Grade – 6 Science (Spectrum)

Chapter 1 – The Wonderful World of Science

A. Tick (✓) the correct option

1. c) The world around us
2. b) A person who follows the scientific method to solve problems or make discoveries
3. b) Water
4. b) Ask a question
5. a) To collect data

B. Fill in the blanks

1. natural
2. hypothesis
3. question
4. independent
5. conclusion

C. True or False

1. True
2. False
3. True
4. False
5. False

D. Match the following

Column A	**Column B**
1. Observation	d) What we notice using our senses
2. Hypothesis	a) A guess or prediction made before an experiment

Column A	Column B
3. Experiment	c) Something that is tested or tried out
4. Data	b) The process of collecting and analysing data
5. Conclusion	e) The final result of an experiment

E. Answer in brief

1. Science is a way of understanding the world through observation, questioning, and experimentation.
2. Asking a question.
3. They use observations, tools, and experiments.
4. Drawing a conclusion.
5. They analyse it to find patterns and answers.
6. Curiosity helps us ask questions and explore new ideas. It is the starting point of discoveries.

F. Answer in detail

1. Science helps us understand how things work around us. It helps in solving problems, improving health, cooking food, using machines, and making better decisions in daily life.
2. An experiment is a test done to check a hypothesis. It is important because it helps us find accurate answers and prove ideas.
3. Observation helps us collect information using our senses. It is the first step in understanding any problem.
4. A conclusion is the final result after analysing the data. It tells whether the hypothesis is correct or not.
5. Scientists observe carefully, collect data, analyse it, and then draw conclusions to solve problems step by step.
6. Example: A plant is not growing well.
   We observe sunlight, water, and soil conditions, test changes, and find the cause.

G. Brain Teaser

Stars twinkle because their light passes through Earth's atmosphere, which is constantly moving. This movement bends the light, making stars appear to flicker.

Competency-Based Questions

A. Assertion-Reason

1. c
2. c
3. a
4. c

B. Case Study

1. c) Observing the problem
2. b) Hypothesis
3. c) She shook the pen and scribbled on paper
4. b) Scientific thinking
5. c) Curiosity

Chapter 2 – Diversity in the Living World

NCERT Corner

Let Us Enhance Our Learning

Q1. Wheat plants have fibrous roots and their leaves show parallel venation. Kidney bean plants have a taproot system and their leaves show reticulate venation.
This shows that wheat is a monocot plant, while kidney bean is a dicot plant.

Q2. Animals can be grouped based on their habitats.

- **Aquatic animals (A):** Dolphin, Whale
- **Terrestrial animals (B):** Horse, Sheep, Squirrel, Earthworm, Pigeon
- **Animals living in both habitats (C):** Frog, Crocodile, Tortoise

Q3. Radish is a modified root and belongs to plants with a taproot system.
The leaves of radish show reticulate venation, which is a characteristic of dicot plants.

Q4. Both the mountain goat and the goat found in the plains are herbivorous mammals and have hooves.
However, the mountain goat has thick fur and strong legs for climbing steep slopes, while the plains goat has less fur and is adapted to flat land.
These differences are due to adaptations to their respective habitats.

Q5. Animals can be grouped based on their mode of movement.

- Flying animals: Pigeon, Bat
- Non-flying animals: Cow, Lizard, Tortoise, Whale, Fish, Grasshopper, Cockroach

This grouping is based on observable characteristics.

Q6. Cutting down forests leads to loss of biodiversity, destruction of habitats, and imbalance in the environment.
Animals lose their homes and food sources.
To address this, we should plant more trees, conserve forests, and use resources wisely.
Awareness and sustainable practices are necessary to protect nature.

Q7.

In the flowchart,

- A represents plants with reticulate venation (dicots) such as mango and rose.
- B represents plants with parallel venation (monocots) such as grass and wheat.

Q8. Sanjay can ask questions like:

- Does the hibiscus plant have a woody stem?
- Does it have branches near the base?
- What is its height?

These questions help in correctly identifying it as a shrub.

Q9.

- Group A (Dicot, Taproot): Examples – Mango, Pea
- Group B (Monocot, Fibrous roots): Examples – Wheat, Rice

(a) Plants of group A also have reticulate venation.
(b) Plants of group B also have parallel venation.

Q10.The duck has webbed feet, while other birds like pigeons have clawed feet. Webbed feet help the duck to swim easily in water.
This is an adaptation for an aquatic lifestyle.

Assessment Corner

A. Tick (✓) the correct option

1. b) Water Lily
2. b) They have adapted to live on land
3. b) Camel
4. a) The variety of plants and animals in an area
5. b) They lay eggs in water
6. b) Tropical Rainforest
7. c) Tiger
8. b) Differences in their environment and adaptation
9. c) Their similarities and differences in characteristics
10. a) Thick fur or blubber to conserve heat
11. d) Leaves
12. b) It has a constant temperature and receives year-round rainfall
13. b) Modified into spines to reduce water loss

B. Fill in the blanks

1. Fish
2. water

3. benefit
4. cactus
5. biodiversity
6. adaptation

C. True or False

1. False
2. False
3. False
4. True
5. True
6. False

D. Match the following

1. c) Potato
2. d) Banyan
3. e) Climber
4. b) Fruit
5. a) Monocot leaves

E. Answer in brief

1. Plants that creep along the ground are called creepers.
2. Organisms that live and reproduce on land are called terrestrial organisms.
3. Adaptations are special features that help organisms survive in their environment.
4. Special terms:
    - Aquatic plants – Hydrophytes
    - Desert plants – Xerophytes
5. Types of habitat: Terrestrial and Aquatic
6. Aquatic organisms live in water. Examples: Fish, frog

7. Venation is the arrangement of veins in a leaf. Examples: Maize, Banana
8. Features: Availability of sunlight, oxygen, soil, and varying temperature

F.

1. Animals are grouped based on similarities and differences in their features such as body structure, movement, and habitat. This classification helps in studying them easily. A habitat provides animals with food, water, shelter, and suitable living conditions. It also offers protection from enemies. Thus, habitat is essential for survival.

2. Rainforests have a hot and humid climate throughout the year. They receive heavy rainfall regularly. The temperature remains almost constant. Due to these conditions, the vegetation is dense and green. This supports a rich variety of plants and animals.

3. Trees in mountainous regions are usually cone-shaped. Their branches slope downward to allow snow to slide off easily. They have needle-like leaves which reduce water loss. These features help them survive in cold and snowy conditions. Such adaptations prevent damage from heavy snowfall.

4. There are two main types of root systems: **taproot system and fibrous root system**.
In a taproot system, there is one main root with smaller branches growing from it.
In a fibrous root system, many thin roots grow from the base of the stem.
Taproots grow deep into the soil, while fibrous roots spread out near the surface.
These root systems help plants absorb water and anchor firmly in the soil.

5. Leaf venation is of two types: reticulate and parallel venation.
In reticulate venation, veins form a net-like pattern, as seen in dicot plants.
In parallel venation, veins run parallel to each other, as seen in monocot plants.
Venation helps in the transport of water and nutrients.
It is also useful in classifying plants.

6. Adaptations are special features that help organisms survive in their environment.
In rainforests, plants have large leaves to absorb sunlight and animals adapt to climb trees.
In deserts, plants like cactus store water and have spines instead of leaves.
Animals in deserts are adapted to conserve water and tolerate heat.
These adaptations help them survive in different conditions.

