

Junior SCIENTIST

==== **SOLUTION MANUAL** =====

Class 6 to 8





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Junior SCIENTIST

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Diversity in the Living World



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. Shrubs 2. fibrous 3. venation 4. habitat 5. hibernate
6. whales, dolphins 7. altitude

C. State whether the following statements are True or False :

1. False 2. True 3. False 4. False 5. False 6. True
7. True 8. True

D. Match the following columns :

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

E. Answer the following questions in brief :

1. The variety of Flora and fauna and microorganisms in an area constitute the biodiversity (biological diversity) of that area. It also includes their inter-relationship and their relationship with the environment they are found in.
2. Plants with green and tender stems are called herbs. They are small plants. For example, tomato, alovera, etc. Plants which have many woody stems, medium-height and are in the form of bush are called shrubs. They are generally smaller than trees. For example, cotton, rose, etc.
3. Radish
4. Roots arising in many directions from the base of the stem are known as fibrous roots. For example, wheat, rice, etc.
5. A taproot is a long, thick root that grows straight down. It has a single main

root while roots arising in many directions from the base of the stem are known as fibrous roots. All these roots are small and are of same size.

6. (a) **Habitat** : The natural environment of a living being is called a habitat.
 (b) **Adaptation** : Adaptations are structural or functional adjustments shown by an organism in order to survive in its environment.
7. Camel, kangaroo rats.
8. The damage to habitats of plants and animals results in loss of their homes, food and other resources. This leads to the loss of bio-diversity.

Group	Types of seed	Type of root	Examples
A	Dicot	Taproots	Tomato, chickpea
B	Monocot	fibrous roots	Rice, maize

F. Answer the following questions in detail :

1. If the veins run parallel to one another from the base to the tip of the leaf, the leaf is said to have parallel venation. For example, grass and some monocot plants. Leaves of some plants have veins arranged in a net like pattern on both sides of the mid-rib. This kind of venation is called reticulate venation. For example, peepal and mango.
2. Plants have adapted to survive in hot and dry deserts. Roots in most plants are long that go deep into the soil for absorbing water. Leaves in desert plants are either absent, very small or reduced to spines to reduce the loss of water by transpiration. Stems are green in colour and prepare food for the plant. Stems have a waxy coating that prevents the loss of water.
3. **Herbs** : Plants with green and tender stem are called herbs. These are usually short and may not have many branches. For example, tomato, alovera.

Shrubs : Plants which have many woody stem, medium height and are in the form of a bush are called shrubs. They are generally smaller than trees. For example, cotton, rose.

Trees : A tree has a firm single main stem which is brown in colour. This is called trunk. The trunk is thick, hard and woody. For example, banyan, neem.

Creepers : Plants with weak stems that can not stand up-right and spread on the ground, are called creepers. For example, pumpkin, water melon.

Climbers : Plants those take support on neighbouring structures and climbed up, are called climbers. For example, grapevine, money plant.

4. The adaptations seen in plants found in tropical rainforests are given below :
 - (i) As these forests are very thick, little sunlight reaches the forest floor.

Thus, some plants climb onto the trunks of tall trees to reach the sunlight. Plants that grow near the ground have broad leaves to absorb maximum sunlight.

- (ii) Leaves have unique tips called drip tip. Drip tips allow raindrops to run off quickly without sticking to the leaves. It prevents leaves from rotting due to the accumulation of water.

The adaptations seen in the animals living in tropical rain forests are given below :

- (i) Many animals exhibit the ability to camouflage with their surroundings, either to hide from a predator or to attack a prey. For example, green colour of a sloth helps it to blend with the green leaves and protects it from predators.
 - (ii) Some frogs release poison to protect themselves from predators.
5. (a) Yaks have long hair all over their body to keep them warm.
- (b) In mountains, trees are cone-shaped. It helps rainwater and snow to slide off easily. It also allows the tree to get more sunlight as the lower branches are not shaded by the upper branches.
- (c) Long, thin and strong legs of camel keep its body away from the hot sand.
6. Whales do not have gills to breathe in water. They have lungs. They breathe through the blow holes present on the upper parts of their head. These animals come to the water surface from time to time to gulp oxygen from the air. Frogs have webbed feet for swimming in water and strong hind legs for leaping and jumping on land. They breathe with lungs while on land and with moist skin while in water. They have long sticky tongue to catch their prey. The skin of frog camouflages with its surroundings.



Learning With Fun

A. Picture Talk :

Ans : The kidney bean plants have taproots and leaves with reticulate venation. Wheat plants have fibrous roots and leaves with parallel venation.

B. Research and Project :

Do yourself.

C. Activity :

Habitat	Condition (Features)	Plants (Found)	Animals (Found)
Forest	Warm and humid climate	Rhododendrons	Sloths,
Desert	Hot and dry	Cacti	Camel, Kangaroo, Rat

Mountain	Extremely cold and some times snow fall.	Pine tree	Yak, snow leopard
Ocean	Maritime Climate	Duckweed, hydrilla	whale, dolphin

D. Group Discussion :

Do yourself.



Mindful Eating: A path to a Healthy Body



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. Sugar, Starch 2. energy 3. iron
4. sweat, urine 5. obesity 6. Chulha

C. State whether the following statements are True or False :

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

D. Match the following columns :

1. (c) 2. (g) 3. (f) 4. (d) 5. (h) 6. (e)
7. (b) 8. (a)

E. Answer the following questions in brief :

- Our food contains essential components that are required by our body. These components are called nutrients. There are five main nutrients—carbohydrates, fats, proteins, vitamins and mineral.
- Proteins help us to grow, maintain and repair worn out cells and building new cells.
- (i) Water helps to transport digested food, chemicals and gases.
(ii) It helps to excrete unwanted materials in the form of urine and sweat.
(iii) It helps to regulate our body temperature through the process of sweating.

	Carbohydrate rich food item	Protein rich food item	Fat rich food item
4.	Sweet potato	Moong dal	Butter

Rice	Beans	Milk
Peas	Fish	Mustard oil
Maize	–	Butter milk
White bread	–	Cottage cheese

5. Excessive loss of water from the body is called dehydration.
6. Oral Rehydrating Solution (ORS) is given to the patients to cure dehydration. One can also make it at home by mixing six teaspoonfuls of sugar and half teaspoonful of salt in one litre of boiled water.
7. A diet which contains the right proportions of all the nutrients carbohydrates, fats, proteins, vitamins and minerals along with water and roughage is called a balance diet.
8. Over the time, cooking methods continued to evolve, with new techniques and technologies emerging. The invention of oven, stove, and grills allowed for more precise and efficient cooking, while the advent of refrigeration and freezing made it possible to store food for longer periods. That's why cooking practices, change over time.
9. A disease which occurs largely due to the deficiency of one or more nutrients in the diet over a long period of the time is called deficiency disease. For example, Kwashiorkor and Marasmus.
10. We should follow some simple techniques:
 - (i) Do not wash vegetables after cutting them.
 - (ii) Do not keep fruits and vegetables after cutting them.
 - (iii) Rice and pulses should not be washed repeatedly as it remove nutrients.
 - (iv) After washing pulses and rice, if you soak them, do not throw away the water. Use it in your cooking.
11. The entire distance travelled by food items from the producer to the consumer is called food miles.

