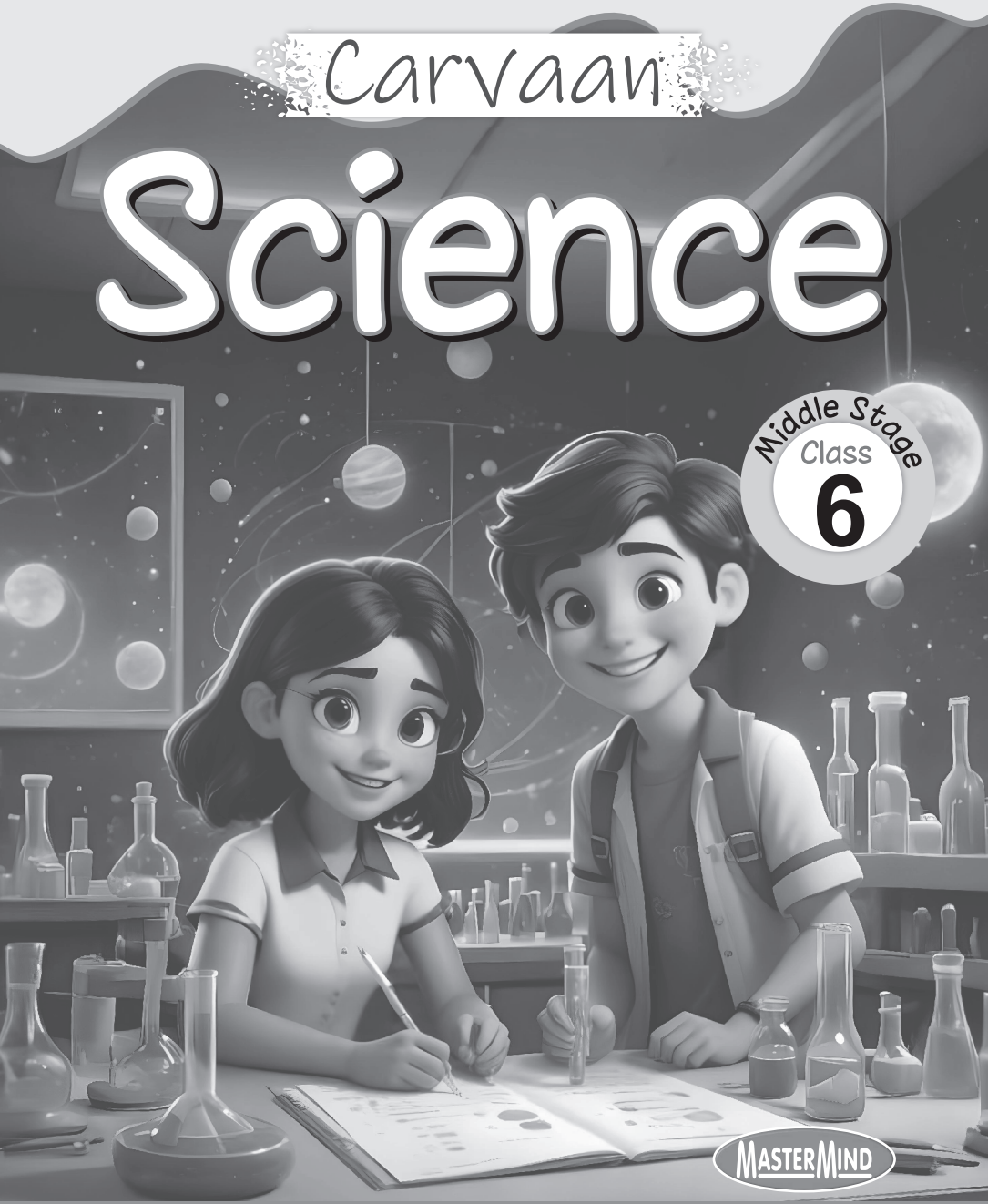
Teacher's Manual

Carvaan

Science



Chapter 1 : The Wonderful World of Science

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

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

C. 1. Astronomy 2. hypothesis 3. Astronomy 4. Scientific Method 5. renewable

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

E. **Very short answer type questions:**

1. Science is the study of the natural world through observation and experiments.
2. (i) Biology (ii) Astronomy
3. A hypothesis is a educated guess that can be tested through experiments.
4. Earth scientists study rocks, oceans, the weather and even earthquakes.
5. The purpose of renewable energy is to find new ways to power our homes without harming the Earth.

Short answer type questions:

1. The main branches of science are:
   (i) Biology Science - Study of living organisms.
   (ii) Earth Science- Study of rocks and weather etc.
   (iii) Physics - Study of forces and energy.
   (iv) Chemistry - Study of substance and interactions.
   (v) Astronomy - Study of space and stars.
2. Science help us understand nature, develop technology, improve health and make life easier.
3. Science begins with curiosity —asking questions like "Why ?" and "How ?" Here's a simple process that scientists use to discover answers:
   - **Observation** : Start by noticing something around you. For example, you might observe that plants grow faster when they get a lot of sunlight.
   - **Ask Questions :** After observing, you may wonder, "Do plants need sunlight to grow?"
   - **Make a Hypothesis :** A hypothesis is a guess. You might say, "I think plants grow faster with sunlight because they use it to make food."
   - **Experiment :** Test your hypothesis by growing two plants—one in

the sunlight and one in the shade. See what happens!

- **Analyze :** Look at the results. Which plant grew faster? Was your hypothesis correct?
- **Conclusion :** Based on your experiment, you can conclude whether your hypothesis was right or wrong.

4. Doctors and scientists use biology and chemistry to discover medicines and vaccines to keep us healthy.
5. Exciting future science projects focus on curing diseases, space exploration, and renewable every innovations.

