CHAPTER

2

Diversity in the Living World

NCERT TEXT-BOOK QUESTIONS

Answer 1:

Wheat Seeds	Kidney Bean Seeds
Single cotyledon- monocot seed	Two cotyledons- dicot seed
Fibrous root	Tap root
Parallel venation	Reticulate venation

Answer 2:

- A (Aquatic): Whale, Dolphin,
- B(Terrestrial): Horse, Sheep, Squirrel, Earthworm, Pigeon, Tortoise
- C (Both- Amphibian): Frog, Crocodile

Answer 3:

Radish is a taproot as it has a thick main root. It's leaves show reticulate venation.

Answer 4:

Similarities: They both are herbivorous and live in herds.

Differences:

Mountain Goat	Plain area Goat
They are characterized by their thick, white fur, short legs, and specialized hooves that provide excellent traction on rocky surfaces. They also have long, curved horns.	They can vary widely in colour and size, depending on the breed. They have shorter hair and more varied body shapes, with horns that can be straight or curved.
Native to rugged, mountainous areas, particularly in North America.	Typically found in lowland areas, grasslands, and farms
They are well-adapted to steep, rocky terrains.	They are domesticated goats that thrive in more accessible environments.

Answer 5:

These animals can be grouped on the basis of their habitat.

- **Land animals:** Cow, cockroach, pigeon, bat, tortoise, grasshopper, lizard
- **Aquatic animals:** Whale, fish

Answer 6:

Cutting down trees is called deforestation. Its major impact on our surroundings are:

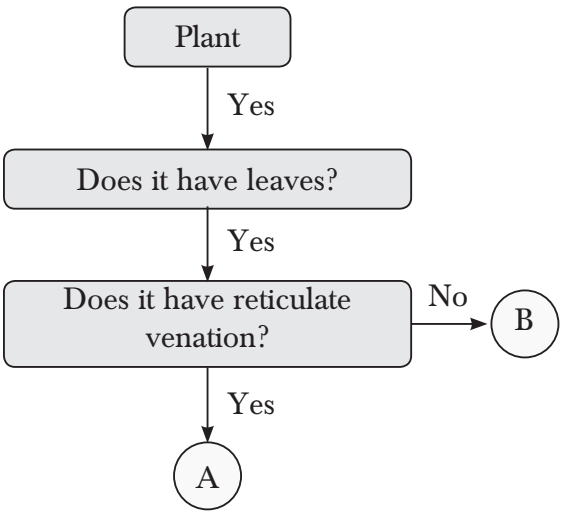
- **Loss of Biodiversity:** Deforestation destroys habitats, leading to the extinction of many species and reduced genetic diversity
- **Climate Change:** Trees absorb carbon dioxide; their removal increases greenhouse gases, contributing to global warming.
- **Soil Erosion:** Without trees, soil is prone to erosion, resulting in loss of fertile land and sediment build up in waterways.
- **Altered Water Cycles:** Deforestation disrupts rainfall patterns and groundwater levels, causing floods and droughts.
- **Poor Air Quality:** Trees filter pollutants and produce oxygen; their removal worsens air quality and increases health risks.
- **Displacement of Indigenous Communities:** Many indigenous people rely on forests for their livelihoods, and deforestation can remove them from their homes and territories.
- **Increased Human-Wildlife Conflicts:** Habitat loss forces wildlife into human areas, leading to conflicts and risks of disease spread.

- **Climate Regulation Disruption:** Forests help regulate local climates; deforestation can cause temperature rises and altered humidity levels.

We can address these challenges in the following ways:

- **Reforestation and Afforestation:** Plant trees in deforested and non-forested areas to restore ecosystems.
- **Strengthen Policies:** Enforce laws that protect forests and regulate land use.
- **Support Conservation Programs:** Fund initiatives that protect endangered species and their habitats.
- **Community Engagement:** Involve local communities in forest management and conservation.
- **Education and Awareness:** Raise awareness about the importance of forests and the impact of deforestation.

Answer 7:



A: Mango, Hibiscus, Rose, Tulsi, etc.

B: Banana, Wheat, Lemongrass, etc.

Answer 8:

a. Why is it a shrub?

b. How is it different from coriander plant?

c. What kind of root system does it has?

d. Which type of leaf venation does it show?

Answer 9:

Examples of group A: Kidney beans and Gram seeds.

Examples of group B: Wheat and maize seeds.

a. Group A plants show reticulate type leaf venation.

b. Group B plants show parallel type leaf venation.

Answer 10:

Ducks have webbed feet, which means the toes are connected by flaps of skin. This adaptation helps them swim efficiently in water.

Pigeons have non-webbed feet with three forward-facing toes and one backward-facing toe, suited for perching and walking on various surfaces.

PRACTICE FOCUS

A.**Choose the most appropriate answer**.

1. c. Both a and b

Explanation : A hibiscus is classified as a shrub and a banana plant is considered as large herb due to its non – woody stem structure, even though it can grow tall.

And hibiscus shows reticulate venation as it is dicotyledon plant, while banana plant shows parallel ventation as it is a monocotyledon.

2. d. Explanation : Rest all are pulses and maize is a cereal grain.

3. a. Short legs

Explanation : Hot desert camels have long legs to keep their bodies far away from the hot ground.

4. b. Cactus plant

Explanation : In order to prevent loss in arid regions, the stem has been modified into fleshy, succulent and flat green structure .

5. c. Flowers

Explanation : The ovary of a flower develops into a fruit and ovules within the ovary develop into seeds.

B. Fill in the blanks using suitable words.

1. biodiversity

2. feet

3. contraction, relaxation

4. arboreal

5. habitat

6. tap root

7. water, oxygen , optimal temperature

C. Identify the habitat of the given organisms and complete the table.

1. Rhododendron :

Habitat : alpine regions, coniferous forests and tropical jungles.

Adaptive Features : thermonastic leaf movement that help to adapt to freezing and thawing., reducing or losing water to avoid freezing stress.

2. Ducks :

Habitat: Freshwater and seawater

Adaptive Features: webbed feet, streamlined body shape, an oily coating on their feathers to stay waterproof

3. Earthworm:

Habitat : moist, compost rich soil

Adaptive Features : streamlined body shape, bristles and mucus secretion

D. Answer in one word (VSA).

1. Climbers
2. Tap root system
3. Parallel venation
4. Slithering
5. Amphibians
6. Cheetah Reintroduction Project, 2022
7. Sacred groves

E. ASSERTION AND REASON.

1. d. A is false, but R is true.

Explanation : Camels store fat in their humps , which they use for energy when food is scarce.

2. a. Both A and R are true, and R is the correct explanation of A.

Explanation : Hollow bones help birds fly by increasing their oxygen intake and providing structural strength.

HOTS

1. A tap root goes deep into the soil because it grows vertically downwards as a single, dominant root, while a fibrous root system consists of numerous smaller roots that spread horizontally near the soil surface, preventing deep penetration; essentially, the tap root's structure allows it to reach deeper water sources while the fibrous roots focus on maximizing surface contact for water absorption in shallow soil layers.

2. Human beings are not physically designed to fly. We cannot create enough lift to overcome the force of gravity because of our weight. It's not only wings that allow birds to fly. Their streamline body ,light body frame and hollow bones make them fly.

3. Desert plants typically do not have broad and thin leaves because such a large surface area would lead to excessive water loss through transpiration.

PICTURE BASED ASSESSMENT

1. Snake or earthworm differ in their mode of movement. Snakes slithers using undulating muscle contractions and earthworms moves through peristaltic relaxation and contractions by pushing against soil with their segmented body

2. Observe the given plants and complete the table

Plants		
Name	Pea plant	Wheat plant
Leaf Venation	Reticulate	Parallel
Type of Root	tap root	Fibrous root
Type of Seed	dicotyledons	monocotyledons
Type of Plant	herb	herb

VALUE AND LIFE SKILL BASED

Aman will stop them from doing this act. He will try to make them understand how these small plants are useful to us and our surroundings.

He should make the students understand about the importance of biodiversity , how plants help us, providing us things to live on this earth , support animals and our surroundings.

CASE STUDY BASED ASSESSMENT

1. Mangroves have "breathing roots," because they grow in saline, muddy environments where the soil has very little oxygen, so they need to access oxygen directly from the air through specialized roots that grow above ground to facilitate respiration in their underground tissues.
2. The most extensive areas of mangroves are found in Asia, followed by Africa and South America.
3. Their dense root systems protect shorelines from erosion and act as natural barriers against storms. Mangroves also trap carbon dioxide, helping mitigate climate change.

LEARN HOLISTICALLY

1. Sacred groves are forest areas that are protected by local communities and religious groups due to their spiritual significance. They are important for preserving biodiversity because they protect rare and endangered species of plants and animals. The vegetation cover of sacred groves improves soil stability and prevents soil erosion.

   Sacred groves are used for the conservation and sustainable use of natural resources by the local communities. Sacred groves absorb carbon dioxide from the atmosphere and help mitigate climate change's effects.
2. The forest protected or conserved in the name of God (on religious grounds) and considered to be sacred is known as sacred grove or Devrai.Sacred groves also help in soil conservation and prevent soil erosion, which is essential for maintaining the fertility of the land. Protecting these groves also helps maintain the natural balance of the ecosystem, which is crucial for the survival of various species of flora and fauna. The value of sacred groves is immense. It is also the repositories of rich medicinal plants, wild relatives of crops and many important species, which act as the valuable gene pool. They give much ecological and genetically significance and play an important role in wildlife conservation also.
3. Do it yourself
4. Do it yourself

PERFORMANCE METRICS
(COMPETENCY BASED)

1. b. Habitat destruction

   Explanation : Habitat destruction occurs when a natural environment can no longer support its native species. This can be caused by human activities like deforestation, pollution, and urbanization.
2. c. Project tiger

   Explanation : Project Tiger is a centrally sponsored scheme specifically designed to protect and conserve the Bengal tiger population in India.
3. a. Reduced sweating and concentrated urine

   Camels conserve water in hot desert environments by significantly reducing their sweating and producing highly concentrated urine.
4. b.

   Explanation: Rest of the plants are found in hilly regions.
5. c. Lateral movement of the body

   Explanation : Most fish swim by flexing their body muscles from side to side, creating a wave-like motion that pushes them forward, with the tail fin providing the primary thrust.

CHAPTER

3

Mindful Eating: A Path to a Healthy Body

NCERT TEXT-BOOK QUESTIONS

Answer 1:

i. Chana because other three are millets.

ii. Rice because other are rich sources of protein while rice is a source of starch (a type of carbohydrate)

Answer 2:

Traditional Culinary Practices	Modern Culinary Practices
Cooking – on chulhas	Cooking- gas stoves
Grinding- on sil-batta	Grinding- electrical grinder
Blending- manually	Blending- electrical blenders

Answer 3:

i. How can food act as medicine?

ii. Which type of food can act as medicine?

Answer 4: Yes, it is rightly said.

Examples of Delicious but Less Healthy Foods

Pizza - With its cheese, savoury toppings, and crispy crust, pizza is a comfort food for many. However, it's often high in calories, refined carbs, and saturated fats, especially when loaded with cheese and processed meats like pepperoni.

Ice Cream - This sweet treat is rich and creamy, and it comes in so many appealing flavours. Unfortunately, most ice creams are high in sugar, fat, and calories, which makes them a dessert best enjoyed in moderation.

Examples of Nutritious but Sometimes Less Enjoyable Foods Quinoa - High in protein, fibre, and essential amino acids, quinoa is a powerhouse of nutrition. But on its own, it has a mild, nutty flavour that some people find bland or even unappealing.

Sprouts - Packed with fibre, vitamins, and minerals, sprouts are fantastic for heart health and immunity. However, their strong, somewhat sulfurous taste when overcooked isn't everyone's favourite.

Answer 5:

He should add fruits, vegetables and other fibre rich food items in his meal. Roughage or fibre helps in digestion and prevent constipation.

Answer 6:

i. Night blindness - Vitamin A deficiency disease.

ii. Vitamin A - rich food items.

iii. Carrot, leafy vegetables, sweet potato, animal liver

Answer 7:

(iii) Fresh fruits they contain fibre, vitamins, and minerals in their natural, unaltered state.