F. Answer the following questions in detail :

1. Proteins help us to grow, maintain and repair worn out cells and building new cells. Therefore, it is advised to give protein rich diet to children as it helps in the growth of their body. Food containing proteins are often known as body building foods.
2. (a) **Carbohydrates** : Carbohydrates are energy giving compounds. The function of carbohydrates is to provide energy for work and other physiological activities– Sugar and starch are the two main types of carbohydrates present in our food. Sugar provides instant energy to the body.
- (b) **Vitamins**: Vitamins are a group of nutrients that our body requires in

small quantities. They help in protecting our body against diseases. They keep our skin, eyes, bones and teeth healthy.

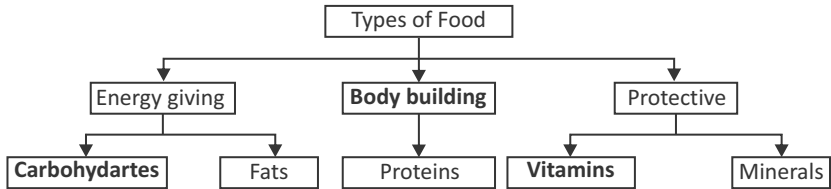
3. Roughage does not provide any nutrient to our body, but is an essential components of our food and add to its bulk, thus prevent constipation. The added bulk also makes us feel full faster, hence we end up eating less food.
4. Minerals are protective foods that are important to our body for its proper functioning. Normal growth and good health. They belong to the group of protective foods. Calcium, iron, phosphorus, sodium and iodine are some essential minerals. we get minerals from fresh vegetables, fruits, salt, meat, fish and eggs.
5. **Kwashiorkor** : The condition occurs due to severe protein deficiency. These are the following symptoms of this disease :
 - Dark and scaly skin
 - Protruding belly
 - Loss of appetite
 - Swollen legs due to accumulation of water

Marasmus : This disease is caused due to the deficiency of proteins, fats and carbohydrates. The symptoms of this disease are :

- Lean and thin child
 - Stunted growth
 - Weak legs
 - Lack of movement by the child due to lack of energy.
6. You may have heard of *jowar*, *bajara*, *ragi* and *sanwa* etc. These are native crops of India. These can be easily cultivated in different climatic conditions. These highly nutritious grains are also called millets. They are good source of vitamins, minerals like iron and calcium and dietary fibres as well. that is the reason they are also called nutriceals. They contribute significantly to a balanced diet required for the normal functioning of our body.
 7. Paheli should avoid eating biscuits and other junk food as they contain *maida* which has minimum quantity of fiber or roughage. She should start eating pulses whole grains, fruits and vegetables to get rid of constipation as they have a higher amount of nutrients and roughage.
 8. (a) He is suffering from night blindness.
(b) Absence of vitamin A causes night blindness.
(c) Carrot, papaya, milk and spinach.



A. Web Chart:



B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.

CHAPTER 4 Exploring Magnets



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. two 2. repel, attract 3. ends
4. Lodestone 5. compass 6. heating, hammering

C. State whether the following statements are True or False :

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

D. Match the following columns :

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

E. Answer the following questions in brief :

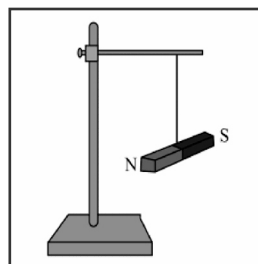
1. A magnet is a substance that can attract objects made up of iron, nickel, steel and cobalt towards itself.

- Magnets that are obtained naturally from the Earth are called natural magnets. For example, magnetite or lodestone.
Magnets that are made by human beings are called artificial magnets. For example, bar magnet, horseshoe magnet.
- Those materials which get attracted by magnets, are called magnetic materials. Those materials which do not get attracted by magnets, are called non-magnetic materials.
- Magnetic compass is a simple device used for navigation.
- When a bar magnet is cut into half, each broken piece from a North Pole and a South Pole automatically.
- The two properties of a magnet are as follow:
 - Like poles of two magnets repel each other and unlike poles attract each other.
 - Poles of magnet always exist in pairs.
- At both ends on a magnet is its magnetic force maximum.
- Take the bar magnet and suspend it freely with help of a thread, the end that points towards North pole will be regarded as North end of the magnet.

F. Answer the following questions in detail :

- Take some iron filing and put it on a sheet of paper. Bring a bar magnet near to this sheet. What happens to the iron filing? Most of the iron filings stick to the ends of the bar magnet and very few are found in the middle. It shows that the magnetic force is maximum at its ends.
- When suspended freely, a magnet always aligns itself in the North–South direction. We can prove it with the help of an activity given below.

Take a bar magnet and suspend it on the camp stand, holding it with a thread or a string. Allow it to suspend freely until it points to one direction and stays stable. Observe for a minute and move the magnet. now, observe and check the alignment of the magnet. Does it points in the same direction as before? The bar magnet always rests in North–South direction.



- The magnetic compass has a needle which is made up of magnet. The needle can rotate freely and always point to the North–South direction.
- Bar magnets are stored in pairs, with unlike poles close to each other. Magnetic keepers are kept at their two ends. A wooden cork is also kept between two bar magnets. A horse-shoe magnet is stored by keeping a single magnetic keeper on its poles. Magnets should be kept away from

mobiles, television, music systems, cassettes, compact discs and computers.

5. An iron piece steel can be magnetised by stroking it several times with a magnet, as described below :
 - (i) Take a screwdriver and place it on the table.
 - (ii) Now, take a bar magnet and place one of its poles near one edge of the screwdriver.
 - (iii) without lifting the bar magnet, move it along the length of screwdriver till you reach the other end.
 - (iv) Now, lift the magnet and bring the same pole to the same point of the screwdriver from where you began.
 - (v) Move the magnet again and along the iron bar (screwdriver) in the same direction as you did before. Repeat this process about 30-40 times.
 - (vi) Remember that the pole of magnet and the directions of its movement should not change.
6. We can identify the magnets by bringing each iron bar close to the other two bars one by one. The two magnets will attract the iron bar but will repel or attract each other depending on their poles. If a bar repels one bar and attracts another, it indicates that the repelling bar is also a magnet and the one that only attracts and does not repel is the piece of iron bar.