7. A habitat is the natural place where an organism lives.
Aquatic habitat includes water bodies like rivers, lakes, and oceans.
Organisms living here are adapted to water conditions.
They have features like gills, fins, or streamlined bodies.
Examples include fish, whales, and aquatic plants.

8. Aquatic organisms have adaptations like gills for breathing and fins for movement.
Their bodies are often streamlined to move easily in water.
Frogs are amphibians and can live both on land and in water.
They breathe through their lungs on land and through their skin in water.
This dual adaptation helps them survive in both habitats.

9. Grassland plants have deep roots to absorb water from the soil.
They have narrow leaves to reduce water loss.
These plants can survive strong winds and grazing animals.
Many grow close to the ground to avoid damage.
Such adaptations help them survive in open areas.

G. Brain Teaser

1. Veins help transport water and food in leaves. Without veins, photosynthesis cannot occur properly.
2. Mountain trees are cone-shaped with needle leaves to prevent snow accumulation and reduce water loss.

Competency-Based Questions

A. Assertion–Reason

1. a
2. a
3. a
4. a

B. Case Study

1. c) The presence or absence of a backbone

2. c) Bird
3. d) Invertebrates
4. a) Fish
5. b) It helps in classifying animals as vertebrates or invertebrates

C. Art Integration (Activity-Based Answer)

In a national park, different plants and animals are kept in conditions similar to their natural habitats. For example, aquatic animals are provided with water bodies, while terrestrial animals are given land areas with vegetation. Trees and plants from different regions are grown in suitable soil and climate conditions. These arrangements help organisms survive and behave naturally. It also helps visitors understand biodiversity better.

D. Group Discussion (Points for Answer)

Different plants have different features based on their environment.
Roots absorb water and anchor the plant.
Stems support the plant and transport materials.
Leaves prepare food through photosynthesis.
Flowers help in reproduction.
Each part plays an important role in the survival of the plant.

Crossword Puzzle – Answers

Across

1. Ovules
2. Internode
3. Tendrils
4. Shrub

Down

5. Tuber
6. Banyan
7. Trunk
8. Creeper
9. Pistil

Chapter 3 – Mindful Eating: A Path to a Healthy Body

NCERT Corner

Let Us Enhance Our Learning

Q1.

(i) **Chana**
Jowar, bajra, and ragi are millets, while chana is a pulse.

(ii) **Rice**
Kidney beans, green gram, and soya bean are pulses, while rice is a cereal.

Q2. Traditional cooking methods use simple tools and natural ingredients, such as grinding by hand and cooking on chulhas. These methods often preserve nutrients and are eco-friendly. Modern methods use machines, gas stoves, and processed foods, making cooking faster and easier. However, excessive processing may reduce nutritional value. Both methods have their own advantages.

Q3.

- How does good food help in preventing diseases?
- Can eating healthy food reduce the need for medicines?

Q4. Not all tasty foods are healthy, as many contain excess sugar and fats. For example, chips and sweets are tasty but unhealthy. On the other hand, some nutritious foods like vegetables may not always seem appealing but are essential for health. A balance of taste and nutrition is important.

Q5. Medu should include more fruits, vegetables, and fibre-rich foods in his diet. He should reduce intake of biscuits, noodles, and white bread. Drinking enough water and eating balanced meals will help improve digestion. These changes can reduce stomach ache and constipation.

Q6.

(i) Disease: Night blindness
(ii) Lacking nutrient: Vitamin A
(iii) Food items: Carrot, spinach, milk, eggs

Q7. Preference

Fresh fruit is the best choice because it contains natural nutrients and fibre. Fresh fruit juice is also good, but lacks fibre. Canned juice often contains preservatives and added sugar, making it less healthy.

Q8. Gaurav's treatment

(i) Calcium helps in strengthening bones.
(ii) Vitamin D helps the body absorb calcium effectively.
(iii) Question: Why is Vitamin D necessary along with calcium for bone healing?

Q9. Sugar does not give a blue-black colour with iodine because it is a simple carbohydrate, not starch. Iodine reacts only with starch.

Q10. Raman's statement (Activity)

Take samples of sugar and starch (like potato). Add iodine solution to both. Starch turns blue-black, while sugar shows no change. This proves that all starches are carbohydrates, but not all carbohydrates are starches.

Q11. The saree likely had starch (from starching clothes), so it turned blue-black. The socks did not contain starch, so no colour change occurred.

Q12. Millets are rich in nutrients like fibre, vitamins, and minerals. They are easy to grow and support good health. However, eating only millets is not enough, as our body needs a balanced diet with all nutrients.

Q13. Add the solution to a starch-containing food like a potato. If it turns blue-black, the solution is iodine. If no colour change occurs, it is not iodine.

Assessment Corner

A. Tick (✓) the correct option

1. b
2. b
3. b
4. a
5. c
6. b
7. b
8. a

9. c
10. b

B. Fill in the blanks

1. Calcium
2. Iron
3. balanced
4. Roughage
5. water
6. healthy

C. Match the following

Column A	**Column B**
1. Carbohydrates	d) Gives quick energy
2. Proteins	a) Body-building nutrient
3. Fats	e) Keeps us warm and stores energy
4. Vitamins	b) Found in fruits and vegetables
5. Roughage	c) Helps in digestion
6. Iron	g) Found in spinach, helps make blood
7. Balanced diet	j) All nutrients in the right amounts
8. Vitamin A	i) Keeps eyes and skin healthy
9. Calcium	h) Makes bones and teeth strong
10. Water	f) Helps in digestion and cooling the body

D. True or False

1. False
2. True
3. True

4. False
5. False
6. True

E. Answer in brief

1. Roughage is the part of food that cannot be digested.
2. Dehydration is caused by excessive loss of water.
3. Kwashiorkor is caused by a lack of proteins.
4. A balanced diet contains all nutrients in proper amounts.
5. Types: Simple (sugar), Complex (rice, wheat).
6. Proteins help in the growth and repair of body tissues.

F. Answer in detail

1. Proteins in food can be tested using a chemical test. A few drops of copper sulphate and sodium hydroxide solution are added to the food sample. If the colour changes to violet or purple, it indicates the presence of proteins. This test is known as the Biuret test. It helps identify protein-rich foods.

2. Roughage is the indigestible fibre present in food. It helps in proper digestion by adding bulk to food. It prevents constipation and keeps the digestive system healthy. Roughage also helps in easy removal of waste from the body. It is found in fruits, vegetables, and whole grains.

3. We should wash vegetables before cutting them. Cooking should be done with minimal water and for a shorter time. Avoid overcooking food, as it destroys nutrients. Use the water used in cooking instead of throwing it away. These methods help retain nutrients in food.

4. A balanced diet includes all nutrients in the right proportions. It provides energy, growth, and protection from diseases. Nutrient loss happens due to overcooking, reheating, and washing cut vegetables. Peeling too much and throwing away cooking water also reduces nutrients. Proper cooking methods can prevent this loss.

5.Dietary fibre helps in digestion and prevents constipation. It keeps the digestive system clean and healthy. Water helps in digestion, absorption of

nutrients, and removal of waste. It also regulates body temperature. Both are essential for maintaining good health.

6. Calcium is essential for strong bones and teeth. Vitamin D helps in the absorption of calcium in the body. Phosphorus also supports bone strength. A diet rich in these nutrients helps prevent bone diseases. Milk, eggs, and green vegetables are good sources.