While fresh fruit juice is still nutritious (especially if it's homemade and retains some pulp for fibre) but it lacks the complete benefits of whole fruit.

Canned juice, although convenient, is usually the least nutritious due to processing.

Answer 8:

i. Calcium keeps bones and teeth healthy.

ii. Vitamin D helps body absorb calcium for bone and teeth health.

iii. Why the doctor has not prescribed Vitamin D supplement in first visit?

Answer 9:

The reason sugar does not turn blue-black with iodine solution is that

iodine specifically reacts with complex carbohydrate not simple carbohydrates. Starch is a complex carbohydrate while sugars are simple carbohydrates.

Answer 10:

Activity: Materials Needed: Iodine solution, various food samples (potatoes, rice, bread, fruits, vegetables, and sugar), test tubes, and a dropper.

Steps:

Label the test tubes with the names of each food sample.

Place small pieces of each food item into separate test tubes.

Add a few drops of iodine solution to each sample.

Observe colour changes: a blue-black colour indicates the presence of starch, while no change indicates the absence of starch.

Observation: Record which foods contain starch (e.g., potatoes, rice) and which do not (e.g., fruits, sugar). This activity demonstrates that while starches are carbohydrates, other carbohydrates exist that are not starches, supporting Raman's statement.

Answer 11:

The iodine drops on the saree turned blue-black, indicating that the saree material contains starch. Fabrics made from natural fibers, like cotton or linen, are sometimes treated with starch to give them a smoother, crisper appearance.

The iodine drops on the socks did not change colour, suggesting that the socks either contain no starch or are made from synthetic fibers (like polyester or nylon) that don't typically contain starch.

Answer 12:

Millets are considered a healthy choice of food due to their impressive nutritional profile. Millets are high in fiber, protein and essential minerals like magnesium, phosphorus, iron, and zinc. They also contain B-vitamins, which are important for energy metabolism and brain health.

While millets are nutrient-dense, relying solely on them for all nutritional requirements is not sufficient. Including fruits, vegetables, proteins, and healthy fats along with millets ensures a well-rounded, nutritionally complete diet.

Answer 13:

Take a potato mash, add few drops of this solution over it. If its colour changes to blue-black, it is an iodine solution.

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. d. Chole bhature

Explanation : Chole bhature food belongs to Punjab state

2. d. Grains

Explanation : According to the listed options, "Grains" are generally not considered a rich source of minerals compared to fruits, vegetables, and nuts.

3. d. Oat

Explanation : Rice, sorghum, and bajra are all considered millets, which are typically grown in warmer climates, while oats are usually considered a temperate climate cereal grain.

4. c. Roughage

Explanation : To relieve constipation, you can add more fiber-rich foods to your diet.

5. d. Vitamin D

Explanation : Vitamins D, K, and C, as well as calcium, magnesium, and zinc, are all essential for strong bones.

B. Fill in the blanks using suitable words.

1. Carbohydrates
2. Millets
3. night blindness
4. Protein
5. iron
6. scurvy
7. food miles

C. Complete the following table.

Nutrient deficiency	Sources	Symptoms	Deficiency diseases
Vitamin A	carrot, sweet potatoes, milk, mangoes, papayas	Improper vision, unable to see clearly in night	Night blindness
Vitamin D	Exposure to sunlight, milk, butter, fish, eggs	bone pain, muscle weakness, and skeletal deformities	Rickets
Calcium	Milk/soya milk, curd, cheese, paneer	Weak bones, tooth decay, hand and feet spasms, fatigue	Bone and tooth decay, osteoporosis
Iron	Green leafy vegetables, beetroot, pomegranate	Weakness, shortness of breath	Anaemia
Iodine	Seaweed, water chestnut (singhada), iodised salt, fish and seafood	Swelling at the front of the neck due enlargement of thyroid gland, retarded mental and physical growth	Goitre

D. Answer in one word(VSA).

1. Iodine
2. Vitamin C
3. Roughage
4. Iodine solution
5. Rice
6. Mid-Day Meal in Schools
7. Junk food

E. ASSERTION AND REASON.

1. a. Both A and R are true, and R is the correct explanation of A.

Explanation : Protein is a macronutrient that is vital for child growth and development.

2. d. A is false, but R is true.

Explanation : Our bodies need very small amounts of vitamins and minerals, not large quantities. These nutrients are called micronutrients.

HOTS

1. People from different states often prefer different food items primarily due to variations in climate, geography, and readily available local ingredients, which shape their culinary traditions and influence what foods are most commonly grown and consumed in their region; essentially, people tend to eat what is easily accessible and culturally familiar to them in their area.

2. Nutritionists recommend adding millets to your diet because they are a highly nutritious whole grain packed with fiber, protein, vitamins, and minerals, making them beneficial for managing blood sugar levels, promoting digestive health, supporting weight management, and providing essential nutrients.

3. The most common cause of goitre is a lack of iodine in the diet.

Iodine deficiency is the most common cause of goiter. The body needs iodine to produce thyroid hormone. If you do not have enough iodine in your diet, the thyroid gets larger to try and capture all the iodine it can, so it can make the right amount of thyroid hormone. So, a goiter can be a sign the thyroid is not able to make enough thyroid hormone. The use of iodized salt in diet prevents a lack of iodine in the diet.

PICTURE BASED ASSESSMENT

1. First picture shows the food items which are rich in minerals and vitamins and also conatins good quantity of roughage.

Ans second picture shows the food items having high carbohydrate content having less minerals and vitamins and roughage.

2. Observe the given pictures and complete the table.

Name: Scurvy	Name: rickets
Symptoms: Loosening of teeth, Bleeding gums, slow healing of wounds	Symptoms: Soft and bent bones, ribs softening, protruding abdomen, joint pain and muscle pain
Can be cure: Citrus fruits, amla, guava, green chilli, orange, lemon	Can be cure: Exposure to sunlight, milk, butter, fish, eggs

VALUE AND LIFE SKILL BASED

Malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients.

The values that can be learnt are not wasting food and avoiding junk food.

CASE STUDY BASED ASSESSMENT

1. Anant's diet is lacking in carbohydrates, minerals, proteins and vitamins.

2. A diet rich in carbohydrates and proteins benefit athletes by improving their performance and endurance.

3. Water plays a crucial role in maintaining an athlete's energy and hydration by facilitating proper muscle function, regulating body temperature, transporting nutrients to cells, and removing waste products, allowing them to perform at their best without experiencing fatigue or cramps due to dehydration.

LEARN HOLISTICALLY

1. Millets are a type of whole grain that are high in fiber, vitamins, and minerals. They are a staple food in many parts of Asia and Africa. Millets are gluten free and can be used as a substitute for rice or other grains.

Millet is a good source of protein, fiber, key vitamins, and minerals. The potential health benefits of millet include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut.

2. Millets encompass a diverse group of small-grained, dryland cereals including foxtail, barnyard and fonio, among others. As whole grains, millets are a good source of essential nutrients.Millets are primarily grown in Asia and Africa, with India being the top producer followed by Nigeria, Niger and China. They were among the first plants to be domesticated and still serve as a traditional staple crop in parts of Sub-Saharan Africa and Asia.These crops, rooted in ancient cultures and ancestral traditions, have long survived harsh growing conditions. Their climate resilience and adaptability offer opportunities for strengthening food security and bolstering economic growth.

Millets provide antioxidants, minerals and protein. As whole grains, each millet variety also offers different types and amounts of fibre, which play a role in regulating bowel function, blood sugar and lipids. Millets are resistant to drought and tolerant to crop diseases and pests, allowing them to survive in adverse climatic conditions. The genetic diversity of millets lends itself to many diverse and innovate applications of millets in areas such as therapeutics and

pharmaceuticals. Used innovatively, millets offer even greater market opportunities for regional and international trade.

3. b. They increase the risk of high blood sugar.

Explanation : The potential health benefits of millet include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut.

4 a.

Explanation : It is not a source of protein.

5 c. calcium

Explanation : A diet low in calcium and vitamin D can increase the risk of osteoporosis.

PERFORMANCE METRICS

(COMPETENCY BASED)

1. d. Vitamin D

Explanation : Vitamin D is formed in the skin when it's exposed to sunlight.

2. a. They are carbohydrates.

Explanation : As compared to fats, carbohydrates get easily oxidized and converted into glucose and provide energy.

3. b. They increase the risk of high blood sugar.

Explanation : The potential health benefits of millet include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut.

4. a.

Explanation : It is not a source of protein.

5. c. calcium

Explanation : A diet low in calcium and vitamin D can increase the risk of osteoporosis.

CHAPTER 4

Exploring Magnets

NCERT TEXT-BOOK QUESTIONS

Answer 1:

i. attract, repel
ii. magnetic materials
iii. north-south
iv. two

Answer 2:

i. False ii. True
iii. False iv. True

Answer 3:

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

Answer 4:

Option (i). It is because position A and C are the poles of the magnets and poles of a magnet have more strength as compared to the centre of the bar magnet. So, more number of clips will be attracted at the poles

Answer 5:

Reshma can bring one metal bar close to the other two bars one by one. If it repels either of the two, then it is a magnet and the bar that it repels is also a magnet. The one which does not repel but only attracts is the piece of iron.

Answer 6:

To identify the poles of an unmarked magnet, bring a marked magnet close to it. The north pole of the marked magnet

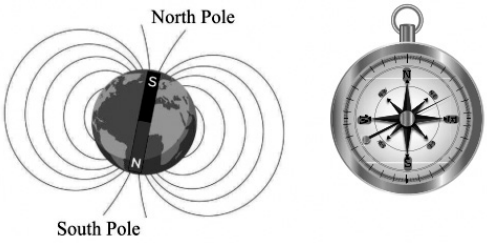
will attract the south pole of the unmarked magnet and repel its north pole, helping you determine which end is which.

Answer 7:

To find the north pole of an unmarked bar magnet without using another magnet, suspend it freely using a string. Allow the magnet to settle and come to rest. The end that points towards the geographic north is the north pole of the magnet, and the opposite end is the south pole. This works because the Earth acts as a giant magnet, and the suspended magnet aligns itself with the Earth's magnetic field.

Answer 8:

Yes, by observing a magnetic compass, we can find the Earth's magnetic poles.



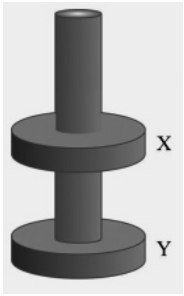
The compass needle's N-pole points towards the Earth's geographic north, which means the Earth's magnetic S-pole is near the geographic north. Conversely, the Earth's magnetic north pole is near the geographic south.

Answer 9:

To help the mechanic prevent the steel screws from falling, the screwdriver can be magnetized. By rubbing a magnet along the length of the steel screwdriver in one direction several times, the screwdriver will temporarily become magnetized. This will allow it to attract and hold the steel screws, making the repair work easier.

Answer 10:

Magnet X does not move down because both magnets X and Y are facing to each other with same poles, either north-north or south-south poles. So, they repel each other.



By changing the direction of magnet X we can bring both magnets closer.

Answer 11:

Referring point 5 as North pole of the magnet, we can say that point 4 and 6 must be South poles. If point 4 is S-pole, point 3 should be N-pole. Thus, points 2 will be S-pole and so the point 1 will be N-pole

A. Choose the most appropriate answer.

1. c. Lodestone

Explanation : Lodestone is a naturally magnetized piece of the mineral magnetite, making it the only naturally occurring magnet among the given options .

2. c. Each piece has both a north and a south pole

Explanation : Because magnetic poles always exists in pairs.

3. b. They repel each other

Explanation : like poles always repel each other.

4. a. North-South

Explanation : A freely suspended magnet always aligns itself in a north-south direction. This is because the Earth acts like a magnet, with its magnetic force attracting the magnet's north pole to its south magnetic pole.

5. d. Glass

Explanation : Glass is considered a non-magnetic material, meaning it does not respond to magnetic forces.