Long answer type questions:

1. Science begins with curiosity —asking questions like "Why ?" and "How ?" Here's a simple process that scientist use to discover answers:
   - **Observation** : Start by noticing something around you. For example, you might to observe that plants grow faster when they get a lot of sunlight.
   - **Ask Questions :** After observing, you may wonder, "Do plants need sunlight to grow?"
   - **Make a Hypothesis :** A hypothesis is a guess. You might say, "I think plants grow faster with sunlight because they use it to make food."
   - **Experiment :** Test your hypothesis by growing two plants—one in the sunlight and one in the shade. See what happens!
   - **Analyze :** Look at the results. Which plant grew faster? Was your hypothesis correct?
   - **Conclusion :** Based on your experiment, you can conclude whether your hypothesis was right or wrong.
2. Branches of science are:
   (i) **Biology:** This is the study of living things. From the tiniest ants to the largest whales, biology helps us understand animals, plants, and even ourselves.
   (ii) **Physics:** Physics is all about forces, energy, and motion. It helps explain how things move, why the sun shines, and even how we can hear music through our headphones!
   (iii) **Chemistry:** Chemistry deals with substances and how they interact. It helps explain why things burn, how food is cooked, and what makes up the materials we use every day.
   (iv) **Earth Science:** This branch focuses on our planet. Earth scientists study rocks, oceans, the weather, and even earthquakes!
   (v) **Astronomy:** Astronomy takes us beyond the Earth into space. It helps us learn about the moon, stars, planets, and galaxies far away from us.

3. Science is important in everyday life as it improves health, technology, transportation and agriculture. Medicines and vaccines help prevent diseases, while scientific advancements in technology make communication easier through mobile phones and the internet. Transportation such as cars and airplanes, allows faster travel and electricity powers our daily activities. In agriculture, science helps grow better crops, ensuring sufficient food production. Overall, science make life healthier, safer, and more convenient.

Chapter 2 : Diversity in the Living World

A. 1. (a) 2. (a) 3. (a) 4. (a) 5. (a)

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

C. 1. Reticulate venation, Parallel venation 2. Radish 3. Banyan tree 4. Bud 5. Transpiration

D. 1. True 2. True 3. False

E. 1. Mango 2. Pea 3. Wheat 4. Pea 5. Lemon

F. **Very short answer type questions:**

1. Plants can be of the following types:
   (i) Trees (ii) Shrubs (iii) Herbs (iv) Climbers (v) Creepers
2. The leaf blade (lamina) is the flat part of a leaf that helps in photosynthesis.
3. Bees, butterflies, ants, etc.

Short answer type questions:

1. Yes, snake is a reptile.
2. Name of two mammals are: tigers and elephants.

Long answer type questions:

1. Differentiate between stem & root :

Stem :

(i) The stem is the part of the plant that grows about the ground (in most cases).

(ii) It supports leaves, flowers, and fruits.

(iii) It transports water and nutrients from the root to other part of the plant.

(iv) Some stems store food, like potatoes.

Root :

(i) The root is the part of the plant that grows below the ground (in most cases)

(ii) It anchors the plant in the soil.

(iii) It absorbs water and minerals from the soil.

(iv) It lacks nodes and internodes.

(v) Some roots store food like carrots and radishes.

2. A flower has two main type of parts:
   Vegetative parts and reproductive parts.

(i) Vegetative parts : These parts provide support and protection to the flower but do not take part in reproduction.
   Sepals : These are the small, green, leaf like structure at the base of the flower. They protect the flower bud before it blooms.
   Petals : These are the colourful parts of the flower that attract pollinators like bees and butterflies.

(ii) **Reproductive Parts** : These parts are responsible for the production of seeds and new plants.
   Stamen (Male Reproductive Part):
   Anther- Produces pollen grains.
   Filament- A stalk that hold the anther.
   Carpel (Female Reproductive Part):
   Stigma- Sticky top part that captures pollen.
   Style- Tube that connects the stigma to the ovary.
   Ovary- Contains ovules, which develop into seeds after fertilization.
   Together, these parts help in pollination, fertilization and seed formation, allowing the plant to reproduce.

3. The root system is the underground part of a plant that helps in anchorage, absorption of water and minerals, and storage of food. It grows beneath the soil and supports the plant's growth.
   Types of Root Systems:

(i) Tap root system-
   - Consists of a main primary root that grows deep into the soil.
   - Lateral roots grown from the primary root.
   - Found in dicot plants eg- mango, carrot and pea.

(ii) Fibrous root system-
   - Composed of many thin roots growing from the base of the stem.
   - Roots are shallow and spread out in the soil.
   - Found in monocot plants eg- wheat, rice.

   Functions of the Root System:
   - Anchorage - Head the plant firmly in the soil.
   - Absorption - Takes up water and minerals from the soil.
   - Storage - Some roots store food eg- carrot, and sweet potato.
   - Conduction - Transport water and nutrients to the stem.
   - Prevention of soil erosion - Roots bind the soil and prevent it from being washed away.

   Thus, the root system plays a vital role in plant survival and growth.

4. Invertebrates are animals that do not have a backbone. They represent the largest group of animals on Earth. Most invertebrates have simple body structures, and many possess and exoskeleton (a hard outer covering) for protection.

Some examples of invertebrates are-bees, butterflies, leeches, ants etc.

5. Classification of Animals-

Animals are classified based on their characteristics, structures and evolutionary relationships.

The basic classification is as follows:

1. Based on Presence of Backbone-

(i) **Vertebrates -** Vertebrates are animals that have a **backbone** or **spinal column**. They possess well-developed organ systems, including an internal skeleton for support and protection. Vertebrates are further divided into five main groups:

Fish: These animals live in water and breathe through gills. Examples: Shark, goldfish, tuna.