G. Brain Teaser

1. Roughage remains undigested because the human body lacks enzymes to digest fibre.
2. No, only drinking milk is not sufficient because the body needs a variety of nutrients from different foods.

Competency-Based Questions

A. Assertion–Reason

1. c
2. c
3. a

B. Case Study

1. b
2. c
3. c
4. c

C. Art Integration (Answer Points)

A chart can include diseases like scurvy, rickets, and anaemia. It should show symptoms and food sources like fruits, milk, and green vegetables. This helps in understanding deficiency diseases.

D. Group Discussion (Points)

Excess intake of fats can lead to obesity and health problems. It may cause heart diseases and reduce physical fitness. Balanced intake of fats is important for good health.

Crossword Puzzle – Answers

Across

1. Roughage
2. Iron
3. Diabetes

Down

4. Rickets
5. Protein
6. Starch
7. Goitre
8. Obesity

Chapter 4 – Exploring Magnets

NCERT Corner

Let Us Enhance Our Learning

Q1. Fill in the blanks

(i) Unlike poles of two magnets **attract** each other, whereas like poles **repel** each other.
(ii) The materials that are attracted towards a magnet are called **magnetic materials**.
(iii) The needle of a magnetic compass rests along the **north-south** direction.
(iv) A magnet always has **two** poles.

Q2. True or False

(i) False
(ii) True
(iii) False
(iv) True

Q3. Fill in the table

Column-I	Column-II
N – N	Repulsion
N – S	Attraction
S – N	Attraction
S – S	Repulsion

Q4. Correct answer: **10, 2, 10**
Reason: Maximum pins stick at the poles (A & C), minimum at the centre (B).

Q5. Reshma can bring the bars close to each other. The two bars that show attraction or repulsion are magnets. The iron piece will only get attracted and will not repel. Thus, the two showing both effects are magnets.

Q6. Bring the known magnet near the unknown one. If it attracts, the poles are opposite. If it repels, the poles are same. This helps identify the North and South poles.

Q7. Suspend the magnet freely with a thread. It will align in the north-south direction. The end pointing towards north is the North pole.

Q8. Yes, the Earth behaves like a giant magnet. The north-seeking end of a compass points towards the Earth's magnetic north. Hence, Earth has magnetic poles.

Q9. The mechanic can magnetise the screwdriver by rubbing it with a magnet. This will help it attract screws and prevent them from falling.

Q10. The magnets repel each other due to like poles facing each other.
To bring them together, flip one magnet so opposite poles face each other. Then they will attract and come in contact.

Q11. Polarity of ends

1 – S
2 – N
3 – S
4 – S
5 – N (given)
6 – N

Assessment Corner

A. Tick (✓) the correct option

1. c
2. b
3. b
4. c
5. a
6. d
7. b
8. c
9. c
10. c

B. Fill in the blanks

1. poles
2. repel
3. attract
4. north-south
5. magnet
6. compass

C. True or False

1. False
2. True
3. True
4. False
5. False

D. Match the following

Column A	Column B
1. Lodestone	b) Natural magnet
2. Bar magnet	d) Shape of a magnet
3. Compass	a) Used to find direction
4. North and South	e) Poles of a magnet
5. Magnetic force	c) Pushes or pulls other magnets

E. Answer in brief

1. Opposite poles attract due to unlike magnetic forces, while like poles repel due to similar magnetic fields pushing each other.
2. In a vacuum, the magnet will still show magnetic properties and have poles.
3. A single pole cannot exist because magnets always have both North and South poles.
4. Permanent magnets retain magnetism for a long time, while temporary magnets lose it quickly.
5. Magnets are used in MRI machines to create images of the body.
6. A compass needle aligns with Earth's magnetic field, pointing towards the North.

F. Answer in detail

1. When the North pole of one magnet is brought near the South pole of another magnet, they attract each other. This happens because opposite poles have unlike magnetic properties. The force between them pulls the magnets closer. This attraction is strong at the poles. It is a basic property of magnets.

2. Magnets are used in compasses for navigation. A compass needle aligns itself with the Earth's magnetic field. It always points in the north-south direction. This helps travellers, sailors, and pilots find directions. It is a simple and reliable tool.

3. The Earth has a magnetic field that surrounds it like a giant magnet. It is created by the movement of molten iron inside the Earth. This field affects

compass needles. It helps in navigation and protects the Earth from harmful solar radiation.

4. A magnet has two poles: North and South. Like poles repel, while unlike poles attract. Magnetic force is strongest at the poles. A freely suspended magnet always points north-south. Magnets attract magnetic materials like iron.

5. Take two bar magnets and bring their opposite poles close. You will observe that they move towards each other. Now bring like poles together; they repel. This experiment shows that opposite poles attract and like poles repel. It confirms the basic property of magnets.

G. Brain Teaser

1. Suspend the magnet freely; once it aligns north-south, the left side is west.
2. Use a magnet to attract and separate metal scrap from waste.

Competency-Based Questions

A. Assertion–Reason

1. a
2. a
3. c
4. a
5. a

B. Case Study

1. c
2. b
3. c
4. c
5. d

C. Art Integration (Answer Idea)

A magnetic robot can use magnets in its hands or legs to pick metal objects or move. Magnets help it interact with its surroundings by attraction and repulsion.

D. Group Discussion (Points)

Magnets are used in compasses, electric motors, speakers, and medical machines. They are essential in daily life and technology.

Crossword Puzzle – Answers

Across

1. Repulsion
2. Generator
3. Creditcard

Down

4. Stroking
5. Keeper
6. Poles
7. Steel
8. Wood
9. Compass

Chapter 5 – Measurement of Length and Motion

NCERT Corner

Q1. Match the following

Column I	Column II
Distance between Delhi and Lucknow	kilometre
Thickness of a coin	millimetre
Length of an eraser	centimetre
Length of the school ground	metre

Q2. True / False

(i) True
(ii) True
(iii) False

Q3. (iv) Handspan

Q4.

- Ruler → up to 15–30 cm
- Measuring tape → up to several meters
- Meter scale → 1 meter

Q5. 1 km = 1000 metres

So,
1.5 km = 1.5 × 1000

= 1500 metres

Q6. Use a thread to trace the curve, then measure it with a ruler.

Q7. Height measurement (example)

- metres: 1.4 m
- centimetres: 140 cm
- millimetres: 1400 mm

Q8. Estimate by placing coins → verify by measuring notebook length and coin diameter.

Q9. 1. **Linear Motion (straight-line movement)**

- Car moving on a straight road
- Train running on a straight track

2. Circular Motion (movement in a circle)

- Hands of a clock
- Stone tied to a string and rotated

3. Oscillatory Motion (back-and-forth movement)

- Swing in a playground
- Simple pendulum

Q10. Table (example)

Size	**Objects**
mm	Thickness of coin, pencil tip, paper
cm	Eraser, pen, book
m	Door, room, playground

Q11. Motion in roller coaster

- A–B: Rectilinear
- B–C: Curvilinear
- C–D–E: Circular
- E–F: Rectilinear

Q12. Do NOT use: Rubber and cloth (they stretch → inaccurate measurement)

Q13.(Student-based answer – design game using unit conversions)

Assessment Corner

A. MCQs

1. d
2. c
3. d
4. b
5. b
6. b
7. c
8. c
9. c
10. d

B. Fill in the blanks

1. Periodic
2. Rotational, rectilinear
3. Thread
4. Reference point
5. Rotational
6. Vernier caliper

C. True / False

1. True
2. False
3. True
4. False
5. False
6. True

D. Match the following

Term	Answer
1.	b
2.	a
3.	c
4.	e
5.	d

E. Answer in brief

1. Metric system ensures uniform and accurate measurement worldwide.
2. Handspan is still used by some craftsmen.
3. Use thread or measuring tape to measure curved lines.
4. Rectilinear motion is motion in a straight line.
5. Hands of a clock show circular motion.
6. A swing shows oscillatory (and periodic) motion.