6. (a) heated

Explanation: When a magnet is heated above its Curie temperature, the magnetic

domains within it become disorganized, causing it to lose its magnetic properties.

B. Fill in the blanks using suitable words.

1. North, south
2. attract, repel
3. attracted
4. magnetism
5. Magnesia
6. hammered , heated
7. ends

C. Identify the instrument and complete the table.

Objects			
Attracted towards magnet because	a scissor is typically attracted by a magnet because most scissors are made from steel, which contains iron, a ferromagnetic material that is strongly attracted to magnets;		A screwdriver is attracted by a magnet because the tip of the screwdriver is usually made of a ferromagnetic material, like steel, which allows it to become magnetized when brought near a strong magnet,
Not attracted towards magnet because		paper is not attracted by a magnet because it is not a magnetic material	
Additional experience	Even if a metal is not inherently magnetic, alloys containing iron, cobalt, or nickel can exhibit magnetic properties.		

D. Answer in one word(VSA).

1. Iron
2. magnetic compass
3. Poles of a magnet
4. Magnetic materials
5. Paperclip
6. Global Positioning System
7. Repel each other

E. ASSERTION AND REASON

1. d. A is false, but R is true.

Explanation : Most types of steel are attracted to magnets because they contain iron.

2. a. Both A and R are true, and R is the correct explanation of A.

Explanation : A magnet always aligns itself in a north-south direction because the Earth acts like a magnet, attracting the magnet's poles accordingly; hence, when freely suspended, a magnet will point towards the Earth's magnetic poles (North and South).

HOTS

1. A magnetic keeper has a piece of wood or soft iron which is used in storing magnets because bar magnets get demagnetised when the poles are left free for a long time.

2. 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.

PICTURE BASED ASSESSMENT

1. The first picture show that like poles of magnet repel each other, as there magnetic field lines are repeling each other.

The second picture shows that, unlike poles attract each other as their magnetic field lines are also attracting each other.

2. An iron bar is used in magnetic keepers because iron is a readily magnetized material, meaning it easily becomes magnetized when placed near a magnet, allowing it to complete the magnetic circuit and prevent a permanent magnet from losing its strength when stored by providing a path for the magnetic field to flow through; essentially acting as a "bridge" between the magnet's poles.

VALUE AND LIFE SKILL BASED

Value learnt are : always get attract towards the knowledge, align yourself towards success and direct towards your goal.

CASE STUDY BASED ASSESSMENT

1. Radio, television, refrigerators
2. People wear magnetic ornaments, like bracelets or necklaces, because they believe the magnetic field generated by the magnets can provide health benefits such as improved blood circulation, pain relief, stress reduction, and potentially alleviating symptoms related to conditions like arthritis, by reducing inflammation in the affected areas.

LEARN HOLISTICALLY

1. A magnet is an object that produces an invisible magnetic field, attracting certain metals like iron, nickel, and cobalt due to the force generated by this field.
   a. It has two poles.
   b. Earth behaves as a large magnet
   c. Not all metals are magnet
   d. Like poles of magnet attract each other and unlike poles attract each other.
   e. Only certain metals like iron, nickel, and cobalt are attracted to magnets,
2. Magnet is the natural substance that attracts the ferromagnetic substances like iron or nickel by the force of attraction. There are so many uses of the magnets in our daily life and in the industries. The most important use of the magnet is the magnetic compass which is used to find the geographical directions. It is used in refrigerator magnets. It is also used in credit cards to protect our data. It is also present in the pocket compass to tell the directions. It is also present in vacuum cleaners, blenders, and washing machines.
3. Magnetic production in 2029 = 80.4 billion
   Increase is 10.25 % from 2029 to 2034.
   Produce in 2034 = 80.4 + (10.25 X 80.4)/100
   = 80.4 + 8.241 = 88.641 billion

PERFORMANCE METRICS

(COMPETENCY BASED)

1. b. Magnet Y will attract magnet Z
   Explanation : Like poles attract each other and unlike poles repel each other.
2. a. Magnet P will repel magnet Q.
   Explanation : Because like poles of magnets are kept in contact each other.
3. a. A magnet has only one pole.
   Explanation : a magnet has two poles : north pole and south pole
4. c. The poles are closer together
   Explanation : The magnetic force between two poles is inversely proportional to the square of the distance between them, meaning the closer they are, the stronger the force.
5. c. The poles are closer together
   Explanation : The force between two magnetic poles is greatest when they are closest together, meaning the distance between the poles is minimal.

CHAPTER

5 Measurement of Length and Motion

NCERT TEXT-BOOK QUESTIONS

Answer 1:

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

Answer 2:

i. True **ii. True** **ii. False**

Answer 3:

iv. handspan

Answer 4:

Type of Scale, Tape, Device	Smallest Value of Measurement
Distance between Delhi and Lucknow	1 mm
Flexible Tape	1 mm, 1 inch
Long Tape Roll	1 cm, 1 inch
Vernier Calliper (from School Lab)	0.1 mm
Screw Gauge (from School Lab)	0.01 mm

Answer 5:

Since 1 km = 1000 metres

So, 1.5 km = 1.5 × 1000 = 1500 metres

Answer 6:

Answer may vary. You can use a thread to measure the curved part. Later straighten the thread and measure its length using any ruler or metal tape.

Answer 7:

If the height of your friend is 1.6 metres: (i) Metres: 1.6 m (ii) Centimetres: 160 cm (iii) Millimetres: 1600 mm

Answer 8:

Measure the diametre of the coin and the length of the notebook. Divide the length of the notebook by the diametre of the coin to estimate the number of coins required. Say the diametre of the coin is 2 cm and the length of the notebook is 18 cm. Then 18/2 = 9 coins can be placed side to side along the length of the notebook. Verify by placing the coins end-to-end and measuring again.

Answer 9:

Linear motion: A car moving on a straight road, an eraser dropping straight down.

Circular motion: A merry-go-round, the motion of a whirling stone tied to a thread.

Oscillatory motion: A swinging pendulum, the motion of a metal strip pressed and released.

Answer 10:

Classify objects by the convenience of measuring in mm, cm, and m:

Size	Objects
mm	The thickness of a coin, the thickness of a cardboard, and the diametre of a small screw.
cm	The length of a pencil, the width of a book, and the height of a water bottle.
m	The height of a room, the width of a playground, and the height of a lamppost

Answer 11:

Portions of the track and corresponding types of motion:

A to B: Linear motion

B to C: Circular motion (loop)

C to D to E: Circular motion

E to F: Linear motion

Answer 12:

Tasneem should not use stretchable rubber because it can change length when stretched, leading to inaccurate measurements. Plywood, cloth, paper, and steel are more suitable as they maintain consistent lengths.

Answer 13:

Create cards with different lengths and corresponding units (mm, cm, m, km). Each card can have a length in one unit and players must match it to its equivalent in another unit. For example, a card with "100 cm" would match with "1 m".

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. (c) meter

Explanation : Meter is a standard unit of measuring distance.

2. a. Measuring tape

Explanation : Measuring tapes designed for carpentry or construction often use a curved metallic ribbon that can remain stiff and straight when extended, but can also retract into a coil for convenient storage.

3. c. Pendulum of the clock

Explanation : The oscillation of a pendulum clock is the back-and-forth swinging of the pendulum, which advances the clock's hands.

4. c. Motion of a wheel of a motorcycle

Explanation : A car wheel exhibits "rolling motion" which is a combination of rotational motion (spinning around its axis) and translational motion (moving forward with the car). Similarly, a motorcycle wheel also performs the same type of rolling motion, making it the closest match.

5. c. A child playing in the park

Explanation : Rest all are exhibiting linear motion. Children playing in a park is a random motion, with no definite pattern.

6. b. Non-standard units

Explanation : Ancient civilizations often used body parts like hand spans, cubits (forearm length), and paces to measure, which varied from person to person, making them non-standard units.

B. Fill in the blanks using suitable words.

1. 1000
2. scale
3. micrometer
4. Linear
5. rotatory
6. Vibratory
7. Curvilinear

C. Observe the motion of the given objects and complete the table.

Objects in motion	Type of motion	Definition
i.	circular motion	The motion of an object along a circular path is called circular motion
ii.	ROTATORY MOTION	The motion of an object around a fixed point or axis is called rotatory or rotational motion.
iii.	OSCILLATORY MOTION	When an object moves to and fro about some fixed position, its motion is called oscillatory motion.

D. Answer in one word(VSA).

1. centimetre
2. Micrometer, screw gauge, vernier calliper
3. Odometer
4. Imperial units
5. Tape measure
6. Astronomical units (AU), like light years, and parsecs
7. If moving on circular tack, then circular motion. If moving on straight track then, rectilinear motion.

E. ASSERTION AND REASON.

1. a. Both A and R are true, and R is the correct explanation of A.

Explanation: A measuring tape, especially a flexible one, can conform to the shape of a curved surface, allowing for an accurate measurement of its length, which is why it is considered a good tool for measuring curved paths, along with a thread which can be easily bent to follow the curve.

2. b. Both A and R are true, but R is not the correct explanation of A.

Explanation: Non-standard units are still sometimes used in informal situations, particularly when a rough estimate is needed or when introducing measurement concepts to young children.

Additional units reflect historical practices and cultural significance. Advantages include familiarity, cultural relevance, and practicality in specific contexts.

HOTS

1. To measure it accurately, he should use a measuring tool like a ruler or a tape measure.

These instrument will not change their size on getting wet.

2. Car A is exhibiting linear motion and car B exhibiting circular motion. On straight track, since magnitude of velocity is not changing, the car will have uniform speed. In circular motion, velocity changes due to change in the direction but magnitude still remains constant.

So it will also have uniform speed.

The forces acting on both them are uniform.

PICTURE BASED ASSESSMENT

1. Difference: The motion of first car is linear and second car is curvilinear.

Similarity: Rectilinear and curvilinear motion are both types of motion, and they both involve an object covering distance over time.

2. Name the measuring tool and write the professional who use them.

Measuring tool		
Name	Measuring Tape	Vernier Calliper
Used by	Used by tailors	Lab technicians

VALUE AND LIFE SKILL BASED

Motion of satellite around the Earth in a fixed path, help to inculcate the value of uniformity in our life. Gravitational pull helps us to understand that we should always be centred towards our root.

Discipline is always important for achieving our goals on time and in perfect manner.

CASE STUDY BASED ASSESSMENT

1. Swing : Oscillatory and periodic motion

Kite : Random motion

Merry go round – Circular motion'

Cyclict – Linear motion

Butterflies – Random motion

Birds – Random motion

2. The motion of kite, butterflies and birds are similar, as both are random and does not follow a definite pattern.

LEARN HOLISTICALLY

1. A tailor primarily uses a flexible measuring tape to measure various body parts, as its flexibility allows for accurate measurements around curves and contours like the waist, bust, and hips; other tools that can be helpful include a French curve for shaping specific areas like necklines and armholes, and a seam gauge for consistent seam allowances.

2. Measurement tools make our lives better and safer, and they enhance the quality and quantity of life. Arguably, the ability to measure physical properties accurately has tremendous survival value that gives humans an adaptive, evolutionary advantage through many years of natural selection.

They are used in a wide variety of applications, including construction, manufacturing, engineering, and science.

3. Do it yourself

PERFORMANCE METRICS (COMPETENCY BASED)

1. b. A moving car with its wheels rotating

Explanation : Car is moving in a straight line, so it is exhibiting a linear motion and its wheels are showing rotational motion.

2. b. Circular motion

Explanation : The blades move in a circular path around the center of the fan, which is considered circular motion.

3. d. All of these

Explanation : A measuring tape, metal metre scale, and tape measures are all commonly used length measuring tools at construction sites.

4. a.

Explanation : Rest all are kept at the wrong position.

5. 1 foot = 3.048 m

Explanation : 1 foot = 0.3048 m

CHAPTER

6 Materials Around Us

NCERT TEXT-BOOK QUESTIONS

Answer 1: (Answers may vary)

Visit your kitchen and see how foods are organized. Think of ways to improve it! Here are some ideas:

Group Similar Items: Keep all pulses, spices, oils, and snacks together in separate sections.