Amphibians: Amphibians can live both on land and in water. Examples: Frogs, salamanders.

- **Reptiles**: These are cold-blooded animals with dry, scaly skin.

Examples: Snakes, lizards, turtles.

Birds: Birds have feathers, wings, and beaks. They are warm-blooded and lay eggs. Most birds can fly, but some, like penguins and ostriches, cannot. Examples: Sparrow, eagle, crow.

Mammals: Mammals are warm-blooded animals that give birth to live young. They have fur or hair on their bodies and produce milk to feed their babies. Examples: Humans, tigers, elephants.

(ii) **Invertebrates:** Invertebrates are animals that do not have a backbone. They represent the largest group of animals on Earth. Most invertebrates have simple body structures, and many possess an exoskeleton (a hard outer covering) for protection.

Some examples of invertebrates include:

- **Insects**: Bees, butterflies, ants.
- **Worms**: Earthworms, leeches.
- **Jellyfish**: Soft-bodied animals that live in water.
- **Molluscs**: Animals with shells, such as snails and oysters.

2. Based on Habitat-

Aquatic Animals

Aquatic animals live in water. They have special adaptations such as gills for breathing underwater and fins for swimming.

Examples: Fish, dolphins, whales, octopuses.

Terrestrial Animals

Terrestrial animals live on land. They have lungs for breathing and legs or feet for walking, running, or climbing. Examples: Lions, elephants, dogs, horses.

Aerial Animals

Aerial animals spend most of their time flying. They have lightweight bodies, wings, and strong chest muscles that help them stay airbone. Examples: Birds (e.g., pigeons, eagles), bats.

Amphibians

Amphibians can live both on land and in water. They have moist skin and lay their eggs in water. Examples: Frogs, toads, salamanders.

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

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

B. 1. False 2. False 3. False 4. False 5. True 6. True 7. True

C. 1. vitamins, minerals 2. iodine 3. vitamin A 4. Rickets 5. fibre

D. 1. (a) 2. (e) 3. (f) 4. (d) 5. (c) 6. (b)

E. **Short answer type questions:**

1. (a) **Carbohydrates :** rice, bread, honey, potato and wheat (chapattis).
   (b) **Fats :** coconut oil, almonds, meat, butter, milk.
   (c) **Proteins :** paneer, eggs, cheese and fish.
   (d) **Roughage :** carrots, apples, peaches, rice (whole grains and pulses (beans).
2. Two rich food in starch are - (i) rice (ii) wheat
3. Three major food groups name are-
   (i) Energy giving foods - potato, sugar, honey.
   (ii) Body building foods - eggs, pulses, milk.
   (iii) Protective foods - spinach, tomato, carrot
4. Different types of food are consumed in India due to climate, agriculture and history. Local crops, traditions, and lifestyle influence the food choices in each state.

Long answer type questions:

1. A balanced diet is important because it provides the body with all the essential nutrients needed for growth, energy, and overall health. It helps in proper body functioning, boosts immunity and prevent diseases.

   Role of Different Food groups:

   (i) Carbohydrates- Provide energy. (eg- rice, bread, potatoes)
   (ii) Proteins- Helps in growth and muscle repair. (eg- pulses, eggs, fish)
   (iii) Fats- Give energy and protect organs. (eg- nuts, butter, oil)

(iv) Vitamins & Minerals- Boost immunity strengthen bones, and support body functions (eg- fruits, vegetables, dairy products).

(v) Water & Fibre- Aid digestion and remove toxins (eg- water whole grains, leafy greens)

2. Fibre is essential for good health as it helps digestion, prevents constipation, controls blood sugar, reduces disease risk and keep us full longer. It also removes waste from the body. Eating fibre-rich foods like fruits, vegetables, and whole grains keeps our digestive system healthy.
3. Protein helps in growth, tissue repair, energy supply, enzyme production, and boosting immunity.

   We can eat eggs, diary products, pulses, nuts, lean meat, fish and soya products to increase protein intake. A protein - rich diet keeps the body strong and healthy.

Chapter 4 : Exploring magnets

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

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

C. 1. Heat 2. Steel 3. The poles 4. Like 5. Unlike

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

E. **Very short answer type questions:**

1. (i) Store in dry place
   (ii) Keep away from heat
   (iii) Avoid dropping or hitting
   (iv) Keep away from electronics
2. (i) Magnetic Substance - iron, nickle and cobalt.
   (ii) Non-Megnetic Substance - paper, wood and aluminium.
3. Iron is used because it is a soft magnetic material that quickly gains and loses magnetism when the electric current is switched on or off.

   Two uses of electromagnets:

   (i) Used in electric trains.

   (ii) Horses hoe shaped electromagnets are used in making electric doorbell.
4. The sure test for magnetism is repulsion, as only a magnet repels another magnet when like poles face each other.

Short answer type questions:

1. Properties of a magnet-
   (i) All magnets attract magnetic materials.
   (ii) All magnets, when suspended freely, point towards north - south direction.

(iii) Magnetic poles are always present in pairs.
(iv) Magnetic attraction is more at the poles of a magnet.
(v) Like poles repel each other while opposite poles attract. Repulsion is the sure test of magnetism.

2. The poles of a magnet are the two ends where the magnetic force is strongest. A magnet has two poles: North Pole (N) and South Pole (S). Like poles repel while unlike poles attract each other.
3. A electromagnetic compass has a magnetized needle that moves freely and aligns with the Earth's Magnetic field. The needle is north pole points towards the geographic north, helping to determine directions- North, South, East and West for navigation.

Long Answer type questions:

1. A magnet is an object that attracts iron and certain other metals. It has two poles- North and South and can attract or repel other magnets.