Learning With Fun

A. Picture Talk:

	Poles of magnet-1		Poles of magnet-2		Interaction
a.	N	S	S	N	Repulsion
b.	N	S	N	S	Attraction

B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. wheel 2. Cubit 3. parallax
4. motion 5. relative 6. circular
7. oscillatory

C. State whether the following statements are True or False :

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

D. Match the following columns :

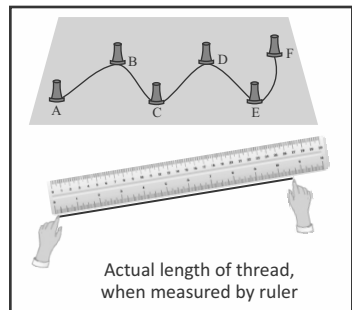
1. (d) 2. (e) 3. (a) 4. (b) 5. (f) 6. (c)

E. Answer the following questions in brief :

1. A unit of measurement accepted universality is called a standard unit.
2. The scale should be placed straight along the box. The observer's eye should be in vertical position to the reading and not inclined in any manner.
3. Correct length of the pen = $(12.8 - 2.7)$ cm = 10.1 cm
4. When an object does not change its position with respect to its surroundings, it is said to be at rest. When an object changes its position with respect to its surroundings, it is said to be in motion.
5. When a body moves along a curved path. It is said to exhibit curvilinear motion.
6. The to and fro movement of a body about a fixed position is called an oscillatory motion. For example, the movement of a pendulum, a swing, etc.
7. When a body moves about a fixed central point (or axis) without changing its position, is said to exhibit rotational motion. For example, the turning of a merry-go-round, the rotation of the Earth about its axis.
8. Motion which repeats itself after a fixed or regular interval of time is called periodic motion, For example motion of a fan, motion of a pendulum.
9. When a body move in straight live. It is said to be in rectilinear motion while when a body moves along a curved path, it is said to exhibit curvilinear motion.

F. Answer the following questions in detail :

1. Measuring length using, non-standard units was not convenient because each individual has a different handspan, footspan and arm length. For the sake of uniformity. Common standard units of measurements are necessary. This system is used all over the world for all scientific work.
2. The measurements taken by handspan and footspan are not accurate because each individual has a different handspan and footspan. We can prove it with the help of activity :
 - (i) Measure the length of your room using your handspan. Suppose it is 25 handspans.
 - (ii) Now, request to your father or elder to measure the length of your room with his handspan. Will it be 25 handspans again? No, it must be less than 25, because your father's/elder's hand is bigger than yours. The length of your room is 25 handspans according to your handspan but less than 25 according to your father's/elder's handspan.
Surely, handspan is not an accurate measurement.
3.
 - (i) The scale should be placed straight along the stone block.
 - (ii) The positions of the observer's eye is also very critical for the accuracy of observation. The observer's eye should be in vertical position to the reading and not inclined in any manner.
 - (iii) It might happen at times that the scale is slightly broken and the zero mark is missing. In such a case, use any other visible observation and subtract this observation from the end reading.
4. We can measure the length of a curved line using a thread by the following methods :
 - (i) Fix board pins on the sharp turnings of the curved line. In the figure given here, A, B,F, etc are the board pins fixed on the curved line.
 - (ii) Tie a knot on a thread at one end.
 - (iii) Now, put the knot on pin A.
 - (iv) Using fingers of both hands, move the thread along the curved line, from pin A such that it goes around board pins B, C, F, etc.
 - (v) Care should be taken that thread is neither too tight nor too loose, when move along the curved line.
 - (vi) When the thread reaches the extreme end of the curved line, cut it from that point.
 - (vii) Remove the thread from pin A and then place it straight along the length of a ruler.



So, the length of thread is equal to the length of the curved line.

5. Motion can be of following types :

Translatory Motion : When an object moves as a whole, that is, if all its part move the same distance in a given time, it is said to in translatory motion. e.g, a train moving on the track.

Rotational Motion : When a body moves about a fixed central point (or axis), without changing its position, is said to exhibit rotational motion. For example, the rotation of the Earth about its axis.

Circular Motion : When a body moves around a circular path in such a way that its position keeps changing with time it is said to exhibit a circular motion. For example, the motion of the Earth around the Sun.

Oscillatory Motion : The to and fro movement of a body about a fixed position is called an oscillatory motion. For example, a swing.

Vibratory Motion : When oscillation take place at a rapid rate, it is called vibratory motion. The strings of an instrument, movement of our vocal cords is example of vibratory motion..

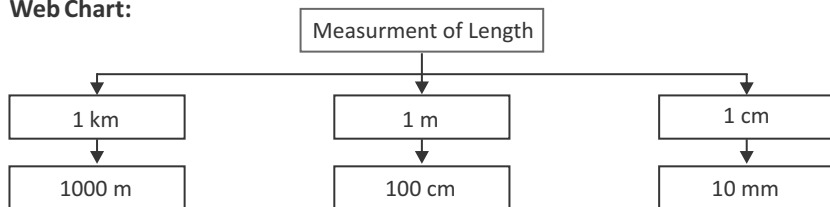
Periodic Motion : Motion which repeats itself after a fixed or regular interval of time is called periodic motion, for example, motion of fan.

Non-periodic Motion : When the motion of a body does not repeat after the same interval of time, its is said to be non-periodic motion. For example, motion of a moving car.

Random Motion : When the motion of the object does not follow a fixed path and keeps changing its direction, then the motion is said to be random motion. For example, the motion of a flying bee.



A. Web Chart:



B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. properties 2. lustrous 3. denser
4. magnet 5. texture 6. translucent
7. Gases

C. State whether the following statements are True or False :

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

D. Match the following columns :

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

E. Answer the following questions in brief :

- Materials have lustre because some of the light falling on their surface gets reflected.
- Solid has fixed shape and volume.
- The liquids which mix with each other are called miscible liquids.
- Water is called a universal solvent.
- Density is defined as the mass per unit volume of a substance.
- Solids** : The molecules are tightly packed usually in a regular pattern. They can not move, they vibrate about their fixed positions.

Liquids : The molecules are less tightly packed with no regular arrangement and move or slide past each other.