Label Containers: Use labels to identify each item easily.

Arrange by Use: Place frequently used items (like salt and oil) within easy reach.

Organize by Expiry: Put items with closer expiry dates in the front.

Answer 2:

Unscramble the letters (Column I) and match with their properties (Column II).

Column I	Column II
(i) MATTER	(a) Occupies space and has mass
(ii) SOLUBLE	(b) Mixes completely in water
(iii) TRANSPARENT	(c) Objects can be seen clearly through it
(iv) LUSTRE	(d) Shiny surface

Answer 3:

The containers which are used to store materials in shops and at home are usually transparent so that the materials stored in them can be seen through them and can be found easily.

Answer 4:

(i). False. Wood is opaque while glass is transparent (ii). True (iii). True (iv). False. An apple is a matter because it occupies space and has mass.

Answer 5:

i. Iron, cement and stones

ii. Plastic and bamboo

iii. Wood and bamboo

iv. Plastic, iron, cement and stones

Answer 6:

We can use plastic containers for collection of (i) food waste (ii) broken glass and (iii) waste paper. These containers may have different colours because food waste is biodegradable, broken glass is hazardous and waste paper is recyclable. In case of food waste, the material of the container should not react with food and should be leak proof. For broken glass the material of the container should be hard so that glass should not cut it. For storing waste paper the material of the container should be light and strong.

Answer 7:

(i) transparent, opaque

Answer 8:

X can be sugar crystal and Y can be rubber block. It is because material X is soluble in water while material Y is insoluble.

The material X is hard. It is because it feels rigid, and does not change its shape.

The material Y is soft. It is because material Y easily changes its shape on applying pressure on it.

Answer 9:

i. (a) steel (b) rubber (c) sugar
(d) cardboard or plywood (e) air

ii. a. You can see clearly through me.
b. I am soft.
c. I am non-lustrous.

d. I am liquid and insoluble in water.

e. I cannot be compressed easily.

Answer 10:

Soluble pairs	Insoluble pairs
(i) Water and glucose	(i) Water and mustard oil
(ii) Water and vinegar	(ii) Water and wheat flour

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. d. It is transparent.

Explanation : Windows are in the rooms to see through. Glass in them make them perfect for this purpose.

2. d. Non-reactive nature

Explanation: Plastic is considered ideal for containers because it doesn't react with the substances stored inside, making it suitable for food and other liquids without altering their properties.

3. a. Clay Modelling

Explanation : Pottery involves shaping clay into desired forms and then hardening it by firing it in a kiln at high temperatures.

4. c. Mass

Explanation : The amount of matter an object has determines its heaviness.

5. b. quantity of material the container holds.

Explanation : The capacity of a container is the maximum volume of liquid it can hold

B. Fill in the blanks using suitable words.

1. transparent
2. solubility
3. transparent
4. Density , hardness
5. its mass
6. heterogeneous
7. lustrous

C. Identify the instrument and complete the table.

	Observable property of the objects	Property shown	Define the term
i.		Transprency	the materials or objects through which we can see through clearly are called transparent materials or objects
ii.		made of plastic	plastic is used in raincoats to make it waterproof

D. Answer in one word(VSA).

1. Lusture
2. High cellulose content
3. Transclucent materials
4. insoluble substances
5. Solubility

E. ASSERTION AND REASON

1. (a) Both A and R are true, and R is the correct explanation of A.

Explanation : Rubber is indeed used in tyres because of its high elasticity and good traction properties

2. (c) A is true, but R is false.

Explanation : Ethanol and water are miscible, meaning they mix completely in all proportions, forming a homogeneous mixture.

HOTS

1. Copper vessels lose their shine when exposed to air because they develop a green

coating on them. This happens because copper corrodes through oxidation, which occurs when copper reacts with oxygen to form copper oxide.

2. When we dissolve sugar in water, the water level does not increase because the sugar particles essentially fill the spaces between the water molecules, effectively occupying the existing volume without adding any new volume to the solution; meaning they fit into the gaps between water molecules rather than pushing them apart and raising the level.

PICTURE BASED ASSESSMENT

1. Glass is a transparent material, tinted glass is a transclucent material and when curtain covers the glass it becomes opaque. This is the difference in the three.

   Similarity between the three are that all the three materials are in solid form.

2. The air is coming out of the tyre. Air is a matter because, it occupies space and has mass. As when air is blown inside the tyres of vehicles, the air molecules exert pressure on the walls of tyres. Therefore, the tyre comes in an accurate regular shape and is easy to use.But when it blows out , the tyre got deflated. This shows that air inside the tyre is a matter.

VALUE AND LIFE SKILL BASED

Conduct regular workshops and training sessions where experts can explain the health and environmental risks associated with pesticides overuse, proper handling procedures, and safe application methods.

Include hands-on demonstrations on how to correctly mix, apply, and dispose of pesticides.

CASE STUDY BASED ASSESSMENT

1. When considering smartphone screens, glass is generally preferred due to its superior scratch resistance, clarity, and touch sensitivity compared to plastic, while ceramic offers even better scratch resistance but can be more brittle; plastic is often used for cheaper options as it's more flexible but scratches easily and may not provide the same visual quality as glass.
2. Glass, due to its superior scratch resistance, clarity, and touch sensitivity.

LEARN HOLISTICALLY

1. Vinegar is a dilute solution of acetic acid in water, giving it a sour taste and acidic properties.

   While acidic, most commercially available vinegars have a relatively mild pH level, typically around 2.4 to 3.0.

   Three uses of vinegar: cooking, cleaning and food preservation.

2. Vinegar has many uses in the kitchen, including cooking, cleaning, and deodorizing.

Cooking

- Add flavor to dishes like marinades, salad dressings, chutneys, sauces, and soups
- Preserve and flavor food

Cleaning

- Kill germs, bacteria, mold, and fungus
- Remove grease, grime, and limescale
- Deodorize
- Clean windows, counters, and kitchen fixtures

3. Do it yourself

PERFORMANCE METRICS (COMPETENCY BASED)

1. c. Steel

   Explanation: Steel is widely used in bridge construction due to its exceptional strength, durability, and ability to resist heavy loads and harsh environmental factors.

2. B. Plastic

   Explanation: A versatile and affordable material that's often used for food packaging. It's resistant to moisture and chemicals.

3. c. They are transparent and resistant to weathering

   Explanation : Glass and ceramics are

frequently used in electronic screens and windows due to their excellent optical properties, including high transparency, ability to transmit light efficiently, and resistance to scratches.

4. c. All three materials are in liquid states.

Explanation : Material X and Z are in gaseous state and material Y is in liquid state.

5. C. Oil

Explanation : Milk, honey, and ink can all mix with water to a certain extent, while oil does not readily mix with water, making it the distinct option.

CHAPTER 7

Temperature and its Measurement

NCERT TEXT-BOOK QUESTIONS

Answer 1:

(ii) 37.0 °C

Answer 2:

(iv) 98.6°F

Answer 3:

(i) temperature (ii). Clinical (iii) Celsius

Answer 4:

(ii) -10°C to 110°C

Answer 5:

(ii) Student 2

Answer 6:

In thermometer 1- colour 2 lines above mark 10 as each line indicates 2 degree Celsius.

In thermometer 2- colour 7 lines above mark 10 as each small line indicates 1 degree Celsius.

In thermometer 3- colour upto 15 lines above mark 0 as each line indicates 0.5 degree Celsius.

Answer 7:

i. It is a laboratory thermometer as its lowest temperature value is -10°C.

ii. The reading is 26°C.

iii. The smallest value that a laboratory thermometer measure is -10°C.

Answer 8:

A laboratory thermometer can't be used to measure body temperature as it does not have a kink. The kink, in a clinical thermometer, prevents mercury levels from falling on its own so that temperature can be read even when the thermometer is no longer in contact with our body.

Answer 9:

(i) 40.0 °C (ii) Day one 7 pm (iii) Day three

Answer 10:

We will use thermometer (b).

Thermometer (a) can measure the smallest value of 1°C and thermometer (c) can measure the smallest value of 2°C as per the small line markings on these. Only thermometer (b) has the markings on it to measure the smallest value of 0.5°C which is necessary for measuring a temperature of 22.5°C.

Answer 11:

(ii) 27.5°C

Answer 12:

A laboratory thermometer with 50 divisions between 0°C and 100°C means each division represents a specific temperature increment. To determine the value of each division, divide the total temperature range by the number of division. Here, the range is values of each division = 10 0°C/50 = 2°C Thus, each division on this laboratory thermometer represents 2°C. This allows for measurements to be read with an accuracy of 20°C increments.

Answer 13:

Answer 14:

She means the temperature on the Fahrenheit scale. Human body temperature does not normally go below 35°C or above 42°C on celsius scale. In the Fahrenheit scale this range is between 95 degrees to 107.8 degrees.

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. c. both a and b

Explanation : Air temperature is typically measured in degrees Celsius (°C) or degrees Fahrenheit (°F).

2. b Mercury

Explanation : Mercury is a liquid at room temperature and expands consistently with temperature changes, making it ideal for use in thermometers.

3. d. All of the above

Explanation Air temperature can be measured using thermistors, thermocouples or mercury thermometers.

4. b. Infrared thermometer

Explanation : Infrared thermometers use infrared radiation to detect the temperature of a surface, making them suitable for quick, non-contact measurements on the forehead or ear canal.

5. b. –40°C

Explanation : The relation between °C and °F is

$$°F = \frac{9}{5}(°C) + 32$$

when °F = °C

$$\therefore \quad °C = \frac{9}{5}°C + 32$$

$$\therefore \quad °C - \frac{9}{5}°C = 32$$

$$\therefore \quad -\frac{4}{5}°C = 32$$

$$\therefore \quad °C = -40°C$$

$$\therefore \quad T = -40°C$$

∴ At –40°C both the celcius and Fahrenheit scales show the same reading

B. Fill in the blanks using suitable words.

1. lowest
2. Temperature
3. 94°F to 108°F.
4. Infrared thermometer
5. Daniel Gabriel Fahrenheit
6. Weather forecasting
7. 100°C

C. Identify the instrument and complete the table.

Instruments	Name	Purpose
i.	Digital thermometer	It is also used to measure human body temperature.
ii.	Infrared thermometer	An infrared (IR) thermometer is a non-contact device used to measure temperature from a distance. It detects infrared radiation emitted by an object or person and converts them into electric signals. It was commonly used in situations where direct contact is not safe or practical.
iii.	Min. - Max. thermometer	This device is used to measure minimum and maximum temperature of a particular day.
iv.	Laboratory thermometer	It is used in laboratory to measure the temperature of boiling liquids

D. Answer in one word (VSA).

2. Thermometer
3. Temperature
4. Lord Kelvin
5. Infrared thermometer
6. Thermistors
7. Alcohol
8. Kelvin (K)

E. ASSERTION AND REASON

1. a. Both Assertion (A) and Reason (R) are correct, and Reason (R) correctly explains Assertion (A).

Explanation: Digital thermometers are safer than mercury thermometers because they do not contain toxic substances like mercury. If a mercury thermometer breaks, it can release harmful mercury vapors and pose a serious health risk.

2. d. Assertion (A) is incorrect, but Reason (R) is correct.

Explanation : Laboratory thermometers do not have a "kink" like clinical thermometers, so the liquid falls back down as soon as it is removed from the heat source, giving an immediate reading of the current temperature.

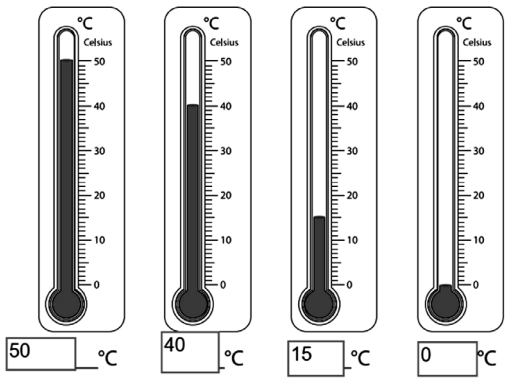
HOTS

1. People prefer digital thermometers over mercury-based thermometers because they are safer to use due to the lack of toxic mercury, provide faster readings, are generally more accurate, and are easier to read with a digital display, making them a more convenient option overall.