   Discovery of Magnet: Magnets were first discovered naturally in the form of lode-stons (magnetite), a magnetic rock.

   Who discovered it first: The discovery at magnets is credited to the ancient Greeks. Around 4000 years ago, a shephred named Magnes in Magnesia (Greece) in believed to have found that certain stones attracted iron. This led to the study of magnetism.

2. A piece of iron can be converted into a magnet using electromagnetism.

   Electromagnetism:

- Wrap and insulated copper around the iron piece.
- Connect the wore to a battery to create an electric current.
- The iron piece becomes a magnet as along as the current flows.

3. **Natural Magnets:** These are found in nature and occur in the form of lodestone (magnetite). They have a weak magnetic force and irregular shape. Examples are- Magnetite, Earth's magnetic field.

   Artificial Magnets: Magnets that are artificially made by man are called artificial magnets eg- alloys. They can be of different shapes. Examples are - bar magnets and horses hoe magnets.

Chapter 5 : Measurement of Length and Motion

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

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

C. 1. position 2. Meter 3. oscillatory 4. 250 5. mole

D. 1. False 2. False 3. False 4. False 5. False

E. **Very short answer type questions:**

1. **Measurement:** Quantitive analysis of unknown quantity with the help of known fixed quantity is called as measurement.

2. **Distance:** The actual length covered by a moving body irrespective of the direction, is called distance.

Short answer type questions:

1. A palm length is not a standard unit because it varies from person to person and is not uniform for accurate measurement.
2. Motion is the change in the position of an object with respect to time.
3. **Measurement:** Quantitative analysis of unknown quantity with the help of known fixed quantity is called as measurement.
4. **Uniform Motion:** If a body covers equal distance in equal interval of time along the same straight path, is called uniform motion.

   Non-Uniform: If a body covers unequal distance in equal time interval along the same straight path, is called non-uniform motion.
5. **Periodic Motion:** A motion which repeats itself after a fixed interval is called as periodic motion. For example- Movement of hands of a clock.

   Non-Periodic Motion: A motion which repeats itself but not after a fixed time interval is called non periodic motion.

   For example- Moving of air or wind.

Long answer type questions:

1. **Measurement**

   Definition: Quantitative analysis of unknown quantity with the help of known fixed quantity is called as measurement.

   The known fixed quantity is called as unit. Example of unit for length is metre and for mass is kilogram and gram.

   Standard Unit

   A unit which is acceptable by a large proportion of people as a basic system for measurement is called standard unit.

   The set of units acceptabled by scientists all over the world is called international system of units (SI units). It is a modern form of metric system, developed in 1960. The table given shows all SI units.

Quantity	SI Unit
1. Length	Metre (m)
2. Mass	Kilogram (kg)
3. Time	Seconds (s)
4. Temperature	Kelvin (K)
5. Electric Current	Ampere (A)

2. The actual length covered by a moving body, irrespective of the direction is called distance.

Difference between Distance & Displacement.

Distance	Displacement
1. Total length covered by an object. 2. Always positive. 3. eg: A car moves 5 km in a circular path, distance = 5 km.	1. Shortest straight line distance from the start to the endpoint. 2. Can be positive, negative or zero. 3. eg: If the car returns to the start point, displacement = 0 km.

4. Types of Motion:

(i) **Translatory Motion:** The motion in which all the parts of a body cover the same distance in the same time, via any path is called translatory or translational motion.

For example:

- Train on a straight track
- Movement of a lift
- Any zig-zag movement like that of a snake
- Movement of a ball on a parabolic path

(ii) **Rotatory Motion:** The kind of a motion in which different parts of a body move in circular motion respect to a fixed point, is called circular motion. Examples of a rectilinear motion are:

- The movement of potter's wheel
- The spinning wheel
- Circular motion of a ceiling fan.

(iii) **Oscillatory Motion:** Motion of a body "to and fro" or "back and forth" along a fixed path is called oscillatory motion. Examples of oscillatory motion are:

- Movement of a pendulum
- Movement of a suspended spring
- Movement of a swing.

4. A falling leaf exhibits random motion because it moves in an irregular and unpredictable manner due to the influence of wind and gravity.

Explanation of Random Motion:

Random motion occurs when an object moves in different directions without a fixed path. The motion is unpredictable and does not follow a specific pattern.

Another examples:

The movement of duet particles in the air is an example of random motion as they move in different directions due to air currents.

Chapter 6 : Materials Around Us

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

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

C. 1. translucent materials 2. luster 3. Diamond 4. insulators 5. electricity

D. 1. True 2. True 3. True 4. True

E. **Very short answer type questions:**

1. **Hardness:** Hardness is a property which help us to group different materials.
2. **Lustre:** The surface of some materials are shiny while others are rather dull. This shine of the materials is called lustre.
3. **Transparency:** This property of materials is dependent on whether the material allows light to pass through it.
4. **Solubility:** The ability of a substance to dissolve in a liquid.
5. **Density:** It tells how heavy or light a material is for its size.

Short answer type questions:

1.

- Solids can be transparent (glass), translucent (frosted plastic), or opaque (wood).
- Liquids are mostly transparent (water), but some are translucent (milk) or opaque (paint).
- Gases are usually transparent (air), but some can be opaque (fog)

2. Miscible liquids are those that mix completely with each other to form a uniform solution.

   Example- water and vinegar.

   Immiscible liquids do not mix completely and form separate layers. Example- oil and water.

3. Examples of good conductors of electricity-copper, aluminium and silver.

   Examples of bad conductors of electricity- plastic, rubber and wood.

Long answer type questions:

1. Classification is the process of grouping materials based on their properties to make study easier.

   Examples: Materials around us can be classified based on their properties:

   (i) On the basis of hardness- Hard (iron) and soft (cotton).