Gases : The molecules are loosely packed. The molecules in a gas are far from each other with, no regular arrangement.

- Glass, windows, slides, mirror, bowls.
- Gases like carbon dioxide and oxygen are soluble in water. Plants and animals living in water use these gases for their survival.

F. Answer the following questions in detail :

- Grouping of things on the basis of any of their common properties is called Classification.

There are following advantages of classification :

- (i) It makes the study of a large number of different types of objects easy, simple, systematic and convenient.
- (ii) It gives a general idea about all the items in the group.
- (iii) Classification makes it easy to judge difference between two groups.

2. Differences between solids, liquids and gases are given below :

S. N.	Solids	Liquids	Gases
(i)	They have fixed shape.	They have no fixed shape.	They have no fixed shape.
(ii)	They have definite volume.	They have definite volume.	They have definite volume.
(iii)	The molecules in solids are very tightly packed.	The molecules in liquid are less tightly packed.	The molecules in loosely packed.
(iv)	Example : Ice, utensils, tools, etc.	Example : Water, oil, petrol, etc.	Example : oxygen, nitrogen, smoke, etc.

3. Materials can be classified as transparent, translucent or opaque based on the amount of light that allowed to pass through them.

- (i) The materials through which one can see clearly are transparent substances. they allow most of the light falling on them to pass through. Examples : glass and water.
- (ii) Materials through which one cannot see clearly are translucent They allow some of the light falling on them to pass through. Examples : tissue paper, fog.
- (iii) The materials through which one cannot see at all are opaque. Objects made of such materials do not allow light to pass through. Example : cardboard and wood.

4. The property of materials to allow heat and electricity to pass through it is called conductivity. Conductor can be group into two categories :

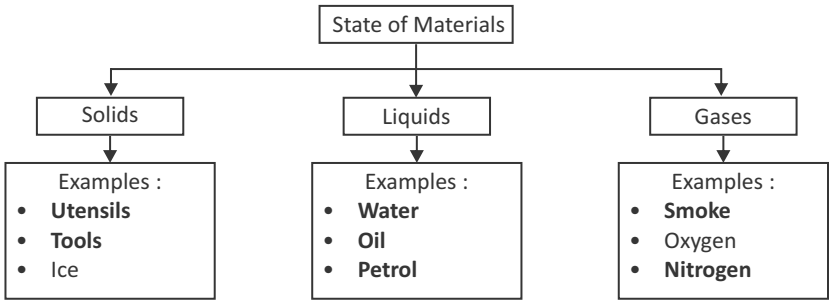
Conductor of heat : Materials that allow heat to pass through them are called conductors of heat. For example: silver, iron

Conductor of electricity : Materials that allow electricity of pass through them are called conductors of electricity, for example, water, copper wire, etc.

5. Materials may float or sink depending on their density. Density is the mass per unit volume of a substance. Materials such as wood, cork and ice float on water because they are less dense than water. Materials such as stone, iron and aluminium sink in water because they are denser than water.



A. Web Chart:



B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.



CHAPTER 7 Temperature and its Measurement



EXERCISE

A. Tick (✓) the correct option :

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

B. Fill in the blanks :

1. °C
2. Sir Thomas Allbutt
3. Temperature
4. 37 °C
5. -10 °C to 110 °C
6. 212 °F
7. fever

C. State whether the following statements are True or False :

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

D. Match the following columns :

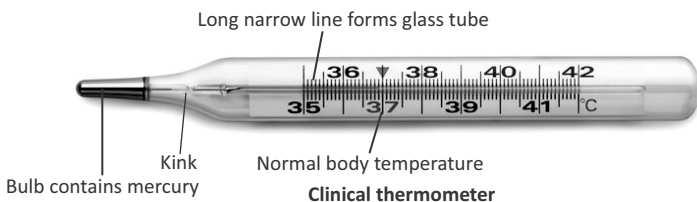
1. (f) 2. (a) 3. (e) 4. (b) 5. (c) 6. (g)
7. (d)

E. Answer the following questions in brief :

1. The degree of hotness or coldness of an object is called its temperature.
2. $\frac{C}{5} = \frac{F - 32}{9}$
3. The kink prevents immediate backflow of mercury from the tube to bulb.
4. A laboratory thermometer can not be used to measure body temperature of a human because it does not have a kink.
5. Difference = $100^{\circ}\text{C} - 0^{\circ}\text{C} = 100^{\circ}\text{C}$
Total no. of divisions = 50
Each division on the thermometer represents = $\frac{100^{\circ}\text{C}}{50} = 2^{\circ}\text{C}$
6. She is most likely referring to the Fahrenheit scale. A temperature of 101°F is a common fever range while 101°C would be dangerously high.

F. Answer the following questions in detail :

1.



Clinical thermometer has a long, narrow, uniform glass tube with a bulb at one end containing mercury. There is a small shining thread of mercury outside the bulb. A kink or bend is present just above the mercury bulb. The kink prevents immediate back flow of mercury from the tube to bulb. Thus, it allows us to read the temperature conveniently.

2. Yes, we can tell the temperature of an object by touching it. We can prove it with the help of following activity :
- (i) take three mugs containing ice-cold water, hot water and normal water.
- (ii) Put your right hand in cold water and left hand in hot water for about 2-3 minutes.
- (iii) Now put both your hands in the mug containing normal water.

We will observe that left hand feels cold whereas the right hand feels warm so, it is really difficult to make out whether the water is actually hot or cold.

We conclude that touch is not a very reliable way of measuring the hotness

or coldness of a object.

3. (a)

S. N.	Clinical thermometer	Laboratory thermometer
1.	It is used for measuring the temperature of the human body.	It is used for measuring temperatue of all materials.
2.	It has a range from 35 °C to 42 °C	It has a range from -10 °C to 110 °C
3.	In it a kink is present just above the mercury bulb.	In kink may or may not be present in it.

(b)

S. N.	Celsius Scale	Fahrenheit Scale
1.	It was developed by Anders Celsius.	It was developed by Gabriel Fahrenheit.
2.	The unit of temperature on this scale is indicated by degree Celsius.	The unit of temperature on this scale is indicated by degree fahrenheit.
3.	The lower fixed point is 0 °C.	The lower fixed point is 32 °F.
4.	The Upper fixed point is 100 °C.	The lower fixed point is 212 °F.
5.	It has 100 equal parts.	It has 180 equal parts.

4. (a) As we know, $^{\circ}\text{F} = \frac{9}{5}^{\circ}\text{C} + 32$
 $= \frac{9}{5} \times 15 + 32$

$$= 27 + 32 = 59$$

Hence, the temperature is 59 °F.