2. No, you cannot use a clinical thermometer to measure the temperature of boiling water because a clinical thermometer has a limited temperature range, typically only designed to measure human body temperature which is much lower than the boiling point of water (100°C), and exceeding this range could damage the thermometer.

PICTURE BASED ASSESSMENT

1.



Temperature in °F ,

Celsius to Fahrenheit $F = C\left(\frac{9}{5}\right) + 32$

(i) F = 50 (9/5) + 32 = 90 + 32 = 122°F

(ii) F = 40 (9/5) + 32 = 72 + 32 = 104°F

(iii) F = 15 (9/5) + 32 = 27 + 32 = 59°F

(iv) F = 0 + 32 = 32°F

Celsius to Kelvin: $K = C + 273.15$

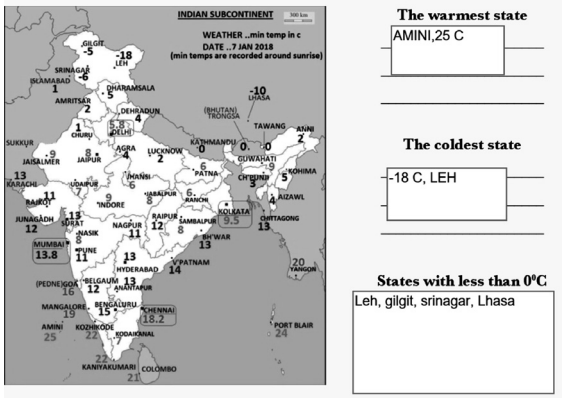
(i) K = 50 + 273.15 = 323.15 K

(ii) K = 40 + 273.15 = 313.15 K

(iii) K = 15 + 273.15 = 288.15 K

(iv) K = 0 + 273.15 = 273.15 K

2. Compare the minimum temperature of various states of India. Complete the table attached.



VALUE AND LIFE SKILL BASED

a. Without a thermometer, you can only

roughly estimate temperature by touching a surface or person with the back of your hand, observing physical changes like sweating or shivering.

b. They should be told about the advantages of knowing about the accurate temperature. How it could be beneficial ? And more safer version of thermometer i.e. digital thermometer can be put to use.

CASE STUDY BASED ASSESSMENT

1. A body temperature of 39°C (102.2°F) indicates a fever.

2. Shook the thermometer to bring the mercury level back down to its starting point, allowing it to accurately measure a new temperature by resetting the mercury column below the lowest reading on the scale.

3. Digital thermometer

LEARN HOLISTICALLY

1. Global warming is caused by the release of greenhouse gases into the atmosphere, such as carbon dioxide, methane, and nitrous oxide. These gases trap the sun's heat, preventing it from escaping back into space.

2. Global warming or climate change has today become a major threat to the mankind. The Earth's temperature is on the rise and there are various reasons for it such as greenhouse gases emanating from carbon dioxide (CO_2) emissions, burning of fossil fuels or deforestation.

The rise in the levels of carbon dioxide (CO_2) leads to substantial increase in temperature. It is because CO_2 remains concentrated in the atmosphere for even hundreds of years. Due to activities like fossil fuel combustion for electricity generation, transportation, and heating, human beings have contributed to increase in the CO_2 concentration in the atmosphere.

Recent years have been unusually warm, causing worldwide concern. But the fact is that the increase in carbon dioxide actually began in 1800, due to the deforestation of a large chunk of North-eastern American, besides forested parts of the world. The things became worse with emissions in the wake of the industrial revolution, leading to increase in carbon dioxide level by 1900.

Global warming causes many changes to the Earth's climate, including rising temperatures, more acidic oceans, and rising sea levels. These changes affect people, nature, and cultivated lands.

3. If the temperature of the earth keep increasing by 2°C every year, then after earth's expected air temperature after 20 years = (Present temperature + 2 X 20)°C

4. Do it yourself

PERFORMANCE METRICS

(COMPETENCY BASED)

1. c. Kelvin Scale

Explanation : Temperature can never be negative on Kelvin scale

2. d. 75°C

Explanation : The approximate temperature of the mixture will be somewhere between 50° C and 100° C.

3. a. 212°F

4. a.

Explanation : Rest all are used to measure the body temperature.

5. c. the glass body of laboratory thermometer is stronger than that of clinical thermometer.

Explanation : A clinical thermometer is designed to measure body temperature, which is within a much smaller range compared to a laboratory thermometer. When placed in boiling water, the clinical thermometer's glass body, not designed for high temperatures, can break due to the sudden heat expansion.

CHAPTER

8

A Journey through States of Water

NCERT TEXT-BOOK QUESTIONS

Answer 1:

(iv) The conversion of water vapour into its liquid state describes condensation.

Answer 2:

(i) a. water colours (ii) b. ink pen

Answer 3:

Natural grass cools the surrounding area through a process called evaporation and transpiration. In transpiration, plants release water vapour from their leaves, which cools the air around them. Additionally, when water evaporates from the surface of the grass, it absorbs heat from the surroundings, leading to a cooling effect.

Answer 4:

Alcohol, nail paint removal, petrol, diesel, etc.

Answer 5:

Fans increase the air movement around the wet clothes, which helps to disperse the water vapour away from the surface of the clothes.

Answer 6:

Water (moisture) from the sludge evaporates with time making it handling and transportation easier.

When sludge is left in heaps for 3–4 days, the moisture content in the sludge decreases as water evaporates over time. The reduced water content makes the sludge lighter and less bulky. This makes transportation easier.

Answer 7:

We perform various activities where process of evaporation help us.

i. We dry our clothes on a sunny and windy environment.

ii. We can smell the food being cooked even without entering the kitchen.

iii. Washed utensils dry up after some time.

iv. After mopping the floor, the water left on the surface evaporates over time, drying the floor.

v. When you water plants, some of the water evaporates from the soil into the air, especially on hot days.

Answer 8:

Ice, snow and frost are the solid state of water present in nature.

Answer 9:

Only a small fraction of the water on Earth is suitable for use by plants, animals, and humans. The majority of water is found in the oceans, which cannot be used directly. Water is essential not only for drinking but also for various other activities. As the global population increases, the availability of safe and clean water is declining. While it is our right to have access to water for survival, it is equally our responsibility to protect and preserve water bodies from pollution to ensure their continued availability for future generations.

Answer 10:

To cool down the hot seat of a two-wheeler parked in the sun, you can try the following methods:

1. Cover it with a damp cloth: Place a wet cloth or towel over the seat. As the water evaporates, it absorbs heat, helping to cool the seat down.

2. Sprinkle water on the seat: Lightly spray water on the seat. The evaporation process

will draw heat away from the seat, reducing its temperature.

3. Use a sunshade or seat cover: If available, use a sunshade or seat cover to shield the seat from direct sunlight, helping to keep it cooler.

4. Move to a shaded area: If possible, relocate the two-wheeler to a shaded spot. This will minimize the seat's exposure to the sun and prevent it from getting too hot.

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. b. Condensation

Explanation :The process in the water cycle that involves the conversion of water vapour into liquid water is condensation.

2. c. 100°C

Explanation : Water boils at 212°F or 100°C and melts at 32°F or 0°C.

3. a. Evaporation ,b. Melting

Explanation : When liquid water absorbs heat and transforms into water vapour (gaseous state), it is called evaporation. It can happen at any temperature but occurs faster at higher temperatures.

And melting is the process when solid ice absorbs heat and changes into liquid water. It occurs at 0°C (the melting point of ice).

4. d. Precipitation

Explanation : Precipitation is any liquid or frozen water that forms in the atmosphere and falls back to the earth. It comes in many forms, like rain, sleet, and snow.

5. c. Water seeps down in the soil to restore ground water.

Explanation : Rest all are the cooling effect of evaporation.

B. Fill in the blanks using suitable words.

1. Evaporation 2. 100
3. 0 4. condensation
5. transpiration 6. photosynthesis
7.water cycle

C. Complete the following table.

Properties	Ice	Water	Water Vapour
State	Solid	Liquid	gas
Shape	Definite	Non - definite	Non - definite
Fluidity	Do not flow	Flows	Highest fluidity
Ability to spread	do not spread.	spread	Spread the most

D. Answer in one word (VSA)

1. Fluidity 2. Water cycle
3.Evaporation 4. Condensation
5. Transpiration
6. Temperature decreases
7. Condensation

E. ASSERTION AND REASON.

1. a Both A and R are true, and R is the correct explanation of A.

Explanation: When water vapour in the air cools down, it condenses into tiny water droplets, which then gather together to form clouds. This process of condensation releases heat into the atmosphere, contributing to the formation of clouds.

2. c. A is true, but R is false.

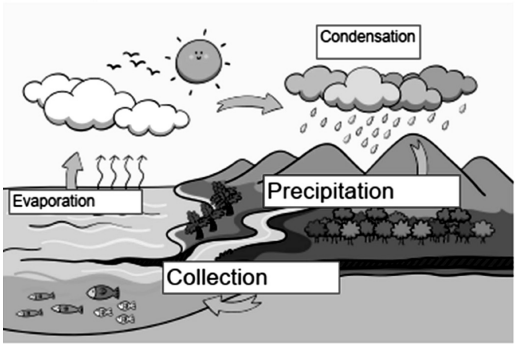
Explanation: In the process of evaporation, liquid particles absorb or gain energy from their surroundings to change their state to gaseous state. When the liquid particles absorb energy from the surroundings, the temperature of that region decreases. This causes cooling effect. Changing of water to water vapour does not releases energy but instead absorbs energy.

HOTS

1. Water is sprinkled on the roof-top because it absorbs heat (energy) and evaporates leaving the roof-top cooler than before. when water evaporates, it absorbs heat from the roof, effectively lowering its temperature and thus helping to cool the interior of the building as well. So,it makes easier for people to sleep on the roof.
2. If the water cycle is disrupted, it would lead to significant imbalances in water availability, potentially causing extreme weather events like droughts in some areas and flooding in others, impacting ecosystems and ultimately threatening life on Earth due to lack of freshwater for plants and animals to survive.

PICTURE BASED ASSESSMENT

1.



Evaporation : When liquid water absorbs heat and transforms into water vapour (gaseous state), it is called evaporation.

Condensation : Change of water vapours into water with fall in temperature is called condensation.

Precipitation : Precipitation is any liquid or frozen water that forms in the atmosphere and falls back to the earth

Collection : It is a collection of rainwater after precipitation in rivers, canals, underground or other water resources.

2. Answer the questions, by looking at the pictures:

We persnire to release moisture on skin. It causes cooling affect due to the process of evaporation

Water molecules on the surface of the earthen pots are the result of evaporation.

How do dews form on the leaves?

Dew formation is the condensation, where water vapour changes from a gas to a liquid state when it encounters a cool surface.

VALUE AND LIFE SKILL BASED

The teacher is trying to teach the students about the importance to save water. Without clean water there is no life on the earth.

Also she want to teach the students to lessen the use of plastic.

CASE STUDY BASED ASSESSMENT

1. The water in the animal trough froze overnight because the temperature dropped below freezing, causing the water to solidify into ice.
2. The black surface absorbs more sunlight, which then transfers heat to the water, keeping it warmer and less prone to freezing during night.
3. Condensation, evaporation

LEARN HOLISTICALLY

1. Groundwater plays an important role in water availability as it represents a significant portion of the Earth's freshwater, acting as a vital source for drinking water, especially during droughts when surface water like rivers and lakes may dry up. But it is less accessible than surface water because it is stored deep underground within porous rock layers, requiring wells and pumps to extract it, making access more complex and expensive compared to simply drawing water from a river or lake.

2. Water scarcity limits access to safe water for drinking and for practising basic hygiene at home, in schools and in health-care facilities. When water is scarce, sewage systems can fail and the threat of contracting diseases like cholera surges. Scarce water also becomes more expensive.

   When waters run dry, people can't get enough to drink, wash, or feed crops, and economic decline may occur.