F. Answer in detail

1. The metric system is an internationally accepted system of measurement. It uses standard units like metre, kilogram, and second. It is important because it ensures uniformity, accuracy, and easy conversion.

2. Place a thread along the curve, mark its length, then straighten it and measure using a ruler. This gives an accurate measurement.

3. A reference point is a fixed point used to describe position. It helps determine whether an object is at rest or in motion. Without it, a position cannot be defined clearly.

4. Difference Between Types of Motion

Basis	Rectilinear Motion	Circular Motion	Periodic Motion
Definition	Motion in a straight line	Motion along a circular path	Motion that repeats itself at equal intervals of time
Path of Motion	Straight line	Circular (round path)	Can be straight or curved, but repeats regularly
Direction Change	Direction remains same (no turning)	Direction continuously changes	Direction may change during motion
Time Factor	No fixed time pattern	No fixed time pattern necessarily	Has a fixed time interval (time period)
Nature of Motion	Simple, one-directional	Rotational or revolving	Repetitive and rhythmic
Examples	Car moving on a straight road; Train on straight track	Blades of a fan; Hands of a clock	Pendulum; Swing
Speed/Velocity	Can be constant or variable	Speed may be constant but direction changes (velocity changes)	Motion repeats with same pattern over time
Key Feature	Straight path	Circular path	Equal time repetition

5. Choosing a different reference point can change whether an object appears at rest or in motion because motion is relative.

If an object does not change its position with respect to a chosen reference point, it is said to be at rest. But if it changes its position with respect to another reference point, it is said to be in motion.

For example, a person sitting in a moving bus is at rest with respect to the bus, but in motion with respect to the road or trees outside.

Thus, by changing the reference point, the same object can appear either at rest or in motion.

6.

- Rolling ball → rotational + rectilinear
- Moving fan → circular + periodic

Brain Teaser

1. Use a thread to measure circumference, then measure thread length.
2. Yes, tree is in motion relative to Earth's rotation.

Competency-Based Questions

Assertion–Reason

1. a
2. c
3. a
4. c
5. c

Case Study

1. b
2. c
3. b
4. c

Crossword Answers

Across

1. Circular
2. Random
3. Rotational

Down

4. Divider
5. Vibration
6. Periodic

Chapter 6 – Materials Around Us

NCERT CORNER

Q1. At home, materials are usually arranged based on type like grains, pulses, spices, and liquids. A better method is to organise them based on their properties such as solid/liquid, perishable/non-perishable, and frequency of use. This makes it easier to find items quickly and maintain cleanliness. It also helps in proper storage and avoids wastage.

Q2.

(i) TREMAT → **MATTER** → (b) Occupies space and has mass
(ii) ULSBELO → **SOLUBLE** → (d) Mixes completely in water
(iii) TNERPASNART → **TRANSPARENT** → (a) Objects seen clearly
(iv) ERUSTL → **LUSTRE** → (c) Shiny surface

Q3. Transparent containers are used because they allow us to see the contents clearly without opening them. This saves time and effort while searching for items. It also helps in checking the quantity of materials easily. Moreover, it reduces confusion and keeps things well organised.

Q4.

(i) False – Wood is opaque, glass is transparent
(ii) True
(iii) True
(iv) False – Apple occupies space and has mass

Q5. Materials like wood, plastic, and bamboo are most suitable for making chairs. These materials are hard, strong, and durable, so they can support weight for a long time. They are also lightweight, making them easy to move. Additionally, they can be cleaned easily and remain comfortable in different seasons.

Q6. For food waste, plastic or metal containers are suitable as they are waterproof and easy to clean. For broken glass, strong metal or thick plastic containers should be used to avoid injury. Wastepaper can be stored in cardboard or plastic containers. The materials should be strong, durable, and safe to handle.

Q7. Air is **transparent,** and the wooden door is **opaque**.

Q8. Material X is likely salt, as it is hard and dissolves in water. Material Y could be clay or sponge, as it is soft and does not dissolve in water. Material X is hard, while material Y is soft. This is based on their physical properties and behaviour in water.

Q9.

(a) Metal
(b) Sponge
(c) Salt
(d) Translucent material
(e) Air

Q10.

Soluble:

- Sugar + water
- Honey + water

Insoluble:

- Oil + water
- Wheat flour + water

ASSESSMENT CORNER

A. MCQs

1. c
2. b
3. b

4. c
5. a
6. c
7. c
8. c
9. d
10. d

B. Fill in the blanks

1. Transparent
2. Natural
3. Spring balance
4. Insoluble
5. Mercury
6. Flexible

C. True / False

1. False
2. False
3. True
4. False
5. True
6. True

D. Match the following

1–c
2–a
3–b
4–d
5–e

E. Answer in brief

1. Hardness helps us know whether a material can resist pressure or scratching.
2. Materials like copper and aluminium conduct heat and electricity well.
3. Solubility is tested by mixing a substance in water and observing if it dissolves.
4. Transparency means allowing light to pass through clearly.
5. Classification helps in selecting suitable materials for different uses.
6. Oil floats because it is lighter than water, while iron sinks because it is heavier.

F. Answer in detail

1. Materials are substances from which objects are made, such as wood, metal, plastic, and glass. They are important because different materials have different properties. These properties decide how and where a material can be used. For example, metals are used for making utensils because they conduct heat well. Thus, understanding materials helps us choose the right material for specific purposes.

2. Materials are classified into natural and man-made materials based on their origin. Natural materials are obtained directly from nature, such as wood, cotton, and wool. Man-made materials are created by humans, like plastic, glass, and synthetic fibres. This classification helps us understand how materials are produced and used. It also helps in managing resources wisely.

3. Materials are classified based on properties like hardness, transparency, solubility, and lustre. Hard materials resist scratching, while soft materials can be easily pressed. Transparent materials allow light to pass through, whereas opaque materials do not. Solubility tells whether a material dissolves in water. These properties help in grouping materials and choosing them for specific uses.

4. Transparent materials allow light to pass through completely, so objects can be seen clearly, like glass. Translucent materials allow only some light to pass, so objects appear blurred, like butter paper. Opaque materials do not allow light to pass at all, like wood. This classification is important in everyday uses such as windows, lamps, and walls.

5. Solubility helps in identifying whether a substance dissolves in water or not. Materials that dissolve are called soluble, while those that do not are insoluble.

This property helps in separating mixtures and selecting materials for different purposes. For example, sugar dissolves in water but sand does not. Thus, solubility is an important basis for classification.

6. Floating or sinking depends on the density of a material compared to water. Materials that are lighter than water float, while those heavier than water sink. For example, oil floats on water, while iron sinks. This property helps in separating substances and understanding their behaviour in liquids. It is also useful in designing boats and ships.

G. Brain Teaser

1. When a cold drink bottle is opened, dissolved gas escapes quickly due to a pressure difference, forming bubbles.
2. Handles are made of bakelite or wood because they are poor conductors of heat and keep hands safe from burns.