(b) As we know, $^{\circ}\text{F} = \frac{9}{5}^{\circ}\text{C} + 32$
 $= \frac{9}{5} \times 35 + 32$

$$= 63 + 32 = 95$$

Hence, the temperature is 95 °F.

(c) As we know, $^{\circ}\text{F} = \frac{9}{5}^{\circ}\text{C} + 32$
 $= \frac{9}{5} \times 50 + 32$

$$= 90 + 32 = 122$$

Hence, the temperature is 122 °F.

5. (a) As we know, $^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$
 $= \frac{5}{9} \times (95 - 32)$
 $= \frac{5}{9} \times 63 = 35$

Hence, $95^{\circ}\text{F} = 35^{\circ}\text{C}$

(b) As we know, $^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$
 $= \frac{5}{9} \times (104 - 32)$
 $= \frac{5}{9} \times 72 = 40$

Hence, $104^{\circ}\text{F} = 40^{\circ}\text{C}$

(c) As we know, $^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32)$
 $= \frac{5}{9} \times (113 - 32)$
 $= \frac{5}{9} \times 81 = 45$

Hence, $113^{\circ}\text{F} = 45^{\circ}\text{C}$



Learning With Fun

A. Picture talk

Ans : Student 4

B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.

**EXERCISE****A. Tick (✓) the correct option :**

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

B. Fill in the blanks :

1. three 2. fixed, definite 3. 0°C
4. evaporation 5. rainy 6. condensation
7. water cycle

C. State whether the following statements are True or False :

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

D. Match the following columns :

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

E. Answer the following questions in brief :

1. Water can be changed from one state to the other by heating or cooling.
2. Wet clothes placed on a clothes line get dry after some time because of evaporation.
3. Water gets evaporated despite being under the tree during the daytime because the air surrounding the tree also gets heated up from the presence of sunlight. So water gets evaporated from the heated air.
4. The water found on the surface of the Earth, like water in the river or lakes, is known as surface water. The water that is trapped under the Earth's surface is the ground water.
5. Plants also contribute to water cycle by adding a large amount of water vapour through transpiration.
6. The evaporated water is carried away by warm air. As the warm air moves higher from the surface of the Earth, it starts to cool down. This water vapour condenses on dust particles present in the atmosphere to form tiny water droplets which float in air to form clouds.
7. Some amount of rain water is absorbed by the soil and settles down as ground water. Most of the rainwater flows down the hills and mountains to collect into rivers, lakes or streams.
8. Reason for conservation of water :

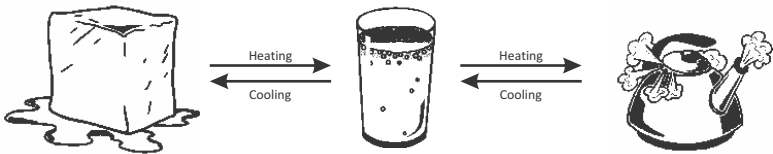
- (i) The growth of population has resulted in water scarcity.
- (ii) Our water resources like the underground water, rivers, lakes, etc. are polluted.

F. Answer the following questions in detail :

1. All three forms of water are interchangeable *i.e.*, it can be converted from one form to another form and then brought back to the original form by changing the temperature.

Ice starts melting at 0 °C. This is called the melting point of ice. However, if water is cooled, it changes to ice at the same temperature, *i.e.*, at 0 °C. Therefore, the freezing point of water is also 0 °C.

Water starts boiling at 100 °C. This is known as the boiling point of water. At this temperature, water changes rapidly to steam. When steam is cooled, water is formed. This is known as the process of condensation.



Interconversion of states of water

2. The dew is the water vapour that forms as a result of condensation. When condensation happens small water droplets form, which are called dew. It is the result of water changing from vapour to liquid.
3. About 3/4 of the Earth's surface is covered with water. But about 97% of this water is in the form of saline water in oceans and seas. We cannot drink saline water. Only 3% of the water present on the Earth is fresh water, out of which 2% of fresh water is locked up in the glaciers and ice caps. So, only 1% of the fresh water is found as lakes, rivers, ponds, streams and groundwater.
4. The cyclic movement of water from the Earth to the atmosphere and back to the Earth through various processes is called as water cycle. Different steps of water cycle include :

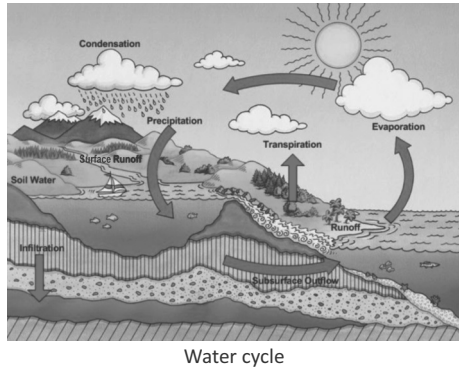
Evaporation : The water present on the surface of oceans, seas, rivers, lakes and ponds gets evaporated by the sun's heat.

Transpiration : Plants also contribute to water cycle by adding a large amount of water vapour through transpiration.

Condensation : The evaporated water is carried away by warm air. As the warm air moves higher from the surface of the Earth, it starts to cool down. This water vapour condenses on dust particles present in the atmosphere to form tiny water droplets which float in air to form clouds or fog.

Precipitation : All these droplets collect to form bigger drops of water. Bigger water drops come down as rain by the process of precipitation.

Surface run-off : Some amount of rain water is absorbed by the soil and settles down as ground water. Most of the rainwater



blows down the hills and mountains to collect into rivers, lakes or streams.

- Solid state of water (ice)** : Molecules in the ice are packed tightly. So, it can not be compressed. It retains its shape irrespective of the container in which it is placed. Ice does not flow or spread.

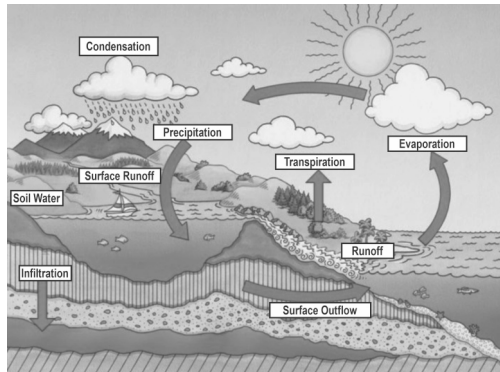
Liquid state of water (Water) : Water flows and changes its shape. It takes the shape of the container in which it is placed, but its volume remains fixed. Water also has the property to spread.