   (ii) On the basis of solubility- Soluble (salt in water) and insoluble (sand water).

   (iii) On the basis of transparency- Transparent (glass), translucent (butter paper), and opaque (wood).

2. **Definition:** Anything that occupies space and mass is called *matter*. Mass is the amount of a substance that a thing or a matter contains and the amount of space occupied by a thing or a matter is its volume.

States of matter

There are three states of matter on the basis of nature of particles in them and the way in which they are packed or arranged. These are:

Solids : They have the following characteristics :

- They have fixed shape.
- They have definite volume.
- Molecules in solids are fixed and can't move. (Molecule is a group of two or more atoms).
- They have strongest inter-molecular forces.
- They have least inter-molecular spaces.

Liquids : They have the following characteristics :

- They take the shape of container in which they are kept.
- They have definite volume.
- Molecules are packed less tightly as compared to solids but more tightly as compared to gases.
- They have less stronger inter-molceular force as compared to solids but more stronger inter–molecular forces as compared to gases.
- They have more inter-molecular spaces as compared to solids but less as compared to gases.

Gases : They have the following characteristics :

- Their shape is not fixed.
- Their volume is not definite.
- Molecules are free to move.
- They have least inter-molecular forces.
- They have maximum inter-molecular spaces.

3. Matters has the following properties:

(i) **Mass and volume-** Matter has weight and occupies space.

(ii) **States of matter-** It exists in solid, liquid, and gas forms.

(iii) **Density-** Some materials are heavy while others are light.

(iv) **Solubility-** Some substance dissolve in water, while others do not.

(v) **Transparency-** Objects can be transparent, translucent or opaque.

Chapter 7 : Temperature and its Measurement

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

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

C. 1. 37 2. 10, 100 3. thermometer 4. expands, contracts 5. Mercury, alcohol.

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

E. **Very short answer type questions:**

1. We jerk a clinical thermometer before measuring body temperature to bring the mercury level down below normal temperature, ensuring an accurate reading.
2. The three scales of temperature measurement are Celsius, Fahrenheit and Kelvin.
3. The temperature range of a laboratory thermometer is 10° C to 10° C.
4. Temperature is the measure of the hotness or coldness of an object.
5. **Melting Point-** The temperature at which a solid changes into a liquid.

   Boiling Point- The temperature at which a liquid changes into a gas.

Short answer type questions:

1. We use Mercury in thermometers because it expands uniformly, is highly visible, does not stick to glass, and has a wide temperature range.
2. (i) Do not tilt the thermometer while measuring the temperatures. Place it upright.

   (ii) It should not touch the sides or bottom of the container.

   (iii) Note the reading only when the bulb has been surrounded by the substance from all sides.
3. Advantages:

   (i) Provide fast and precise readings.

   (ii) Safer as it does not contain toxic mercury.

   (iii) Displays temperature digitally.

   Disadvantages:

   (i) Needs batteries to function.

   (ii) May give incorrect readings.

   (iii) Costs more than a clinical thermometer.

4. (i) Celsius to Fahrenheit

$°F = (°C \times 9/5) + 32$

eg: 25°C to Fahrenheit

$$\left(25 \times \frac{9}{5}\right) + 32$$

$45 + 32 = 77°F$

(ii) Celsius to Kelvin

$K = °C + 273.15$

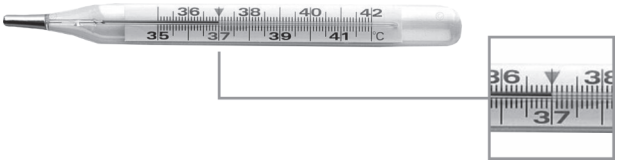
eg: 25° C to Kelvin

$= 25 + 273.15 = 298.15K$

Long answer type questions:

1. The commonly used clinical thermometer comprises a narrow tube (capillary) of thick glass. At the end of the capillary tube is a thin glass bulb filled with mercury.

Mercury is preferred in thermometers because it is present in a liquid state over a wide range of temperatures. It is silvery grey, therefore it is relatively easy to observe. It does not stick to the glass in which it is enclosed. It can measure temperatures from 35 °C to 42 °C.



Precautions to be followed while using a clinical thermometer

- The thermometer should be washed before and after use preferably with an antiseptic solution.
- The thermometer should be read keeping the mercury level along the line of sight.
- It should be handled with care.
- The bulb of the thermometer should not be touched while taking a reading. Hold the thermometer by its glass body.
- It should be ensured that before use, the mercury level is below 35 °C or 95 °F.

2.

Feature	Celsius	Fahrenheit	Kelvin
(i) Freezing point of water.	0°C	32°F	273K or 273.15K
(ii) Boiling point of water.	100°C	212°F	373K
(iii) Usage.	Used World Wide	Used mainly in U.S.	Used in Science
(iv) Relation	$°C=(°F - 32)\times\frac{5}{9}$	$°F=(°C\times\frac{9}{5})+32$	K=°C+273.15 or 273

3. Differentiate between clinical and laboratory thermometer

CLINICAL THERMOMETER	LABORATORY THERMOMETER
It is used to measure the human body temperature.	It is used to find out the boiling point and freezing point of the substances.
Its range is 35°C to 42°C.	Its range is – 10°C to 110°C.
Mercury level does not fall on its own, as there is a kink near the bulb to prevent the fall of mercury level.	Mercury level falls on its own as no kink is present.
Temperature can be read after removing the thermometer from the armpit or mouth.	Temperature is read while keeping the thermometer in the source of temperature, e.g., a liquid or any other thing.
Jerks are given to lower the mercury level.	No jerk is required to lower the mercury level.