COMPETENCY-BASED QUESTIONS

Assertion–Reason

1. d
2. a
3. c
4. a
5. a

Case Study

1. c
2. c
3. b

CROSSWORD ANSWERS

Across

1. Plastic
2. Solid
3. Insoluble

Down

4. Hardness
5. Texture
6. Sponge (cotton)

Chapter 7 – Temperature and Its Measurement

NCERT CORNER

Q1. (ii) 37.0°C

Q2. (iv) 98.6°F

Q3. Fill in the blanks

(i) temperature
(ii) clinical
(iii) Celsius

Q4. (ii) –10°C to 110°C

Q5. Student 3
(thermometer upright, bulb not touching sides/bottom, proper reading position)

Q6. (Practical – colour the mercury level according to given temperatures)

Q7.

(i) Laboratory thermometer
(ii) Reading: ~25°C (approx based on marking)
(iii) Smallest value: 1°C

Q8. Because it does not have a kink and cannot hold the mercury level after removal, so accurate body temperature cannot be recorded.

Q9.

(i) Highest temperature: 40.0°C
(ii) Day: Day One, Time: 7 pm
(iii) Temperature returned to normal on: Day Three

Q10. You will use thermometer (b).

Reason:
22.5°C is a room/laboratory temperature, not body temperature.
So we need a thermometer with a range covering around 0°C to 100°C

(laboratory thermometer).
Thermometer (b) fits this range and can measure 22.5°C accurately.

Q.11 (ii) 27.5°C
The mercury level is exactly halfway between 27°C and 28°C, so the reading is 27.5°C.

Q.12

A laboratory thermometer has 50 divisions between 0°C and 100°C.

So,
Value of each division = $\frac{100-0}{50} = 2°C$

Each division = 2°C

Q.13

You need to draw a scale from 10°C to 20°C where the smallest division is 0.5°C.

Explanation (what the drawing should show):

- Total range = 10°C
- Each division = 0.5°C
- Number of divisions = $\frac{10}{0.5} = 20$

Mark like this:
10, 10.5, 11, 11.5, 12 … up to 20°C
A thermometer scale from 10°C to 20°C will have 20 equal divisions, each representing 0.5°C.

Q.14 If someone says they have a fever of 101 degrees, they mean it in the Fahrenheit scale.

Reason:

- Normal body temperature = 37°C or 98.6°F
- 101°C is extremely high and not possible for the human body

So, 101°F indicates fever

ASSESSMENT CORNER

A. MCQs

1. b
2. c
3. b
4. b
5. c
6. b
7. c
8. b
9. c
10. c

B. Fill in the blanks

1. Kelvin
2. 37°C
3. Laboratory
4. Air
5. Infrared
6. Fahrenheit
7. Kelvin

C. True / False

1. False
2. True
3. True
4. True
5. False
6. False

D. Match the following

1–c (Clinical thermometer → Measures body temperature)
2–d (Laboratory thermometer → Liquids in labs)
3–a (Digital thermometer → Digital readings)
4–b (Infrared thermometer → Without contact)

E. Answer in brief

1. A clinical thermometer is not suitable for measuring boiling water because its range is only 35°C to 42°C, while boiling water is 100°C, which may damage the thermometer.

2. The scale of a thermometer affects accuracy because smaller divisions provide more precise readings, and an appropriate range ensures correct measurement.

3. Mercury is used in thermometers because it expands uniformly, is clearly visible, does not stick to glass, and has a high boiling point and low freezing point.

4. The kink in a clinical thermometer prevents the mercury from falling back, allowing the reading to be taken accurately after removal.

5. A laboratory thermometer is not used to measure body temperature because it does not have a kink, so the mercury level falls immediately and cannot hold the reading.

6. The Kelvin scale starts from absolute zero (0 K = –273°C) and has no negative values, whereas the Celsius scale starts from 0°C. The relation is: K = °C + 273.

7. Precautions include: cleaning the thermometer before use, ensuring the mercury level is below 35°C, holding it by the stem, and reading at eye level.

8. A digital thermometer is safer because it does not contain mercury, so there is no risk of harmful exposure if it breaks, and it also gives quick readings.

F. Answer in detail

1. A laboratory thermometer is not suitable for measuring human body temperature because it does not have a kink to hold the mercury level. When removed from the body, the mercury quickly falls back, making it difficult to read the temperature. It is designed for measuring a wide range of temperatures in experiments. Human body temperature requires a specific narrow range for accurate readings. Hence, a clinical thermometer is preferred.

2. The kink in a clinical thermometer prevents the mercury from falling back into the bulb immediately after measuring temperature. This allows the reading to remain steady even after the thermometer is removed from the body. It ensures that the user can read the temperature properly. Without the kink, the mercury would drop quickly, making accurate reading difficult. Thus, it improves accuracy and usability.

3. Mercury is used because it expands uniformly with temperature and gives accurate readings. It is clearly visible due to its shiny nature, making it easy to read. Mercury does not stick to the walls of the glass tube, unlike water. It also has a wide temperature range, so it can measure both high and low temperatures. These properties make mercury ideal for thermometers.

4. While using a laboratory thermometer, it should be kept upright and the bulb should not touch the sides or bottom of the container. The reading should be taken while the thermometer is still immersed in the liquid. It should be read at eye level to avoid parallax error. The thermometer should be handled carefully to prevent breakage. Proper handling ensures accurate and safe measurement.

5. A digital thermometer is safer because it does not contain mercury, which is toxic if released. It gives quick and accurate readings without the risk of glass breakage. It is easy to use and reduces chances of human error. Digital thermometers are also more durable and convenient. Hence, they are widely preferred in modern use.

6. The sense of touch is not reliable for measuring temperature because it depends on previous exposure and surrounding conditions. The same object may feel hot or cold depending on what we touched before. Our skin cannot measure exact temperature accurately. It only gives a relative feeling, not a precise value. Therefore, instruments like thermometers are used for correct measurement.

7. Using the correct thermometer ensures accurate measurement of temperature. Different thermometers are designed for specific purposes, such as clinical or laboratory use. Using the wrong thermometer may give incorrect readings. Accurate measurement is important in medical diagnosis and scientific experiments. Hence, selecting the appropriate thermometer is essential.

8. When a thermometer is placed in a freezer, the temperature decreases and the mercury contracts. As the temperature falls further, mercury may eventually freeze at very low temperatures. This affects its ability to measure temperature

properly. Therefore, thermometers have a limited working range. Extreme cold can make them ineffective.

9. Temperature should be measured while the thermometer is still immersed because removing it may change the reading quickly. The surrounding air can affect the mercury level. Keeping it immersed ensures accurate measurement of the substance. It prevents errors caused by temperature loss. Hence, readings should always be taken in position.

G. Brain Teaser

(a) Thermometer A (black coated) will show higher temperature
(b) Dark surfaces absorb more heat, while shiny surfaces reflect heat

COMPETENCY-BASED QUESTIONS

Assertion–Reason

1. d
2. a
3. a

Case Study

1. b
2. b

CROSSWORD ANSWERS

Across

1. Thermometer
2. Mercury
3. Kelvin
4. Laboratory

Down

5. Temperature
6. Kink

7. Clinical

Chapter 8 – A Journey Through States of Water

NCERT CORNER

Q1. (iv) Conversion of water vapour into liquid

Q2.