Gaseous state of water (Water Vapour) : It is a gas. Molecules in this state of water are not packed tightly. They move freely in the entire available space. Gases do not possess a fixed shape. They can be compressed. They flow in all the directions.



Learning With Fun

A. Picture talk



B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.

- (iv) Keep on adding the spoon of salt till some salt remains at the bottom of the glass even after stirring it for a minute.

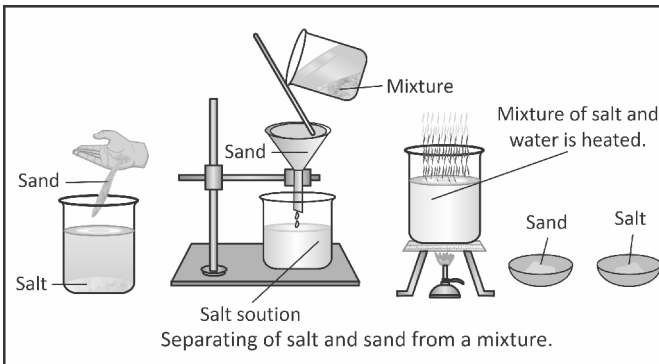
No more salt can be dissolved in water. Such a solution is a saturated solution.

9. (a) No (b) Yes (c) No (d) Yes

F. Answer the following questions in detail :

1. (a) **Sugar from flour** : Sugar can be separated from wheat flour by sieving. Due to the difference in the size of particles, sugar will stay on a sieve and fine particles of wheat flour will pass through it.
- (b) **Wheat, husk and sugar** : Husk is lighter than both wheat and sugar. Thus, husk can be separated from wheat and sugar using winnowing. The, wheat and sugar have different sized particles. Sieving method allows the smaller particles to pass through holes off the sieve while the bigger particles stay on the sieve.
- (c) **Camphor, sand and iron filings** : We can separate iron filings from the mixture, by the method of magnetic separation. Now, heat the mixture of camphor and sand, camphor is separated by converting it to gaseous form and sand remains behind.
- (d) **Salt and iron filings** : Salt and iron filings can be separated by the magnetic separation.
- (e) **Water and salt** : Water and salt can be separated by the method of water and salt.
- (f) **Chalk powder from water** : The mixture of chalk powder and water can be separated by the method of sedimentation and decantation.
2. Threshing is a method used to separate grains from their stalks in the farms. Usually a stalk of wheat or rice has many grains attached to it and it is impossible to separate each grain by hand. These stalks are dried and then beaten against a hard surface. The impact breaks the grains from the stalk and husk. Threshing is also done with the help of cattle or with a mechanical thresher.

3.



4. Sedimentation is the process of settling down of heavier, insoluble particles from a mixture. While the process of pouring out the clean supernatant liquid into another vessel without disturbing the sediment is called decantation.

5. A mixture of two immiscible liquids can be separated by decantation. They can also be separated by using a separating funnel.

The mixture of immiscible liquids is poured into a separating funnel fixed on a stand. The mixture is left undisturbed for some time. The heavier liquid settles at the bottom. The stopcock is opened and the liquid at the lower layer is collected. As soon as that liquid is collected, the stopcock is closed. The next liquid is collected into other vessel.

6. When a solvent and solute once completely, mixed, they form a solution. For example: salt in water, copper sulphate in water, etc.

To obtain a saturated solution, we will follow these steps :

(i) Take about half glass of water.

(ii) Add a small spoon of salt to it and stir with a spoon. The salt is dissolved completely in it and is not visible after a minute.

(iii) Add another spoonful of salt and stir.

(iv) Keep on adding the spoon of salt till some salt remains at the bottom of the glass even after stirring it for a minute.

No more salt can be dissolved in water. Such a solution is a saturated solution.

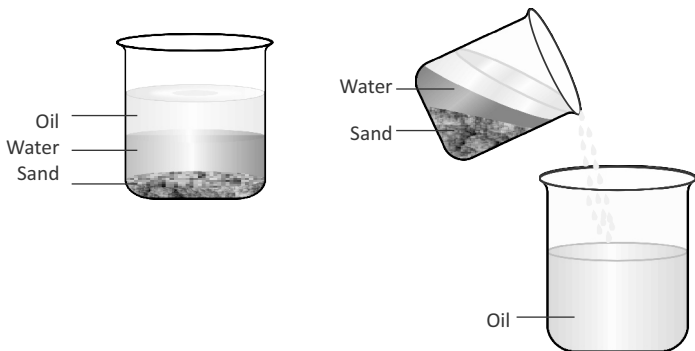
7. A mixture of iron nails, salt and water can be separated by the following Steps :

(i) Hand pick the iron nails or separate the iron nails by magnet :

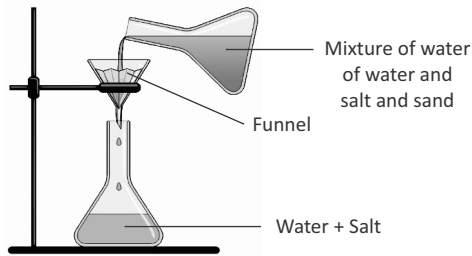
(ii) Now, evaporate the salt and water, thus water will be vaporised and salt is left behind.

8. We can separate salt, sand, oil and water with the following methods :

(i) Oil floats on water, so it can be decanted easily.

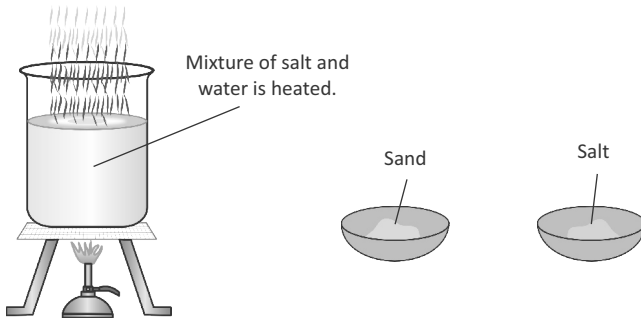


- (ii) Now, filter the mixture, sand will be separated from the water and only salt solution will be left.



Solid particles are separated by filter paper.

- (iii) The salt solution can be separated by evaporation.



Learning With Fun

A. Picture talk

B. Research and Project :

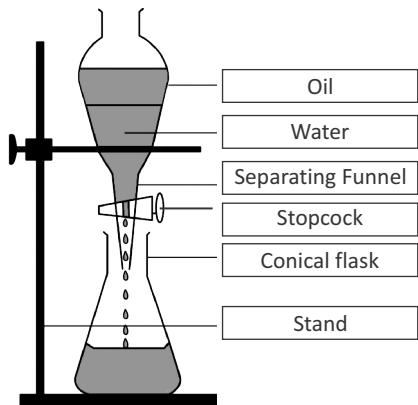
Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.