Chapter 8 : A Journey through States and Water

A. 1. (c) 2. (d) 3. (c) 4. (b) 5. (b) 6. (a) 7. (d)

B. 1. (g) 2. (b) 3. (f) 4. (d) 5. (e) 6. (c) 7. (a)

C. 1. solid, gas and liquid 2. evaporation 3. condensation 4. melting 5. 100 6. 70% 7. sweat, urine

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

E. **Very short answer type questions:**

1. Three states of water are:
   (i) Solid (ice) (ii) Liquid (water) (iii) Gas (water vapour)
2. Condensation
3. Transpiration is the process of water loss in the form of vapour through the stomata of plant leaves.
4. Temperature, surface area, wind speed and humidity.
5. Condensation is the process by which water vapour cools down and changes into liquid water.

Short answer type questions:

1. Water turns into ice through the process of freezing when temperature drops to 0° C or below, the molecules of water lose energy, move slowly, and arrange themselves into a solid structure, forming ice.
2. Temperature affects the state of water as follows :
   (i) Freezing – (Liquid to solid)
   (ii) Melting – (Solid to liquid)
   (iii) Evaporation – (Liquid to gas)
   (iv) Condensation – (Gas to liquid)
3. Water is essential for survival, digestion, temperature regulation, plant growth and daily activities like drinking and cooking.
4. Uses of water:
   (i) Used in preparing food.
   (ii) Washing clothes, utensils and home.
   (iii) Watering crops and farming.
   (iv) Essential for survival and hydration.
5. (i) Drinking and Hydration.
   (ii) Cooking and cleaning.
   (iii) Agriculture.
   (iv) Electricity generation.

Long answer type questions:

1. The water cycle has four main stages:
   (i) Evaporation : The sun heats water from oceans, rivers, and lakes, turning it into water vapour. Plants also release water vapour through transpiration.
   (ii) Condensation : Water vapour cools and forms tiny water droplets, creating clouds.
   (iii) Precipitation : When clouds become heavy water falls as rains snow.
   (iv) Collection : Water gathers in oceans, lakes, rivers, or underground as run off or ground water.
2. Water exists in three different states—solid (ice), liquid (water), and gas (water vapour or steam). These changes occur due to temperature variations.

   Effect of Temperature on the States of Water

   Water changes its state based on temperature variations:

   1. Melting (Solid to Liquid) – Ice melts into water at 0°C when heated. Example: Ice cubes melt at room temperature.

2. Evaporation & Boiling (Liquid to Gas) – Water evaporates at any temperature and boils at 100°C, turning into steam.

   Example: Clothes dry in the sun; water boils in a kettle.

3. Condensation (Gas to Liquid) – Water vapour cools and turns into liquid.
   Example: Water droplets form on a cold glass.

4. Freezing (Liquid to Solid) – Water freezes into ice at 0°C when cooled.

   Example: Water in a freezer turns into ice.

3. Water plays a vital role in the growth and survival of plants. It is needed for photosynthesis, where plants make their food using sunlight. Water also helps transport nutrients from the soil to different plant parts. It keeps plants firm and upright, preventing them from wilting. Through transpiration, plants release excess water from their leaves, which helps in cooling them. Water is also essential for seed germination, allowing new plants to grow. Without water, plants cannot survive or carry out their life processes.

4. Uses of water in various industries and commercial purposes:
   - Water is used in agriculture for irrigation to grow crops.
   - It helps in electricity generation in hydro power plants.
   - Factories use water for cooling machines, cleaning, and manufacturing products.
   - The construction industry needs water to mix cement and make concrete.
   - The textile industry uses water for dyeing and washing fabrics.
   - In the food industry, water is essential for cooking and cleaning.
   - Pharmaceutical companies use water to make medicines.
   - Hotels and restaurants need water for cooking and sanitation.
   - The paper industry requires water to produce paper.
   - Car wash and cleaning services use water to wash vehicles and buildings.

5. Factors increasing the rate of evaporation:

   Temperature – Higher temperature makes water molecules move faster, increasing evaporation.

   Example: Clothes dry faster on a hot day.

   Surface area – A larger surface area allows more water to evaporate.

   Example: Water in a wide bowl evaporates faster than in a narrow glass.

   Wind speed – Stronger wind removes water vapour quickly, speeding up evaporation.

   Example: Wet roads dry faster on a windy day.

   Humidity – Lower humidity (less water vapour in the air) increases evaporation.

   Example: Clothes dry faster in dry weather than in humid weather.

Chapter 9 : Methods of Separation in Everyday Life

A. 1. (a) 2. (c) 3. (d)

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

C. 1. threshing 2. winnowing 3. handpicking

D. 1. False 2. False 3. False

E. **Very short answer type questions:**

1. (i) Homogeneous mixture (ii) Heterogeneous mixture
2. The process of separating wheat grains from stalks after crop harvesting is called threshing.
3. Centrifugation is the process of separating substances of different densities in a mixture by spinning them at high speed.

Short answer type questions:

1. Sedimentation is the process in which heavier particles in a liquid settle at the bottom when left undisturbed.

   Decantation is the process of gently pouring out the clear liquid from the top without disturbing the settled particles. Decantation usually follows sedimentation to separate the liquid from the solid. For example, when muddy water is left in a glass, the mud settles at the bottom (sedimentation), and then the clean water is carefully poured out (decantation).
2. Threshing is used for crops to separate grains from the stalks and husks after harvesting. It helps in removing the edible part of the crop from the plant quickly and efficiently. Threshing can be done by hand, using animals, or with machines like threshers.

   Example: In wheat and rice farming, threshing is used to separate grains from the harvested plants.
3. An example of a mixture that can be separated by handpicking is picking stones from rice or pulses.

Long answer type questions:

1 . **Element –** A pure substance made of only one type of atom. It cannot be broken down into simpler substances.