   There are several causes contributing to water scarcity. Rapid urbanisation and industrialisation have led to increased pollution of water bodies, making them unfit for consumption. Additionally, inefficient agricultural practices and excessive groundwater extraction have depleted crucial water sources.

3. Do it yourself

PERFORMANCE METRICS

(COMPETENCY BASED)

1. c. To regulate body temperature and transport nutrients

   Explanation: Water plays a crucial role in carrying nutrients to cells, removing waste products, and maintaining a stable body temperature through sweating.

2. b. It speeds up evaporation, which absorbs heat from the skin.

   Explanation : Evaporation is a process that requires energy, which is taken from the surface of your skin in the form of heat. As the water evaporates, it absorbs heat from your skin, making you feel cooler.

   Higher wind speeds up the evaporation.

3. d. Temperature does not play any role in evaporation.

   Explanation : Temperature is a major factor affecting the rate of evaporation; higher temperatures lead to faster evaporation rates.

4. b.

Kept in the garden in hot summer evening

   Explanation : Factors affecting evaporation are : temperature , surface area, humidity and wind speed.

5. d.

   Explanation : Rest all are showing the process of evaporation.

CHAPTER 9

Methods of Separation in Everyday Life

NCERT TEXT-BOOK QUESTIONS

Answer 1:

(ii) Sorting

Answer 2:

(iii) Cream from milk

Answer 3:

(iii) Pore size

Answer 4:

(i). True (ii). True (iii). False. It can be done by winnowing as puffed rice is lighter than rice and can easily be blown away.

(iv). True (v) False. It can be separated by sedimentation followed by decantation. If required, filtration can also be done.

Answer 5:

Column I	Column II
(i) Gram flour mixed with black gram	(d) Sieving
(ii) Chalk powder mixed with water	(e) Filtration
(iii) Corn mixed with potatoes	(a) Handpicking
(iv) Iron powder mixed with sawdust	(b) Magnetic separation
(v) Oil mixed with water.	(c) Decantation

Answer 6:

Decantation is used when the solid particles are heavy and settle down at the bottom of the container, allowing the clear liquid to be poured off without disturbing the solid sediment. For example separating sand from water.

Answer 7:

Nasal hair acts like a natural filter, trapping dust, pollen, and other particles from the air we breathe, similar to how a filtration process works to remove solid impurities from a liquid.

Answer 8:

Masks are generally made of materials like cotton, synthetic fibers or polypropylene.

Their role is to filter out airborne particles, including viruses and bacteria, to prevent their inhalation and spread.

Answer 9:

Step-1 : Handpick the potatoes

Step-2 : Add water to the remaining mixture to dissolve the salt

Step-3 : Filter the mixture to separate the sawdust from the salt solution.

Step-4 : Evaporate the water from the salt solution to obtain the salt.

Answer 10:

1. Thirsty; 2. Water;
3. Unfit; 4. Filtered;
5. Muslin; Cloth; 6. Boiled;
7. Cooling; 8. Filtered
9. Fit.

PRACTICE FOCUS

A. Choose the most appropriate answer

1. a. Evaporation

Explanation: When seawater is exposed to heat, the water evaporates leaving behind the dissolved salt crystals.

2. c. Oil +Water

Explanation :

- Vinegar + Water: Vinegar is miscible with water, meaning they mix completely.
- Sugar + Water: Sugar also dissolves in water, making it miscible.
- Salt + Water: Salt dissolves in water, making it miscible.

Oil + miscible i.e. they do not mix with each other.

3. d. sublimation

Explanation: Sublimation is the process where a solid directly transforms into a gas without passing through the liquid phase.

4. a. Evaporation followed by condensation

Explanation : We can separate two miscible liquids by the process of distillation. This technique is based on differences in the boiling points of the components in the mixture.

5. B. Oil in water

Explanation : Oil in water is a heterogeneous mixture and rest all are homogeneous mixture.

B. Fill in the blanks using suitable words.

1. filtration 2. magnet
3. winnowing 4. handpicking
5. filtration 6. sedimentation
7. decantation
8. decantation by separating funnel

C. Complete the following table.

Sample Mixture	Type (Homogeneous/ Heterogeneous)	Mode of separation	Principle involved
Assorted dry fruits	Heterogeneous	hand picking	Difference in size
Fruit juice	Heterogeneous	Filtration	one component is solid other is liquid
Iron fillings in oil	Heterogeneous	Filtration	one component is solid other is liquid
Peanuts husk	Heterogeneous	winnowing	difference in weight

D. Answer in one word(VSA).

1. Churning
2. Sieving
3. Winnowing
4. Filtration
5. Distillation
6. Separating funnel
7. Sedimentation, decantation and filtration

E. ASSERTION AND REASON

1. a. Both A and R are true, and R is the correct explanation of A.

   Explanation: When a mixture of sand and sugar is added to water, the sugar dissolves while the sand remains suspended, allowing for separation through filtration where the sand will be trapped on the filter paper while the sugar solution passes through.

2. a. Both A and R are true, and R is the correct explanation of A.

Explanation: Sieving is a separation technique where a mixture is passed through a sieve with specific-sized holes, allowing smaller particles to pass through while larger particles remain on the sieve, effectively separating them based on their size difference.

HOTS

1. Naphthalene balls disappear when left open because they undergo a process called "sublimation," where they directly convert from a solid state to a gaseous state without passing through a liquid phase.

2. Gently toss the husk and husk mixture into the air; the husk will be blown away by a breeze or fan, leaving the grains behind.

PICTURE BASED ASSESSMENT

1. In this process , salt from seawater is obtained. In this method, the liquid portion i.e. seawater is allowed to evaporate, leaving the solid component i.e. salt. This is a process of obtaining salt from seawater.

2. It is a separating funnel. Immiscible mixtures like oil and water can be separated by using separating funnel. It works on the principle of different densities. The less denser liquid floats over the more denser one.

So, by using the difference in densities properties we can separate the heterogeneous mixture of two liquids.

VALUE AND LIFE SKILL BASED

To remove large impurities from water before disposal into rivers, you can use filtration or sedimentation.

We can aware farmers about water pollution through short plays or nukkad nataks, telling them how this harmful water will ultimately impact them, their children, crops and animals.

Some informative movies can also be shown related to it.

CASE STUDY BASED ASSESSMENT

1. An alternative method to separate salt from seawater is reverse osmosis where water is forced through a semipermeable membrane, leaving the salt behind as the pure water passes through, effectively concentrating the salt in the remaining solution; this method is often used for desalination to produce fresh water from seawater.

2. Evaporation is the process by which an element or compound transitions from its liquid state to its gaseous state below the temperature at which it boils.

LEARN HOLISTICALLY

1. Groundwater plays a crucial role in water availability as it represents a significant portion of the Earth's freshwater, acting as a vital source for drinking water, irrigation and maintaining baseflow in rivers, especially during droughts, but it is less accessible than surface water because it is stored underground, requiring wells and pumps to extract it, often at considerable depths, making access more complex and costly compared to simply drawing water from a river or lake.
2. Water scarcity limits access to safe water for drinking and for practising basic hygiene at home, in schools and in health-care facilities. When water is scarce, sewage systems can fail and the threat of contracting diseases like cholera surges. Scarce water also becomes more expensive.

   When waters run dry, people can't get enough to drink, wash, or feed crops, and economic decline may occur.There are several causes contributing to water scarcity. Rapid urbanisation and industrialisation have led to increased pollution of water bodies, making them unfit for consumption. Additionally, inefficient agricultural practices and excessive groundwater extraction have depleted crucial water sources.
3. Do it yourself

PERFORMANCE METRICS (COMPETENCY BASED)

1. b. Filtration followed by evaporation

   Explanation : In this process, the mixture of salt, sand, and water can be passed through filter paper or any other suitable filter medium to remove the sand. The filtrate obtained will be a salt solution in water. This salt solution can then be heated using evaporation to remove the water and obtain the salt crystals. The sand can be collected from the filter paper and discarded.
2. c. Separating funnel

   Explanation : This mixture can be separated by using separating funnel. It works on the principle of different densities. The less denser liquid floats over the more denser one. Here, oil will float over water.
3. a. Magnetic separation

   Explanation : Magnets are used to separate solid-solid mixture of a metallic and a non-metallic substance.
4. b.

   Explanation : Rest all are solid – solid mixture.
5. a. Rice and broken rice pieces

   Explanation : Winnowing separates lighter particles from heavier ones using wind, so it works best when there's a significant difference in weight between the components.

CHAPTER

10 Living Creatures Exploring Their Characteristics

NCERT TEXT-BOOK QUESTIONS

Answer 1:

Similarities in Life Cycles of Plants and Animals	Differences in Life Cycles of Plants and Animals
(i) Development Stage: Both have distinct stages of development (e.g., germination, flowering in plants; egg, larva, adult in animals).	(i) Respiration: While both respire, the mechanisms differ; animals use lungs or gills, plants use stomata and lenticels.
(ii) Growth: Both plants and animals grow from a small initial stage (seed or embryo) into a mature form.	ii) Growth Patterns: Plants exhibit indeterminate growth (can grow throughout their life), while animals have determinate growth (stop growing after reaching maturity).
(iii) Reproduction: Both undergo process to produce offspring (seeds for plants and young ones for animals).	(iii) Reproductive Structures: Animals have specialized organs for reproduction, while plants uses flowers, cones or spores.

Answer 2:

S. No.	Does it grow?	Does it respire?	Example	Remarks
(i)	No	No	Rock	Non-living. No growth or respiration
(ii)	No	Yes	Virus	Viruses are non-living outside host cells but respire in host
(iii)	Yes	No	Crystals (Salt)	Non-living can perform tasks but does not respire
(iv)	Yes	Yes	Humans, Plants	Living beings

Answer 3:

To ensure proper storage of grains and pulses and prevent germination:

Keep Dry

Cool Storage

Airtight Containers

Answer 4:

The tail in the tadpole stage of a frog provides

i. Swimming Ability: It helps the tadpole swim efficiently in water to find food and escape predators.

ii. Balance and Stability: Assist in maintaining balance while moving in water.

Answer 5:

- Against Charan: The wooden log was once part of a living tree, which was alive and exhibited characteristics of living beings.
- Against Charu: Once the wood is separated from the tree, it no longer exhibits growth, reproduction, or other life processes, making it non-living.

Answer 6: Similarities

- Both begin life as eggs.
- Both have a larval stage (tadpole in frogs, larvae in mosquitoes) that is aquatic.

Distinguishing Features: Mosquitoes have four stages

Egg → Larva → Pupa → Adult

Respiration: Larvae and pupae breathe through siphons.

Frog has four stages

Egg → Tadpole → Froglet → Adult

Respiration: Tadpoles have gills, adults have lungs and can respire through their skin.

Answer 7: Expected observations

- Shoot: Growth upwards, towards the light source.
- Root: Growth downwards, into the soil for stability and nutrient absorption.

Reasons

- Shoots grow towards light (phototropism) for photosynthesis.
- Roots grow downwards (gravitropism) for – nutrient absorption.

Answer 8:

Tara and Vijay are likely trying to understand how the orientation of a seed affects the growth direction of the shoot (the green part above ground) and the root (the part below ground).

Observation 8: The shoot always grows upwards (towards the light) and the root always grows downwards (into the soil), regardless of how the seed is placed, this shows that plants have natural mechanisms (like phototropism and gravitropism) that guide their growth direction.

Answer 9:

- **Aim:** Experiment to Check the Effect of Temperature on Seed Germination
- **Materials:** Identical pots, soil, seeds, thermometers, and different temperature-controlled environments (e.g., refrigerator, room temperature, heated environment).
- **Procedure**

i. Fill each pot with the same type of soil.

ii. Plant seeds in each pot.

iii. Place each pot in a different environment with controlled temperatures (e.g., cold, room temperature, warm). For example, keep one pot outside in balcony to get sunlight. Put another in shade in the room. Keep the third one in basement or at coldest part of the house.

iv. Water each pot equally.

v. Record the number of seeds germinated in each environment daily for two weeks.

- Observation: Measure and compare the rate of germination and growth in different temperatures.
- Conclusion: Determine the optimal temperature for seed germination based on observations

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. c. Presence of cells

Explanation : Because of these cells only, living things grow but non – living things does not.