(i) (b) Water colours
(ii) (b) Ink pen

Q3. Natural grass contains water and undergoes evaporation, which absorbs heat and cools the surroundings. Plastic grass does not have water, so no evaporation occurs. Hence, it feels hotter.

Q4. Alcohol, petrol, kerosene, perfume.

Q5. Moving air increases the rate of evaporation by carrying away water vapour. Even though evaporation causes cooling, faster evaporation leads to quicker drying.

Q6.Leaving sludge allows water to evaporate, reducing its volume and weight. This makes transportation easier and safer. Dry sludge can be handled easily and used as manure.

Q7. Drying clothes, cooling sweat, drying utensils, and making salt. Understanding evaporation helps in faster drying and cooling in daily life.

Q8. Glaciers, ice caps, snow, frost.

Q9. Water is limited and essential for life. We must use it wisely and avoid wastage. Conserving water ensures availability for future generations. Responsible use reflects awareness and care for nature.

Q10. Sprinkle water and allow it to evaporate. Evaporation absorbs heat, cooling the seat quickly.

ASSESSMENT CORNER

A. MCQs

1. c
2. c
3. b
4. b
5. d
6. c
7. b
8. b
9. c
10. b

B. Fill in the blanks

1. condensation
2. water vapour
3. rises
4. steam (or water vapour)
5. condensation
6. condensation

C. True / False

1. False
2. True
3. False
4. True
5. True
6. True

D. Match the following

1–b (Evaporation → liquid to gas)
2–a (Condensation → gas to liquid)

3–c (Melting → solid to liquid)
4–d (Freezing → liquid to solid)
5–e (Sublimation → solid to gas)

E. Answer in brief

1. Evaporation is the process where liquid water changes into water vapour due to heat.
2. Condensation is when water vapour cools and turns into liquid.
3. Transpiration is the release of water vapour from plant leaves.
4. Ice melts when it absorbs heat and changes into liquid water.
5. Precipitation is water falling from clouds as rain, snow, or hail.

F. Answer in detail

1. Water evaporates faster on a hot day because the higher temperature provides more heat energy to water molecules. Wind helps by removing the water vapour from the surface, allowing more evaporation to take place. Dry air also increases evaporation. These conditions together speed up the process. Hence, clothes dry quickly on hot, windy days.

2. Water vapour rises into the atmosphere and cools at higher altitudes. When it cools, it changes into tiny water droplets through condensation. These droplets gather around dust particles in the air. As more droplets collect, they form clouds. Thus, condensation plays a key role in cloud formation.

3. The water cycle ensures continuous circulation of water on Earth. It helps in maintaining the balance of water in oceans, rivers, and atmosphere. It also supports weather patterns and rainfall. Without it, fresh water would not be replenished. Therefore, it is essential for sustaining life.

4. During evaporation, water absorbs heat from its surroundings to change into vapour. This removal of heat causes a cooling effect. For example, sweating cools our body as sweat evaporates. Similarly, wet clothes feel cold while drying. Hence, evaporation leads to cooling.

5. Tiny water droplets in clouds collide and combine to form larger droplets. As they grow heavier, they cannot remain suspended in air. Gravity pulls them down to the Earth as rain. This process is called precipitation. It completes an important stage of the water cycle.

G. Brain Teaser

1. In very cold temperatures, water loses heat and reaches its freezing point. It changes into ice starting from the surface. Continuous cold conditions cause rivers and lakes to freeze.

2. Our breath contains water vapour. When it touches the cold surface of glasses, it cools and condenses into tiny water droplets. This makes the glasses appear wet.

COMPETENCY-BASED QUESTIONS

Assertion–Reason

1. a
2. d
3. a

Case Study

1. b (Condensation)
2. b (Gas to liquid)
3. a (Cooling of vapour on surface)

CROSSWORD ANSWERS

Down

1. Freezing
2. Temperature
4. Melting
5. Mercury
6. Hail

Across

3. Steam
7. Condensation
8. Water

Chapter 9: Method of Separation in Everyday Life

NCERT CORNER

Q1. (ii) Sorting

Q2. (ii) Cream from milk

Q3. (iii) Pore size

Q4. True / False)

1. True
2. False → Handpicking is used when the quantity is small.
3. False → Puff rice and grains are separated by winnowing.
4. True
5. False → Sieving is not used for liquids like rice flour and water.

Q5.

(i) Gram flour + black gram → (d) Sieving
(ii) Chalk powder + water → (e) Filtration
(iii) Corn + potatoes → (a) Handpicking
(iv) Iron powder + sawdust → (b) Magnetic separation
(v) Oil + water → (c) Decantation

Q6. Decantation is used when solid particles are heavy and settle down easily. It is faster and does not require filter paper. It is suitable when particles are large and clear separation is possible.

Q7. Nasal hair works like a filter. It traps dust and impurities from air, similar to filtration.

Q8. Masks are made of cotton, polypropylene, or layered fabric. They filter dust, germs, and droplets from air. They protect both the wearer and others.

Q9. Stepwise process:

- Handpick potatoes

- Add water → salt dissolves
- Sawdust floats → remove (decantation)
- Filter → remove remaining impurities
- Evaporate water → get salt

Q10. Story-based answers

Correct choices:

- Fit/Unfit → Unfit
- Filtered (not churned)
- Boiled (not cooled)
- Cooled (after boiling)
- Filtered again
- Final: Fit for drinking

Suitable title: *"Smart Leela and Clean Water"*

ASSESSMENT CORNER

A. MCQs

1. b
2. c
3. a
4. b
5. c
6. d
7. b
8. a
9. c
10. b

B. Fill in the blanks

1. Sieving
2. Sedimentation
3. Filtration
4. Evaporation
5. Threshing
6. Winnowing
7. Sieving

C. True / False

1. False
2. False
3. False
4. True
5. False
6. False

D. Match the following

1–d (Sieving → size separation)
2–a (Sedimentation → settling down)
3–b (Winnowing → wind separation)
4–c (Hand picking → removing stones)
5–e (Threshing → grains from stalks)

E. Answer in brief

1. Winnowing is the method of separating lighter husk from heavier grains using wind.
2. Hand picking involves manually removing unwanted materials from a mixture.
3. Threshing separates grains from stalks by beating or machines.
4. Sedimentation is the settling of heavier particles at the bottom of a liquid.

5. Filtration separates insoluble solids using a filter.
6. Evaporation is used to separate dissolved solids like salt from water.

F. Answer in detail

1. Sieving separates particles based on size using a mesh. Flour particles are much smaller than sand, so they pass through the sieve while sand remains behind. Winnowing works on weight difference using air, which is not effective here. Therefore, sieving gives a more accurate separation. It is the most suitable method for such mixtures.

2. Sedimentation allows heavier particles to settle at the bottom of the liquid. After settling, decantation is used to carefully pour out the clear liquid without disturbing the sediments. Together, they provide an effective way to separate insoluble solids. This method is commonly used for muddy water. It ensures cleaner separation.

3. In solid-liquid filtration, a liquid passes through a filter while solids are retained. In solid-gas filtration, air passes through filters that trap dust particles. The principle is the same but the medium differs. Liquid filtration uses filter paper, while air filtration uses masks or air filters. Both remove impurities effectively.

4. Hand picking is suitable only when impurities are few and easily visible. In rice and broken wheat, particles are similar in size and large in quantity. It becomes time-consuming and inefficient. Human effort is high and accuracy is low. Hence, it is not a practical method for such mixtures.

