and fresh air to breathe and maintain balance of oxygen and carbon dioxide in air.

(b) Forests provide timber, medicines, gum, resin, spices, paper wood, etc.

F. 1. Measures for forests conservation are as follows:

- Protection of forests from being cut.
- Preventing forest fires.
- Reducing dependence on forest products such as firewood, timber, paper wood, plywood, etc.

2. Various ways to conserve water are as follows:

- Turning off taps when not in use.
- Repairing leaky taps immediately.
- Avoiding flushing the toilets unnecessarily.
- Using a bucket and a mug for bathing instead of using a shower.
- Avoiding over-watering of plants.
- Avoiding washing of cars using a hose pipe.

3. Petroleum was formed from the organisms that lived in water and got buried under ocean or river sediments millions of years ago. The heat, pressure and bacteria acted upon them and a thick oily liquid called petroleum was formed.

Petroleum is used to get various useful components like petrol, diesel, kerosene, lubricating oil, wax, medicinal oil, etc.

- Petrol, diesel and kerosene are used as fuels in automobiles, factories, etc.
- Lubricating oil is used in machines and automobiles.
- Wax is used to make various cosmetic products and candles.
- Medicinal oil is used to prepare certain medicines.

4. The resources which can be replenished naturally over time and are sustainable if managed properly are called renewable resources, whereas those resources which cannot be replenished in reasonable time, if exhausted, are called nonrenewable resources.

Forests, water, solar energy and wind energy are renawable resources while fossil fuels, minerals, etc., are nonrenewable resources.

The nonrenewable resources should be used judiciously because these are found in limited amount and if exhaused, these will not be formed in hundreds or thousands of years.

G. 1. A windmill is a device (machine) that is used to harvest wind energy. A windmill works by using the energy of wind to rotate its blades. It uses a renewable natural resource (wind) to generate energy.

2. Both renewable and nonrenewable natural resources are being used in this picture. Water is useful for plants as it helps them to grow, whereas water sprinkler made of metal is useful to sprinkle water on the plants which avoids wastage of water.

3. Running of automobiles, factories, production of electricity in thermal power plants, etc., are possible due to presence of fossil fuels.

4. Ways to restore nonrenewable resources are as follows:

- We should not overuse and misuse these resources.
- We should avoid mismanagement and wastage of these resources.
- Use alternative resources which are of renewable nature.

If nonrenewable resources would get exhausted, we would have to depend on other resources for our various daily needs.

12 Beyond the Earth

ANSWERS

CHECK POINT 1

1. Stars **2.** Alpha Centauri **3.** 9.46×10^{12} km **4.** Ursa Major **5.** Sirius

CHECK POINT 2

1. (T) **2.** (F) **3.** (T) **4.** (F) **5.** (F)

CHECK POINT 3

1. Asteroids **2.** shooting **3.** away **4.** Soviet Union

PRACTICE TIME

A. **1.** (d) **2.** (a) **3.** (b) **4.** (d) **5.** (a)

B. **1.** (d) **2.** (a) **3.** (c) **4.** (a) **5.** (b)

C. **1.** Moon **2.** Stars **3.** navigators **4.** parsec **5.** Venus

D. **1.** The heavenly bodies moving around a planet are called satellites.

2. New moon.

3. Pole star is located just above the north end of the axis of rotation of the Earth.

4. The group of stars which forms a pattern is called a constellation.

5. The Earth is called the blue planet.

E. **1.** Due to the position of Moon in relation to Earth and Sun, and its revolution around the Earth, we see different phases of the Moon.

2. The time period between two consecutive full moons is called a lunar month. It is 29 days, 11 hours and 43 minutes long.

3. A heavenly body that revolves around the Sun is called a planet. There are eight planets in our solar system. These are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

4. The rocky objects of different sizes that revolve around the Sun are called asteroids. They are found between the orbits of Mars and Jupiter and form an asteroid belt.