2. c. A flowing river

Explanation: While a river can support life within it, the water itself is not considered a living organism.

A growing plant: and a running dog are both living things.

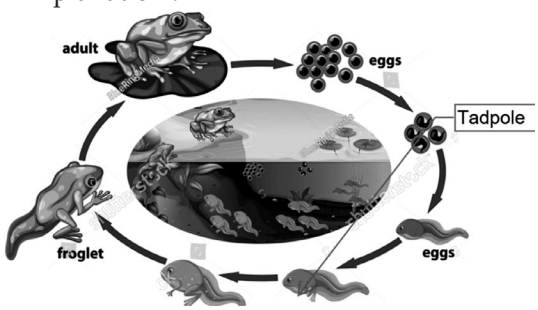
A hatching egg: is considered a potential for life, with the developing embryo inside being considered living.

3. c. it can grow into a plant under the right conditions.

Explanation : Seeds demonstrate all the characteristics of life: they're made of cells, they have a life span, they use matter and energy, they respond to their environment, and they carry DNA.

4. a. Egg → Tadpole → Froglet → Adult Frog

Explanation :



5. b. To feed and grow

Explanation : The larvae are mainly filter

feeders using specialized mouthparts to brush in organic debris and microorganisms from the water around them.

B. Fill in the Blanks Using Suitable Words

1. adapt
2. Reproduction
3. photosynthesis
4. excrete
5. locomotion
6. pupa
7. growth

C. Complete the following table

Objects	Similarities	Differences
	It has flowers in it	It is a living thing
	It is also made of flowers	It is a non- living thing, as flowers are now removed from the plant.

D. Answer in one word(VSA)

1. Excretion
2. Locomotion
3. Reproduction
4. Germination
5. Tadpole stage
6. metamorphosis
7. Stimuli

E. ASSERTION AND REASON.

1. b Both A and R are true, but R is not the correct explanation of A.

Explanation : Plants are living things as they show all the characteristics of living things expect they move from one place to another.

Plants show their movement towards gravity and it is called geotropism. Plants also show their movement towards the sun and it is called phototropism. The Mimosa pudica plant shows the nastic movement, a non-directional movement of a plant part in response to an external stimulus.

2. d. A is false, but R is true.

Explanation : the life cycle from eggs begin from eggs. The eggs hatch into tadpoles, which live in water. Tadpoles have tails for swimming and gills for breathing. They feed on algae and grow over time.

HOTS

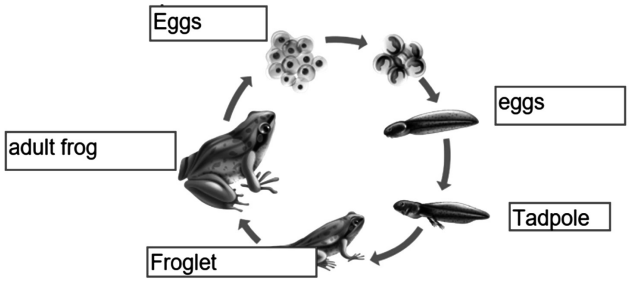
1. Yes, a plant that does not produce flowers can still reproduce; non-flowering plants like ferns and mosses reproduce through spores instead of seeds, which are produced by flowers; therefore, they can still propagate new individuals without blooming.

Non-flowering plants mainly reproduce through spores and vegetative propagation.

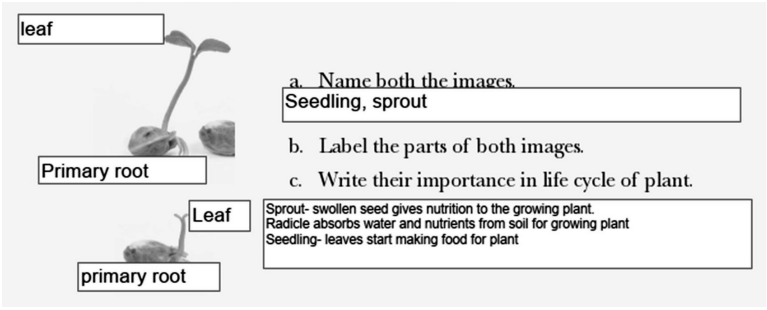
2. If our surrounding will remain free from stagnant water, mosquitoes will not be able to find the place of breeding and ultimately their population will decrease. Although mosquitoes live on land, they lay eggs in clean water, and the stagnant water provides a breeding ground for them. Their larvae grow in clean water. Therefore, by preventing stagnation of water, we can prevent mosquitoes from breeding (mating). As a result, mosquitoes can be controlled.

PICTURE BASED ASSESSMENT

1.



2. Identify the given picture and answer the questions.



VALUE AND LIFE SKILL BASED

This shows the concern of children towards the depletion of the habitat of the frogs and other aquatic organisms. They are concerned about the living creatures, their habitats and conservation of water.

If a water body is destroyed, the most immediate consequence is the loss of habitat for aquatic life, leading to potential extinction of species that rely on that water source; this disruption can ripple through the entire food chain, impacting land animals as well; additionally, the local climate could be altered, impacting weather patterns, and humans would face a severe shortage of drinking water, potentially causing widespread disease and economic decline.

CASE STUDY BASED ASSESSMENT

1. Living organisms play a crucial role in the formation and maintenance of non-living components by shaping the environment through processes like weathering, erosion, nutrient cycling, and the creation of habitats, essentially influencing the composition and structure of non-living elements like soil, water, and atmosphere within an ecosystem.

2. A forest ecosystem can recover after a disaster through a process .The area gradually regrows with vegetation, starting with pioneer species and progressing to more complex communities, by replanting native tree species, protecting remaining vegetation, managing invasive species, and addressing any underlying environmental factors that contributed to the disaster, like soil quality or water management.

3. Living beings contribute to the non-living environment by managing the processes like nutrient cycling, weathering of rocks, creating soil, affecting water flow and releasing gases into the atmosphere. Living beings plays a vital role in the dynamic balance of an ecosystem by interacting with elements like air, water and land.

LEARN HOLISTICALLY

1. An ecosystem is a community of living organisms and their physical environment that interact with each other. Ecosystems can be natural or artificial, and can be found on land or in water.

Two categories of eco – systems are : living and non – living things

Living things : Fish, snake, duck, tortoise, frog, plants

Non – living things : rocks, water, soil, air

"Interdependence of living and non-living things" refers to the crucial relationship where living organisms rely on non-living components like air, water, sunlight, and soil for survival, while the non-living components are often affected by the presence and activities of living organisms, creating a balanced ecosystem where each element depends on the other to exist; essentially, neither can thrive without the other.

Living things depend on non-living factors like water, air, and minerals from the soil for basic life functions.

The interaction between living organisms and their non-living environment creates a delicate balance within an ecosystem

Living organisms can modify their environment through activities like photosynthesis, decomposition, and erosion, affecting the non-living components.

3. "Social disturbances in ecosystems" refers to disruptions within an ecosystem that are caused by human activities, impacting not just the environment but also the social dynamics of the communities that rely on it, often leading to changes in livelihoods, resource access, and potential conflicts between groups due to the altered ecosystem services.

Example : When an ecosystem is disrupted by human activities like deforestation, overfishing, or pollution, the people who depend on that ecosystem for food, water, and income can experience significant social impacts, including displacement, economic hardship, and food insecurity.

PERFORMANCE METRICS

(COMPETENCY BASED)

1. c. They respire to get energy.

Explanation : rest all are either done by plants or animals not by both

2. b. The snail in set-up B will survive while the snail in set-up A will not survive.

Explanation : Snails need oxygen to live, just like all other living things, which is available in set up B not in set up A.

3. c. Living things reproduce their own kind.

Explanation : Reproduction is the key characteristic that allows a species to increase in number, as organisms produce offspring similar to themselves. Rest all options does not satisfy the given condition.

4. c. I,II, and IV

Explanation : The grasshopper will die in the absence of air ,food and water.

5. c. The larvae are known as wrigglers.

Explanation: Wrigglers" is a term used to describe mosquito larvae, not frog larvae which are called tadpoles.

CHAPTER

11 Nature's Treasures

NCERT TEXT-BOOK QUESTIONS

Answer 1:

Item	Jumbled up name	Resources	Renewable or Non-renewable Resources
	Water	River, Pond	Renewable
	Wind	Atmosphere	Renewable
	Forest	Forest	Renewable
	Rock	Minerals	Non-Renewable

Answer 2:

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

Answer 3:

(i) Petrol (ii) Water

Answer 4:

Renewable: Forest / Non-renewable: Coal, natural gas and minerals

Answer 5: It is because:

a) it gets over once used.

b) it takes millions of years to make petroleum

Answer 6:

It is a slow process. It takes many years to grow plants into trees, and so to regrow forest. Human activities like urbanisation also hinder regrowing trees and so the forest.

Answer 7:

Daily Activity	Natural Resource Used	Ways to Reduce use
1. Cooking	Natural gas	Use solar cookers
2. Drinking water	Water	Use a water-efficient faucet
3. Using paper	Trees (forests)	Use digital documents
4. Using electricity	Coal, natural gas	Use energy-efficient appliance
5. Driving a car	Petroleum	Use public transport

Answer 8:

Four activities that are possible due to presence of air

(i) Breathing

(ii) Generating electricity through wind turbines

(iii) Transportation through aeroplanes.

(iv) Flying kites

Answer 9:

List of actions to be taken

i. Encourage neighbours to grow plants in their gardens.

ii. Collaborate with local schools to create green initiatives.

iii. Advocate for the protection of existing trees and green spaces.

iv. Participate in community tree planting drives.

v. Plant trees in local parks and open spaces.

Answer 10:

(i) Solar Energy

(ii) Benefit: Solar energy is a renewable and clean source of energy. Hence it is environment friendly.

Drawback: Dependence on Weather: Solar energy cannot be used during cloudy days or at night, which limits its reliability and convenience.

Answer 11:

a) It will cause soil erosion due to heavy rainfall or storm.

b) Fallen leaves from trees decompose and add organic matter to the soil, enhancing its fertility and structure.

c) In absence of trees, it won't happen so fertility of the soil will be vanished.

Answer 12:

(i) Deforestation reduces the number of trees that can absorb carbon dioxide, increasing the concentration of greenhouse gases.

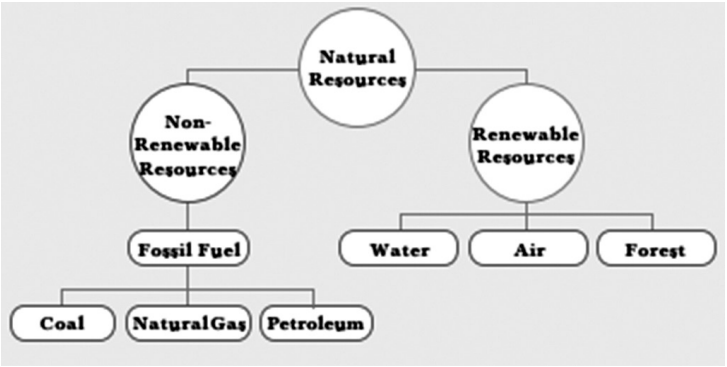
(ii) Burning fossil fuels in vehicles and factories releases harmful pollutants like carbon monoxide and sulphur dioxide into the air.

Action to reduce air pollution: Promote the use of public transport and electric vehicles to decrease the number of fossil fuel-powered vehicles on the road.

Answer 13:

If there were no sunlight for a week, the solar panels would not be able to generate electricity, leading the family to rely on alternative sources of power. Additionally, the growth of plants would be affected due to the lack of sunlight for photosynthesis. They can use gas stove effectively and windmill too.

Answer 14:



Answer 15:

Trees play a crucial role in maintaining ecological balance by providing oxygen, supporting wildlife and preventing soil erosion. Large scale deforestation can lead to loss of biodiversity, leads to climate change and disruption of water cycles. Sustainable practices such as using alternative materials, implementing stricter regulations on tree felling, and promoting reforestation can help balance economic development with environmental conservation.