5. Winnowing depends on wind speed, weight difference, and size of particles. Strong wind helps carry lighter particles away. Heavier grains fall straight down. Proper height and technique also matter. If conditions are not suitable, separation becomes ineffective.

6. Evaporation is not suitable when the liquid needs to be recovered. It is also ineffective for substances that decompose on heating. If energy cost is high, it becomes inefficient. It cannot separate insoluble solids. Hence, it is limited to specific situations like salt extraction.

7. Filtration removes insoluble impurities first, making the solution clean. Then evaporation is used to remove the liquid and obtain the dissolved solid. Using both methods ensures complete separation. This combination is efficient and widely used. It improves purity of the final product.

Brain Teaser

1. No, polythene cannot replace filter paper because it does not have fine pores to allow liquid to pass.
2. Medicine bottle is shaken to mix settled particles evenly before use.

Competency-Based

(Assertion Reason)

1. d
2. a
3. a
4. a

Case Study

1. b (Winnowing)
2. b (Sieving → size separation)
3. b (Hand picking → removing large stones)

Crossword Answers

Across:

1. Soluble
2. Loading
3. Impurity
4. Filtrate

Down:
5. Solubility
6. Sieving

Chapter 10: Living Creatures: Exploring Their Characteristics

NCERT CORNER

Q1.

Similarities:

- Both grow and reproduce
- Both respire and need food
- Both have life cycles

Differences:

- Plants make their own food; animals cannot
- Plants are fixed; animals move
- Plants grow throughout life; animals stop after maturity

Q2.

Growth	Respiration	Example	Remark
No	No	Stone	Non-living
No	Yes	Impossible	No such example exists
Yes	No	Impossible	Growth without respiration not possible
Yes	Yes	Plant/Animal	Living

Q3. It helps farmers store grains properly by keeping them dry and away from moisture to prevent unwanted germination.

Q4. It helps in swimming and movement in water.

Q5.

- Charan (log is non-living): Correct, as it does not grow, move, or respire
- Charu (log is living): Incorrect, because once cut, it loses life processes

Q6. Mosquito vs Frog life cycle

Similarities:

- Both undergo stages
- Both show changes in body form

Differences:

- Mosquito: Egg → Larva → Pupa → Adult
- Frog: Egg → Tadpole → Froglet → Adult

Q7. Plant growth observation

- Roots grow downward (gravity)
- Shoots grow upward (towards light)

Q8.

To show directional growth (tropism)
Correct if root grows downward and shoot upward even when pot is sideways

Q9. Take two sets of seeds

- Keep one in warm place, one in cold
- Observe germination
  Seeds in warm place germinate faster → temperature affects germination

ASSESSMENT CORNER

A. MCQs

1. d
2. a
3. b
4. b
5. c
6. d

7. c
8. c
9. c
10. c
11. b
12. c

B. Fill in the blanks

1. Response to stimuli
2. Reproduction
3. Movement
4. Respiration
5. Touch-me-not plant

C. True / False

1. True
2. False
3. True
4. False
5. True
6. False

D. Match the following

1–a (Reproduction → frog lays eggs)
2–b (Stimuli → leaves fold)
3–c (Growth → seed to plant)
4–d (Excretion → water release)
5–e (Movement → dog runs)

E. Answer in brief

1. Living things show growth, respiration, reproduction, movement, excretion, and response to stimuli
2. Plants respond to light, touch, and gravity

3. Living things grow and reproduce; non-living do not
4. Animals breathe through lungs, gills, or skin
5. Reproduction is producing young ones
6. For energy and survival
7. Removal of waste
8. Through photosynthesis

F. Answer in detail

1. Living things grow, respire, reproduce, and respond to stimuli. They need food and excrete waste. Non-living things do not perform these life processes. They do not grow or reproduce on their own. These features clearly separate living from non-living.

2. Food provides energy for all life processes like growth, movement, and reproduction. It helps repair damaged cells and maintain the body. Without food, organisms cannot survive. Plants make food; animals depend on others. Thus, food is essential for life.

3. Plants remove waste through stomata and leaves. Excess water is released by transpiration. Some wastes are stored in leaves and bark. These parts fall off, removing waste. Thus, plants manage waste without special organs.

4. Respiration is the process of breaking down food to release energy. Animals use lungs, gills, or skin. Plants exchange gases through stomata. Oxygen is taken in and carbon dioxide is released. This process provides energy for survival.

5. Plants need light for photosynthesis. It helps them make their own food using water and carbon dioxide. Without light, plants cannot survive. It is the main source of energy for plants. Hence, sunlight is essential.

6. Animals move to find food, shelter, and escape danger. Movement helps in survival and reproduction. Different animals use different organs for movement. Without movement, survival becomes difficult. It is a key life function.

7. Growth means increase in size and development. Living organisms grow using nutrients. Plants grow throughout life, while animals grow up to a certain stage. Growth is a sign of life. Non-living things do not grow naturally.

8. Living organisms respond to changes like light, heat, and touch. This is called response to stimuli. It helps them survive and adapt. Plants bend towards light; animals react quickly. This ability is a key life characteristic.

Brain Teaser

1. Even though they move, they do not grow, respire, or reproduce. Movement alone does not define life.

2. Yes, non-green plants do contain protoplasm because they are living organisms.
Although they cannot make their own food due to the absence of chlorophyll, they obtain food from other sources. Since all living cells contain protoplasm, these plants also have protoplasm.

Competency-Based

(Assertion Reason)

1. d
2. a
3. b
4. a
5. d

Case Study

1. c (Water, air and warmth)
2. b (Seed is alive)
3. b (Roots/shoots appear)
4. c (No germination without water)

Crossword Answers

Across:

1. Arboreal
2. Gum

3. Tropism
4. Autotroph

Down:
5. Amoeba
6. Inhalation
7. Stimulus
8. Latex
9. Xerophytes
10. Nocturnal

Chapter 11: Nature's Treasures

NCERT CORNER

Q1. Jumbled words

- ocrk → **Rock** (Non-renewable)
- refost → **Forest** (Renewable)
- ndiw → **Wind** (Renewable)
- atwre → **Water** (Renewable)

Q2. True / False

(i) True
(ii) False → Machines are man-made resources
(iii) True
(iv) True

Q3. MCQ Fill

(i) b) Petrol
(ii) b) Water

Q4. Classification

- Renewable → Forests
- Non-renewable → Coal, Natural gas

Q5. Petroleum is non-renewable because It takes millions of years to form and cannot be replaced quickly.

Q6. Trees take many years to grow → cannot be replaced quickly.

Q7. Daily activities + reduction

Activities:

- Cooking (fuel)
- Drinking water
- Transport (petrol/diesel)
- Using electricity
- Writing (paper)

Reduction:

- Save electricity
- Use public transport
- Reduce paper use
- Save water

Q8. Activities due to air

- Breathing
- Burning
- Flying (birds, planes)
- Wind energy

Q9. Increasing green cover

- Plant trees
- Avoid cutting trees
- Spread awareness
- Protect forests

Q10.

(i) Solar energy
(ii) Benefit: No pollution
Drawback: Works only in sunlight

Q11. Soil quality decreases because

Trees hold soil; without them → soil erosion increases.

Q12.

Causes:

- Vehicles
- Factories

Solution:

- Use clean fuels / plant trees

Q13.

- Solar panels won't work
- Windmill may stop (less wind)
- Life and energy supply affected

Q14.