Separation of immiscible liquids by using separating funnel

span. All animals have a fixed life span. There are different stages that form life cycle of animals :

Take birth → grow → reproduce → grow old → die

F. Answer the following questions in detail :

- Living things show unique and special characteristics such as:
 - Cellular Organisation** : All the living things are made up of cells. They can be unicellular (e.g., amoeba) or multicellular (e.g., human being).
 - Growth** : An animal or a plant grows, it get bigger and heavier.
 - Nutrition** : All living things need food to get energy to carry out various life processes.
 - Respiration** : All the living things respire.
 - Movement** : All the animals and human beings show locomotion. There are some animals which do not show locomotion, e.g., Hydra, it remains attached to the weed in pond water. Opening of flower is one of the examples of movement in plants.
 - Excretion** : Many animals and human beings excrete waste in the form of urine and sweat. Plants excrete unwanted gases through stomata. Some plants remove these waste products as secretion.
 - Response to stimuli** : All the living things respond to stimuli. When you accidentally touch a hot object, you immediately withdraw your hand.
 - Reproduction** : All animals and plants reproduce. Human beings and animals such as dog, lion, etc., give birth to young ones like themselves and birds, insects, etc., reproduce by laying eggs.
- A change that produces a response in an organism is called a stimulus while the immediate reaction to adjust oneself according to the change is called response. For example, when you accidentally touch a hot object, you immediately withdraw your hand. The hot object is a stimulus and the withdrawal of your hand is the response to the stimulus.
- Many animals and human beings excrete waste in the form of urine and sweat. Carbon dioxide released during respiration is exhaled through the nose. Plants excrete unwanted gases through the stomata. Some harmful substances produced in plants cannot be excreted through the stomata. Some plants remove these waste products as secretions. Some of those secretion are very useful to us. For example : gum, latex and resin.
- A female frog lays several eggs at a time. A frog's egg is not covered by a shell. A jelly-like fluid keeps all these eggs together and protect them. The male deposits sperms over the eggs. The eggs and sperms meet and fuse in the water. The development of eggs into a frog occurs in three different stages :

Egg → Tadpole (larva) → Adult

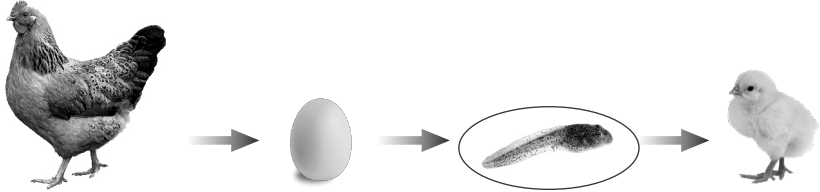
The Tadpole of a frog looks very different from the frog. It grows and develops gradually and then takes the shape and size of an adult frog.

(b) A mosquito begins its life as an egg, the egg develops into a larva, the larva grows into pupa and the pupa transforms into an adult mosquito.



Learning With Fun

A. Picture Talk.



The third stage is wrong because it shows the sperm, which is not a stage of life cycle of a hen.

B. Research and Project :

Do yourself

C. Activity :

Do yourself

D. Group Discussion :

Do yourself

CHAPTER 11

Nature's Treasures



EXERCISE

A. Tick (✓) the correct option :

1. (b) 2. (b) 3. (d) 4. (a) 5. (d) 6. (b)
7. (b) 8. (a)

B. Fill in the blanks :

1. mixture 2. 78 3. Rocks
4. granite, sandstone 5. sea, ocean 6. harvesting
7. CNG 8. Coal, petroleum

C. State whether the following statements are True or False :

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

D. Match the following columns :

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

E. Answer the following questions in brief :

1. Air consists mainly of nitrogen (78%) and Oxygen (21%), other gases (1 %) present include carbon dioxide (0.03%), argon, neon, helium etc. Water vapour and dust particles are also present.
2. Clouds are formed when the water vapour in the air condenses into water droplets.
3. The practice of planting seedling or small trees on a large scale, is called afforestation.
4. The chipko movement took place in April 1973 in the village of Mandal of the Himalayas in Uttarakhand. The woman of the area, under the leadership of an activist, Sunderlal Bahuguna went into the forest and formed a circle around the trees, preventing men from cutting them down. The success of the chipko movement in the hills saved thousands of trees from being cut.
5. Soil is formed by the disintegration of rocks by actions of the Sun, water and living organisms over a long time. Rocks break into smaller and smaller particles to form soil.
6. All these resources are non-renewable resources.
7. Petroleum is a non-renewable resource because it takes millions of years to form and cannot be quickly replenished.
8. Fossils are the remains of plants and animals that got buried under the surface of the Earth, millions of years ago, due to some natural disasters such as earthquakes or volcanic eruptions. These buried remains were transformed into fossil fuels such as petroleum due to the action of heat, pressure and bacteria in the absence of air.
9. Renewable resources : The resources which are available in unlimited quantity in nature are called renewable resources. For example, sunlight, air and water.
Non-renewable resources : The resources which are available in limited quantity in nature and will get exhausted in future due to continuous use are called non-renewable resources. For example : coal, minerals, forests, etc.
10. CNG is useful in the following ways :
 - (i) It is used as an industrial and domestic fuel. It burns readily to produce a lot of heat.

- (ii) It is a cleaner and less polluting fuel. Hence it is used as a fuel to run vehicles as compressed natural gas (CNG).
- (iii) It is used as a source of hydrogen, used in fertiliser industry.
- (iv) It is used to generate power.

F. Answer the following questions in detail :

1. Air helps us in a number of ways. Some of them are given below :
 - (i) Clouds move with the air. This way the air helps bring rain to different places.
 - (ii) Air helps in the dispersal of seeds and pollen grains.
 - (iii) The air help in the winnowing of food grains.
 - (iv) Air guides the movement of parachutes, glider, aeroplane.
 - (v) Air is used to run windmills. Windmill is a machine that turns in the wind and generates power to do mechanical work and to generate electricity.
2. Air pollution refers to the contamination of the air by harmful substances. These can include gases, dust, smokes and other particles that can harm human health, the environment and even damage property.
3. If rainwater is used judiciously, the problem of water shortage can be solved to some extent. Collection of rainwater from surfaces on which rainfalls and storing it for future use is called rainwater harvesting.
4. Plants get energy from the Sun and produces food. Animals eat plants and grow. We get food from both plants and animals. This cycle on Earth is possible due to the Sun. So, we all are dependent on the Sun.
5. Fossils are the remains of plants and animals that got buried under the surface of Earth, millions of years ago. These buried remains were transformed into coal due to the action of heat, pressure and bacteria in the absence of air.
6. The wise and judicious use of fossil fuel is called conservation of fossil fuels. It is essential to :
 - maintain their availability for a longer period of time,
 - reduce air pollution and
 - reduce the risk of global warming.