Example: Gold (Au), Oxygen (O_2)

Compound – A substance formed when two or more elements combine chemically in a fixed ratio. It can be broken down into simpler substances.

Example: Water (H_2O) – made of hydrogen and oxygen

Mixture – A combination of two or more substances that are physically mixed but not chemically combined. They can be separated by physical methods.

Example: Sand and salt, air (a mixture of gases)

2. Methods of separating insoluble solids from liquids:

   (i) **Sedimentation –** Allowing heavier solid particles to settle at the bottom of the liquid.

   Example: Mud settling in a glass of water.

   (ii) **Decantation –** Pouring out the clear liquid without disturbing the settled solid.

   Example: Pouring clear water from a glass after mud settles.

   (iii) **Filtration –** Using a filter paper or strainer to separate solid particles from a liquid.

   Example: Separating tea leaves from tea using a strainer.

   (iv) **Centrifugation –** Spinning a mixture at high speed to separate solids from liquids based on density.

   Example: Separating cream from milk in the dairy industry.

3. Methods of separating miscible and immiscible liquids:

   Separation of immiscible liquids:

   Using a separating funnel – The mixture is poured into a separating funnel, where the heavier liquid settles at the bottom and is drained out first.

   Example: Separating oil from water.

   Separation of miscible liquids :

   Distillation – The mixture is heated, and the liquid with the lower boiling point evaporates first. The vapour is then cooled and collected separately.

   Example: Separating alcohol from water by distillation.

Chapter 10 : Living Creatures : Exploring their Characteristics

A. 1. (b) 2. (a) 3. (b) 4. (b)

B. 1. (f) 2. (d) 3. (e) 4. (a) 5. (g) 6. (b) 7. (c)

C. 1. grow and develop 2. excretion 3. vertebrates 4. backbone 5. Reproduction 6. Transpiration

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

E. **Very short answer type questions:**

1. Metamorphosis
2. Vertebrates
3. Breathing
4. Seed, Germination, Adult plant, Reproduction
5. In the larval stage, mosquito larvae live in water, breathe through tiny tubes, and feed on small organisms. They grow by shedding their skin several times before turning into pupae.
6. During frog metamorphosis, a tadpole with gills and a tail develops legs,

and lungs, and loses its tail to become an adult frog.

Short answer type questions:

1. A life cycle is the sequence of stages a living organism goes through from birth to adulthood and then reproduction. It is important because it helps organisms grow, reproduce, and ensure the survival of their species.
2. The life cycle of a frog has four stages:
   (i) Egg – Frogs lay eggs in water.
   (ii) Tadpole – The egg hatches into a tadpole, which has a tail and breathes through gills.
   (iii) Froglet – The tadpole grows legs, lungs develop, and the tail starts shrinking.
   (iv) Adult Frog – The tail disappears completely, and the frog lives on land and in water.
3. Metamorphosis is the process of major physical changes in the body of an organism as it grows from young to adult. Animals that undergo metamorphosis include frogs, butterflies, moths, beetles, and mosquitoes.
4. The life cycle of a plant differs from that of an animal in several ways:

   Growth – Plants grow continuously throughout their life, while animals stop growing after reaching adulthood.

   Reproduction – Most plants reproduce through seeds or spores, while animals reproduce by giving birth or laying eggs.

   Metamorphosis – Some animals undergo metamorphosis, but plants do not.

   Movement – Animals move freely, whereas plants remain fixed in one place.

Long answer type questions:

1. The life cycle of a mosquito has four stages: Egg, Larva, Pupa, and Adult. The entire cycle takes about 7 to 14 days, depending on temperature and species.

   Egg Stage – Female mosquitoes lay eggs on the surface of stagnant water. The eggs hatch within 1 to 3 days into larvae.

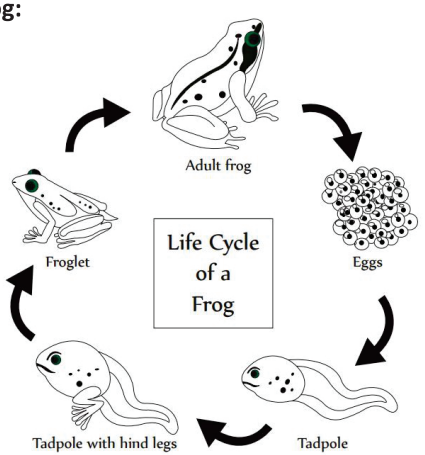
   Larval Stage – The larvae, called wrigglers, live in water and breathe through tiny tubes. They feed on microorganisms and molt several times as they grow. This stage lasts about 4 to 10 days.

   Pupal Stage – The pupae, called tumblers, do not eat but remain active in water. They undergo transformation inside the pupa case for about 1 to 4 days before emerging as adults.

   Adult Stage – The fully developed mosquito emerges from the pupa, dries

its wings, and becomes ready to fly. Males feed on nectar, while females need blood to lay eggs, restarting the cycle.

2. **Life cycle of a frog:**



4. The main conditions for seed germination are:
   - **Water :** Water is crucial for germination because it activates the enzymes that trigger the growth process. When a seed absorbs water, it swells and the seed coat softens, allowing the embryo inside the seed to start growing. This process is known as imbibition.
   - **Oxygen :** Seeds need oxygen to carry out cellular respiration, a process that provides the energy required for growth.
   - **Suitable Temperature :** Most seeds require a specific temperature range to germinate. Generally, seeds germinate best in mild to warm temperatures, between 20°C to 30°C, depending on the type of plant.
   - **Light or Darkness :** Some seeds require light to germinate, while others need darkness.