5. A satellite which is designed by man in order to revolve around the Earth in a fixed orbit is called an artificial satellite. India's first artificial satellite was Aryabhata.

F. **1.** Different phases of the Moon are as follows:

- **New Moon:** It is the phase of the Moon when it is in the same direction as the Sun and its non-illuminated half part faces the Earth and is invisible to us.
- **Waxing Crescent Moon:** It is the phase of the Moon when a part of it is illuminated and is visible to us. This part is seen as a thin curve called crescent which starts growing bigger on every following night.
- **First Quarter Moon:** This phase comes a week after the New moon. At this phase, the half of illuminated Moon is visible to us.

- **Waxing Gibbous Moon:** At this phase, a still bigger part, which is more than half of the illuminated Moon, is visible to us.
- **Full Moon:** This phase comes two weeks after the new moon. At this phase, full illuminated moon is visible to us as a full circular disc.
- **Waning Gibbous Moon:** This phase comes a week after the full moon, when the illuminated part starts decreasing continuously.
- **Last Quarter Moon:** This phase comes three weeks after the new moon in which only half of the illuminated part of the Moon is visible to us.
- **Waning Crescent Moon:** At this phase, which is during the fourth week after the new moon, the size of illuminated part of the Moon decreases and is visible to us as a thin curve again.

2. The surface of the Moon on its near side is entirely different from its far side. The surface on the near side is extraordinarily uneven and consists of lunar highlands and maria (large ditches).

The surface on the far side of the Moon is comparatively smoother and has a finer texture, but is still found with a large number of craters formed by the falling of meteors.

3. The characteristic features of the Sun are:

(a) The Sun is a medium-sized star. It gives out its own light.

(b) It gives a large amount of heat and light to us which is necessary for life to exist.

(c) Its distance from the Earth is 150 million kilometres.

4. The conditions that favour life on the Earth are:

(a) The distance of the Earth from the Sun is such that it receives optimum amount of heat and light from the Sun.

(b) The Earth has a protective covering of atmosphere around it, which protects it from many high energy radiations coming from the Sun.

(c) The atmosphere of the Earth has oxygen gas, which is essential for life to exist.

(d) The atmosphere of the Earth helps in maintaining a moderate temperature range on the Earth.

(e) The gravity on the Earth is optimum that holds the water (oceans) and the atmosphere on the surface and prevents them from escaping. It allows an easy movement of creatures and objects on the surface of the Earth. The just appropriate amount of heat, light, gravity, atmosphere, oxygen and water, all factors combine their goodness together to favour life on this planet.

5. On 24 August 2006, the planet Pluto was degraded by the International Astronomical Union (IAU) from the group of nine planets and considered as a dwarf planet. The changes that have occurred in the solar system after August 2006 are mentioned below:

(a) The planets that come in the classical group are 8, except Pluto.

(b) The planets in the classical group should orbit the Sun.

(c) These planets have sufficient mass for their self-gravity to overcome rigid force so that they assume a nearly round shape.

(d) They have cleared the neighbourhood near their orbits.

G. 1. Do yourself. (**Hint:** Uttarakhand is a hilly state where the sky is very clear with very less or no light pollution.)

2. Jupiter is the largest planet and has many faint rings around it. It has 63 moons revolving around it. One can look for its surface, atmosphere, etc. These features will help to understand its environment, surface composition, etc.

3. (a) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

(b) Planet Venus is called Morning Star because it shines very brightly in the sky before sunrise.

(c) The outermost four planets are Jupiter, Saturn, Uranus and Neptune. The outer planets have gaseous composition and are icy cold. They have rings around them.

Passage/Case-based Questions

1. A shooting star is a meteor which starts glowing on entering the atmosphere of the Earth.

2. Shooting stars look like a streak of light because they burn in the atmosphere of the Earth due to air friction and start glowing.

H. 1. MARS **2.** LUNAR MONTH **3.** CRESCENT **4.** POLE STAR **5.** OZONE **6.** CASSIOPEIA **7.** PHOBOS