- Left: Non-renewable resources
  → Coal, Petroleum, Natural gas
- Right**:** Renewable resources
  → Air, Water, Forest

Q.15

No, cutting trees in large numbers is not justified. Trees give us oxygen, protect the environment, and support animals. Too many trees being cut causes harm like pollution and climate change. We should plant more trees and save them.

Q.16

To use less water in school:

- Close taps properly
- Fix leaking taps

- Do not waste water
- Reuse water for plants

This will save water and help the environment by reducing wastage.

ASSESSMENT CORNER

A. MCQs

1. c
2. c
3. d
4. c
5. b
6. b
7. c
8. c
9. b
10. c
11. c
12. b

B. Fill in the blanks

1. LPG
2. Conserving
3. Hydroelectric
4. Fossil
5. Exhaustion
6. Renewable

C. True / False

1. False
2. True
3. False
4. True
5. True

D. Match the following

1–c (Solar → sun)
2–a (Coal → dead plants/animals)
3–b (Wind → moving air)
4–d (Conservation → wise use)
5–e (Non-renewable → limited)

E. Answer in brief

1. Renewable can be replaced; non-renewable cannot
2. Examples: Sunlight, wind
3. To save for future and protect environment
4. Coal, petroleum
5. Cutting down trees
6. Plant trees, save water, reduce pollution
7. Fuels like coal, petroleum formed from dead organisms
8. Solar energy gives heat and electricity without pollution
9. They will get exhausted

F. Long Answers

1. They are limited and take millions of years to form. Overuse can cause shortage, pollution, and energy crisis. Hence, they must be conserved.

2. They provide oxygen, absorb CO_2, control rainfall, prevent soil erosion, and support wildlife.

3. Even renewable resources can be overused (like water wastage). Careful use is important to maintain balance.

4. Fossil fuels are coal, petroleum, etc. They pollute and are limited. Alternatives like solar and wind are cleaner and sustainable.

5. Conservation at home

- Switch off lights
- Save water
- Use less plastic
- Use public transport

G. Brain Teaser

1. Cotton wool sinks because it absorbs water and becomes heavy
2. Fossil fuels cause pollution and global warming
3. Earthworms come out due to a lack of oxygen in wet soil

Assertion Reason

1. c
2. c
3. a
4. c

Case Study

(i)

1. b
2. b
3. b

(ii)

1. b
2. a

3. c
4. b
5. b

Crossword Answers

Across:

1. Photosynthesis
2. Earthworms
3. Respiration
4. Harmful wastes

Down:
5. Oxygen
6. Humidity
7. Nitrogen

Chapter 12: Beyond Earth

NCERT CORNER

Q1. Match the column

(i) Satellite of Earth → (d) Moon
(ii) Red planet → (c) Mars
(iii) Constellation → (a) Orion
(iv) Evening star → (b) Venus

Q2.

(i) MAN not in CAN → M
(ii) ACE & FAN → A
(iii) RAT not in CAT → R
(iv) SUN not in FUN → S

Final word = MARS

(b) Make Two Similar Riddles

Riddle 1

(i) My first letter is in VERY but not in TRY
(ii) My second letter is in EARTH and SEA

(iii) My third letter is in NIGHT but not in LIGHT
(iv) My fourth letter is in UNDER and FUN
(v) My fifth letter is in SUN and PEN

Letters: V + E + N + U + S
Answer: VENUS

Riddle 2

(i) My first letter is in **JAR but not in CAR**
(ii) My second letter is in **UP and SUN**
(iii) My third letter is in **PEN and CAP**
(iv) My fourth letter is in **ICE and NICE**
(v) My fifth letter is in **TREE and SEE**
(vi) My sixth letter is in **RED and BED**

Letters: J + U + P + I + T + R (JUPITER)

Q3. (i) Sirius

Q4. (ii) Pluto

Q5. Sirius

Q6. Correct order of planets

Mercury → Venus → Earth → Mars → Jupiter → Saturn → Uranus → Neptune

Q7.

- Identify Big Dipper (Ursa Major)
- From its pointer stars → locate Pole Star (Polaris)
- Draw and label accordingly

Q8.

- Draw Orion (3 stars belt)
- Label Sirius (brightest star nearby)

Q9. Because sunlight is too bright, it scatters in the atmosphere and hides stars.

Q10.

- Yes, it appears to move due to Earth's rotation
- It rotates around the Pole Star

Q11.

Night whispers in silent light,
Stars scattered, soft and bright.
Moon walks slow in silver grace,
Dreams drift across the sky's embrace.

ASSESSMENT CORNER

A. MCQs

1. b (Spiral)
2. a (Venus)
3. b (Pluto)
4. c (Jupiter)
5. d (Orbit)
6. c (Positions of Earth, Moon, Sun)
7. c (Uranus)
8. b (First humans on Moon)
9. c (Jupiter)
10. b (Aryabhata)
11. b (Moon between Earth & Sun)
12. b (Same position in sky)

B. Fill in the blanks

1. Sun
2. 27 days
3. Saturn
4. Milky Way
5. Constellation
6. Mars

C. True/False

1. False
2. False

3. True
4. False
5. False

D. Match the following

1. Venus → c) Evening Star
2. Saturn → a) Planet with rings
3. Constellation → e) Group of stars forming pattern
4. Rotation → d) Causes day and night
5. Moon → b) Appears in phases

E. Answer in Brief

1. Earth is called the Blue Planet because a large part of its surface is covered with water, which makes it appear blue from space.
2. Day and night on Earth are caused by the rotation of the Earth on its axis.
3. A constellation is a group of stars that form a recognizable pattern in the sky.
4. The closest star to Earth is the Sun.
5. The Moon appears to change its shape because of the changing positions of the Earth, Moon, and Sun.
6. The name of our galaxy is the Milky Way.
7. A satellite is an object that revolves around a planet.
8. Mars is known as the Red Planet.
9. The Sun is important because it provides light and heat necessary for life on Earth.
10. Saturn is the planet that has visible rings around it.

F. Answer the following questions in detail

1. The Earth rotates on its axis from west to east. The part of the Earth that faces the Sun experiences daylight, while the part that is away from the

Sun experiences night. This continuous rotation of the Earth causes day and night.

2. A constellation is a group of stars that form a recognizable pattern in the sky. Examples of constellations are Orion and Ursa Major. Constellations help people identify stars and directions and were used by travellers and sailors for navigation in ancient times.
3. The Moon is called Earth's natural satellite because it revolves around the Earth naturally. It affects the Earth by causing tides in the oceans and by stabilizing the Earth’s rotation.
4. The Sun is a star and produces its own light and heat, whereas the Moon and planets do not have their own light and only reflect the Sun’s light.
5. The Milky Way is the galaxy in which our solar system is located. It contains billions of stars, planets, dust, and gases.

Competency-Based Questions

Assertion-Reason

1. **(d)** A false, R true
2. **(c)** A true, R false
3. **(a)** Both true, R correct
4. **(a)** Both true, R correct

Case Study

(i)

1. b) Orion
2. c) Reflects Sun’s light

(ii)

1. c) Chandrayaan-3
2. c) Landed near Moon’s south pole
3. c) 23rd August
4. b) Bring Moon rocks to Earth

Crossword Answers

Across

5. Atmosphere
7. Moon
8. Saturn

Down

1. Comet
2. Galaxy
3. Asteroids
4. Orbit
5. Sun