Chapter 11 : Nature's Treasures

A. 1. (c) 2. (b) 3. (b) 4. (c)

B. 1. (e) 2. (a) 3. (f) 4. (c) 5. (d) 6. (b)

C. 1. solar 2. Human made 3. Natural resources 4. Wind energy, coal 5. wood, medicine

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

E. **Very short answer type questions:**

1. Natural resources are materials that are obtained from nature and are used by us to fulfill various needs.

2. Examples of soil- Sandy soil, Clayey soil, loamy soil
3. A forest is a large area covered with many trees, plants, and animals. It provides oxygen, food, shelter, and raw materials and helps maintain the balance of nature by absorbing carbon dioxide and preventing soil erosion.

Short answer type questions:

1. Renewable resources are natural resources that can be replenished naturally over time. Examples: Sunlight, Water.
   Non-renewable resources are natural resources that cannot be replaced quickly once used. Examples: Coal, Petroleum.
2. Water is essential for life as it helps in drinking, cooking, cleaning, farming, and industries. It is needed by plants for growth, and animals for survival, and helps maintain the balance of nature by supporting ecosystems.
3. Human-made resources are created by using natural resources and applying human skills, knowledge, and technology. For example, iron ore (a natural resource) is processed into steel, which is then used to make bridges, buildings, and machines. Similarly, trees are used to make paper and furniture. These resources help improve human life and development.

Long answer type questions:

1. Natural resources are materials that are obtained from nature and are used by us to fulfil various needs. These resources are available without human intervention.
   They are classified into two types:
   Renewable Resources – These resources can be replenished naturally over time and are available in unlimited into two types. Examples: Sunlight, Water, Air and Trees.
   Non-renewable Resources – These resources cannot be replaced quickly once used. Examples: Coal, Petroleum, Natural Gas and Minerals.
2. **Importance of Forests:**
   Forests are important because they provide oxygen, food, wood, and medicine. They help in maintaining rainfall, preventing soil erosion, and giving shelter to animals. Forests also keep the air clean and support many living organisms.
   Impact of Deforestation:
   Cutting down too many trees, or deforestation, causes loss of animal habitats, less rainfall, soil erosion, and an increase in pollution. It also leads to climate change and affects the balance of nature.
3. Fossil fuels are energy sources that are vital to modern life, as they provide the energy needed to power homes, vehicles, factories and many more. However, fossil fuels are non-renewable resources and their use has environmental consequences.
   Fossil fuels are natural energy sources formed from the decomposed

remains of ancient plants and animals. Over millions of years, these remains were buried under layers of earth and rock. With time, heat and pressure transformed them into the fuels, such as petroleum, natural gas and coal that we use today.

Types of Fossil Fuels

- **Coal:** It is a black or brownish rock primarily made of carbon. It is mainly used for generating electricity.
- **Petroleum (Oil):** It is a thick, liquid fuel that can be refined into gasoline, diesel and other products used to power vehicles.
- **Natural Gas:** It is a gaseous fuel made mostly of methane. It is used for cooking, heating and electricity generation.

Uses of Fossil Fuels

Fossil fuels are an important energy source used for many purposes in our daily lives:

- Coal is burned in power plants to generate electricity.
- Natural gas is used to heat homes and buildings.

Chapter 12 : Beyond Earth

A. 1. (b) 2. (b) 3. (b) 4. (b) 5. (c) 6. (b) 7. (b)

B. 1. (d) 2. (e) 3. (b) 4. (c) 5. (f) 6. (a) 7. (g)

C. 1. Big Bank 2. star 3. galaxy 4. stars 5. Milky Way 6. Earth 7. massive 8. 13.8

D. 1. False 2. False 3. False 4. True 5. False 6. True 7. False

E. **Very short answer type questions:**

1. the Sun
2. Nebulae are huge clouds of gas and dust in space where new stars are formed.
3. A black hole is a region in space with extremely strong gravity that nothing, not even light, can escape from. It forms when a massive star collapses at the end of its life.
4. The Milky Way is the galaxy that contains our solar system. It is a huge collection of stars, planets, gas, and dust, appearing as a bright band in the night sky.
5. There are eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
6. Planets orbit around the Sun.
7. The main difference is that a star produces its own light and heat, while a planet does not and orbits a star.

Short answer type questions:

1. A galaxy is a huge collection of stars, planets, gas, and dust held together by gravity. Our galaxy is called the Milky Way.
2. Black holes are important because they affect the movement of stars and

galaxies, help in the formation of new stars, and give scientists information about gravity and space.

3. Planets do not produce their own light and orbit a star, while stars generate heat and light through nuclear reactions.
4. The solar system is organized with the Sun at the center, and eight planets orbiting it in a fixed path. It also includes moons, asteroids, comets, and dwarf planets.
5. A telescope is important in space exploration because it helps scientists observe distant planets, stars, and galaxies, study space objects in detail, and discover new celestial bodies.
6. When a star runs out of fuel, it collapses and may turn into a white dwarf, neutron star, or black hole, depending on its size.

Long answer type questions:

1. The solar system consists of the Sun, eight planets, their moons, and other celestial bodies like asteroids and comets. The Sun is the most important part of the solar system because it provides light and heat, making life possible on Earth. Its gravity keeps the planets in orbit and helps regulate seasons and weather.
2. A black hole is a region in space with extremely strong gravity, where nothing, not even light, can escape. Scientists detect black holes by observing their effects on nearby stars and gas, tracking X-rays emitted from matter falling into them, and using gravitational waves from collisions.
3. Space exploration is significant because it helps us understand the universe, discover new planets, study stars and galaxies, and learn about Earth's place in space. It has led to scientific advancements like satellite technology, weather forecasting, and space travel. Exploring space also helps scientists study the origins of the universe, search for life beyond Earth, and develop new technologies for future space missions.