A. Picture Talk.



water



rock



wind



forest

B. Research and Project :

Do yourself.

C. Activity :

Do yourself.

D. Group Discussion :

Do yourself.

CHAPTER 12 Beyond Earth



EXERCISE

A. Tick (✓) the correct option :

- 1. (b) 2. (d) 3. (a) 4. (a) 5. (a) 6. (b)
- 7. (a) 8. (b)

B. Fill in the blanks :

- 1. Neptune 2. Moon 3. Sun
- 4. distance 5. asteroids 6. dipper
- 7. Dhruv Tara

C. State whether the following statements are True or False :

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

D. Match the following columns :

- 1. (d) 2. (a) 3. (f) 4. (g) 5. (c) 6. (b)
- 7. (h) 8. (e)

E. Answer the following questions in brief :

- (a) **Constellation** : Recognisable pattern of stars in the sky is called a constellation.
(b) **Asteroid** : Small pieces of rock orbiting the sun formed from the broken fragments of planets are called asteroids.
(c) **Phases of Moon** : We see different shapes of the moon in the sky on different nights. These shapes are after referred to as the phases of the Moon.
- Our Earth supports life on it. It allows suitable climatic conditions for existence and continuation of life on it. It also has oxygen. The axis of the Earth on which it rotates is tilted. This is responsible for season changes in the climate.
- Pluto is no longer considered a planet because, it does not meet the IAU definition of a planet.
- Venus is called the Morning star or Evening star because it shines brightly in the sky either just before sunrise or just after sunset.
- When a meteoroid enter the atmosphere of Earth, it is known as meteor. And in the course of travelling, if the meteor does not burn up completely and strikes the surface of the Earth, Then it is regarded as meteorite.
- A celestial body made up of rocky material, that appears as a ball of fire with a long tail, is called a comet.
- Ursa Major, Ursa Minor and Orion.

F. Answer the following questions in detail :

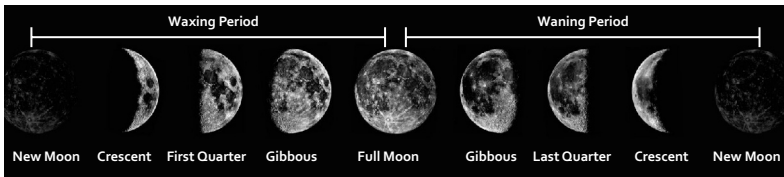
- The planets– Mercury, Venus, Earth and Mars are regarded as the inner planets as they are closer to the Sun, while the planets– Jupiter, Saturn, Uranus and Neptune are called the outer planets as they are far from the Sun. Inner planets are known as terrestrial planets. Outer planets are known as the gas giant planets as they made up of mostly gases.

2.

S.N.	Stars	Planets
1.	Stars are heavenly bodies that are glowing balls of gases.	Planets are heavenly bodies that orbit a star.
2.	Stars have their own light.	Planets do not have their own light.
3.	Stars are huge in size compared to planet.	Planets are smaller in size compared to stars.
3.	Stars twinkle.	Planets do not twinkle.

- When we see no moon in the sky, the phases is called New-Moon. The next day, the Moon changes its position slightly due to the relative motion

between the Earth and the Moon, and thus it is visible as the crescent. Each day, the amount of light falling on the surface of the Moon, increases and accordingly it forms the First quarter, Half Moon, Gibbous Moon and then the Full Moon, in which the entire circle of the Moon is visible. After this, the lit part again decreases and the reverse cycle goes on till the New–Moon.



Phases of the Moon

4. (a) **Orion** : It is also known as the Hunter. It resembles a hunter with a bow. Its Indian name is *Vyadha* or *Mriga*. Orion helps to locate other important stars. Betelgeuse and Rigel are the prominent stars of the Orion constellation. The three stars at the waist of the hunter helps in finding the direction of Sirius.
- (b) **Cassiopeia** : It is a constellation visible from the northern hemisphere. It is easily recognisable due to its MOW-shaped structure which is formed by five of its bright stars. Its Indian name is *Sarmishtha*.
- (c) **Ursa Major** : It is visible through out the year in most of the northern hemisphere. it can be easily recognised having seven bright stars known as big dipper. Its Indian name is *Saptarshi*. It is also known as great bear. The two front stars of the big dipper are called pointers. They point at the polestar.
5. A group of stars that makes a recognisable pattern in the sky is called a constellation.

The four constellations and their Indian names are as follows :

S.N.	Constellation	Indian Name
1.	Ursa Major	<i>Saptarshi</i>
2.	Ursa Minor	<i>Laghu-Saptarshi</i>
3.	Orion	<i>Vyada or Mriga</i>
4.	Cassiopeia	<i>Sarmishtha</i>

6. **Meteoroids** : A meteoroid is a solid object (Chunks of metal of rock) moving in interplanetary space. It's size is considerable smaller than an asteroid. Meteoroids travel around the sun with various speeds.

Meteors : When a meteoroid enter the atmosphere of Earth, it is known as meteor. It occurs at an altitude of 75 km to 100 km form the surface of the Earth.

Meteorites : If the meteor does not burn up completely and strikes the surface of the Earth, Then it is regarded as meteorites. It may impacts the Earth by causing a depression on its surface.



Learning With Fun

A. Picture Talk.

1. Ursa minor
2. Little bear
3. The star at the end of the little dipper's tail is the pole star.

B. Research and Project :

Do yourself.

C. Activity :

	Mercury	Venus	Mars
Its position from the Sun	First Planet	Second Planet	Forth Planet
Brightness	It can be quite bright, but much harder to spot du to its proximity to the sun.	As its brightest, it can cast shadow.	Its brightness varies significantly depending or its position in its orbit.
Time taken (in Earth days) to orbit the Sun	88 days	224 days	687 days
Atmosphere	It has very little atmosphere.	It has densest atmosphere, mainly consisting carbon dioxide.	Thin atmophere of carbon dioxide; thich clouds of gases and acid; red appearance
What are the conditions on the planet like?	Very hot and dry	Extremely hot	Much colder than Earth.

D. Group Discussion :

Do yourself.