Answer 16:

A. Plan to Use Less Water

i. Use grey water for gardening purposes.

ii. Implement a rainwater harvesting system.

iii. Install water-efficient faucets and toilets.

B. Steps to Implement the Plan

i. Monitor water usage regularly and set reduction targets.

ii. Encourage student-led initiatives for water conservation.

iii. Collaborate with local authorities and experts to install water saving devices.

C. Environmental Benefits

i. Promotes sustainability and responsible water usage within the community.

ii. Decreases the energy used in water treatment and distribution.

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. d. Forest

Explanation :The natural resource that is most commonly associated with causing air pollution is "Forest" primarily due to forest fires which release significant amounts of pollutants into the atmosphere when they occur.

2. a. 21%

Explanation: Air is primarily composed of 78% nitrogen and 21% oxygen.

3. a. Practicing 3Rs

Explanation : The three R's that will help us to conserve natural resources for long-term use are reduce, recycle, and reuse.

4. d. Both a and b

Explanation : Both afforestation and reforestation involve actively planting trees, which is a crucial method for protecting nature's biodiversity.

5. C. vermicomposting

Explanation : Vermicompost is a nutrient-rich organic fertilizer that improves soil quality and plant growth.

B. Fill in the blanks using suitable words.

1. renewable
2. non – renewable
3. rainwater harvesting
4. water
5. weathering of rocks
6. rocks/organic matter
7. soil erosion

C. Complete the following table

Points of differences	Renewable Resources	Non- Renewable Resources
Definition	Resources that can be used over and over again	Resources that can only be used once
Examples	wind , water, solar energy	coal, petroleum
Ways to Conserve	Avoid disposing off waste in water bodies, avoiding air pollution	Using them responsibly and wisely, and by reducing your use or limiting their use

D. Answer in one word(VSA).

1. Organic layer
2. 45%
3. Earthworms
4. Rainwater harvesting
5. 150-200 million years
6. afforestation
7. underground water

E. Assertion-Reason Questions.

1. a. Both A and R are true, and R is the correct explanation of A.

Explanation : Assertion is true because water is considered a renewable resource due to its continuous replenishment through the water cycle.

Reason is also true, as the water cycle, which includes evaporation, condensation, and precipitation, is the primary mechanism for replenishing water on Earth.

3. c. A is true, but R is false.

Explanation: Assertion (A) is correct; marble is indeed a metamorphic rock. However, Reason (R) is incorrect; marble is not formed by weathering, but rather by the metamorphism of sedimentary rocks like limestone.

HOTS

1. The loss of forest vegetation leads to a reduction in soil cohesion and a decrease in the shear strength of the soil profile. As a result, the slope becomes more susceptible to landsliding and the return time of landslides decreases.

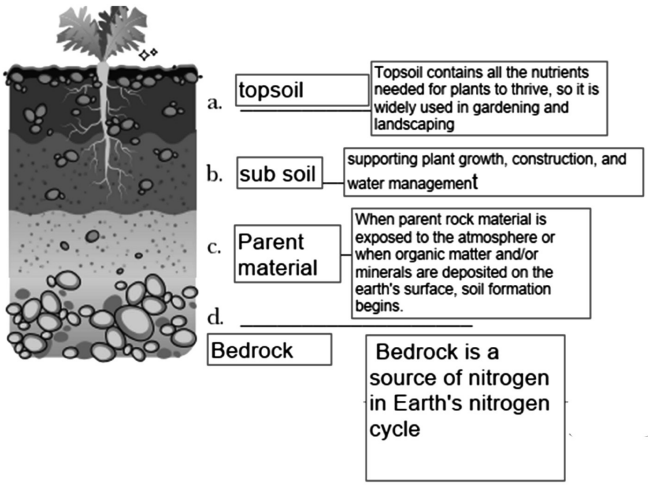
2. Farmers often choose drip irrigation over traditional watering methods because it is significantly more water-efficient, delivering water directly to the plant roots, minimizing evaporation and runoff, and allowing for precise control over water application, ultimately leading to higher crop yields while conserving valuable water resources, especially in arid regions.

PICTURE BASED ASSESSMENT

1. a. Solar energy

b. In a solar cooker, a reflector is used to concentrate sunlight from a larger area onto a smaller cooking surface area, to increase the amount of heat captured and allowing for efficient cooking.

2.



VALUE AND LIFE SKILL BASED

Awareness and understanding of environmental issues provide the basis and rationale for commitment and meaningful action towards environmentally sound and sustainable development. Education has been identified as a critical force for adopting a range of strategies for implementing such policies and programmes. Deep understanding of ecosystems builds a personal connection to the natural world through hands-on experiences, promoting critical thinking about environmental issues, instilling a sense of responsibility and stewardship, and empowering individuals to make informed decisions towards sustainable practices; ultimately leading to a greater appreciation for nature and a motivation to protect it.

CASE STUDY BASED ASSESSMENT

1. Gaura devi

2. The Chipko movement was a non-violent protest that protected India's forests and natural resources. It was a major environmental movement that inspired future movements in India and around the world.

3. There are many ways to conserve forests, including afforestation, controlling forest fires, and sustainable forest management.

LEARN HOLISTICALLY

1. Soil is formed through a process called weathering, where rocks are broken down into smaller particles by physical and chemical processes over a long period of time, with the primary contributors being climate, living organisms, topography, and the original rock material (parent material).

The composition of soil includes mineral particles from weathered rocks, organic matter from decomposed plants and animals, air, and water, all interacting within the soil profile.

2. Topsoil is crucial for plant growth because it contains the highest concentration of essential nutrients, organic matter, and microorganisms necessary for roots to thrive, allowing plants to access the water and nutrients they need to flourish; essentially, it acts as the primary foundation for plant growth and is where most of the biological activity in soil occurs.

Roughly 95% of the world's food is grown in the uppermost layer of soil. This is because topsoil contains all of the nutrients that plants need to survive. These nutrients

usually come from dead organic matter that is then broken down by microorganisms in the topsoil

3. Do it yourself

PERFORMANCE METRICS (COMPETENCY BASED)

1. b. Non-renewable resource Renewable resource

   Explanation :Coal is a non – renewable resource and solar energy is a renewable resource.

2. a. It releases greenhouse gases like carbon dioxide, which trap heat in the atmosphere.

   Explanation: When fossil fuels are burned, they release carbon dioxide into the atmosphere, which acts as a greenhouse gas, trapping heat from the sun and causing the Earth's temperature to rise.

3. b. Developing energy-efficient appliances and green technology

   Explanation : It emphasizes the need for responsible production and consumption patterns, efficient use of resources, and the promotion of green technologies.

4. b. Afforestation Cutting of trees.

   Explanation : afforestation is the planting of tress, not cutting of trees.

CHAPTER

12 Beyond Earth

NCERT TEXT-BOOK QUESTIONS

Answer 1:

(i). (d) (ii). (c) (iii). (a) (iv). (b)

Answer 2:

(i) MARS

(ii)

i. My first alphabet is in VAN but not in PAN

My second alphabet is in EARTH and also in HEAVEN

My third alphabet is in ONE and not in TWO

My fourth alphabet is in SUN and also in FUN

My last alphabet is in STAR but not in RADAR

I am a planet that moves around the Sun.

Answer: VENUS

ii. My first alphabet is in EAT but not in BAT

My second alphabet is in FAT and also in SAT

My third alphabet is in RAT and not in MAT

My fourth alphabet is in TEN and also in NET

My fifth alphabet is in HAT but not in PAT.

I am a planet that moves round the Sun.

Answer 3:

(i). Sirius

Answer 4:

(ii). Pluto

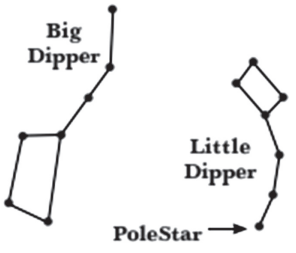
Answer 5:

Sirius

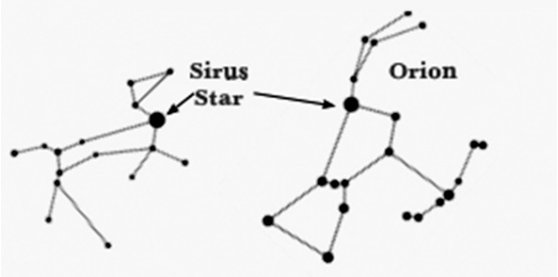
Answer 6:

The order of the planets in the figure is not correct. The correct order from the Sun is: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Answer 7:



Answer 8:



Answer 9:

It happens due to the rotation of the Earth. During the day, the Sun's light scatters in Earth's atmosphere, making the sky bright and obscuring the light from other stars. As the Sun sets, the sky darkens, allowing the light from the stars to become visible again

Answer 10:

The Big Dipper appears to move around the Pole Star due to the rotation of the Earth.

Over a few hours, its position changes, making it seem as if it is rotating around the Pole Star.

Answer 11:

Do it yourself

PRACTICE FOCUS

A. Choose the most appropriate answer.

1. a. Neptune

Explanation : The sequence of planets from closest to furthest from the Sun is: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

2. b. Saturn

Explanation: While other planets like Uranus and Neptune also have rings, Saturn is known to have the most prominent and complex ring system.

3. b. Mars

Explanation: Mars appears red due to iron oxide prevalent on its surface, which essentially looks like rust.

4. a. Orion

Explanation : The Orion constellation is also called 'the hunter' or Mriga in India. Three bright stars that are placed in a line form the 'belt' of the hunter. Sirius is part of this constellation (the brightest star in the night sky).

5. d. Both a and b

Explanation: "Polaris" is the scientific name for the Pole Star, while "Dhruv Tara" is the Hindi name for it, essentially meaning "the fixed star".

B. Fill in the blanks using suitable words:

1. constellation
2. great bear or saptrishi
3. mercury
4. Jupiter
5. Jupiter
6. National Space Day
7. meteors

C. Complete the following table :

Points of differences	Inner Planets	Outer Planets
Atmosphere	They have thin atmosphere	They have thick atmosphere
Distance from the Sun	They are nearer to the sun.	They are far away from the sun
Examples	They Include Mercury, Venus, Earth, Mars	They include Jupiter, Saturn, Uranus, Neptune etc.

D. Answer in one word(VSA).

1. Milky way
2. Orbit
3. Comet
4. Meteorite
5. Meteoroid
6. Halley's Comet.
7. Nuclear fusion

E. ASSERTION-REASON QUESTIONS

1. a. Both A and R are true, and R is the correct explanation of A.

Explanation: When a meteoroid (a small piece of rock from space) enters Earth's atmosphere at high speed, it encounters significant friction with the air molecules, generating immense heat which causes it to burn up, creating a streak of light we see as a meteor or shooting star.

2. d. A is false, but R is true.

Explanation : Jupiter, Uranus and Neptune all have rings, though Jupiter's probably have little ice in them.

Saturn's rings are thought to be pieces of comets, asteroids, or shattered moons that broke up before they reached the planet, torn apart by Saturn's powerful gravity. They are made of billions of small chunks of ice and rock coated with other materials such as dust.

HOTS

1. A comet's tail always points away from the Sun because the pressure from sunlight (radiation pressure) and the solar wind, a stream of charged particles from the Sun, push the dust and gas particles released by the comet away from the Sun, effectively "blowing" the tail in that direction, regardless of the comet's movement direction.

2. Venus is the hottest planet in the solar system because of its extremely thick atmosphere, primarily composed of carbon dioxide, which creates a strong greenhouse effect, trapping heat from the sun and causing surface temperatures to soar, even though it's not the closest planet to the sun.

PICTURE BASED ASSESSMENT

1. Identify the given constellation and write their one significant feature.

Ursa major

Ursa major is also known as big dipper or great bear. In Indian mythology, seven stars of this constellation are together known as Saptarshi mandal, a group of seven rishis namely "Vashistha", "Marichi", "Pulastya", "Pulaha", "Atri", "Angiras" and "Kratu". This constellation helps us to locate pole star or Dhruv Tara.

Orion

The Orion constellation looks like a hunter.
Its three stars in the centre represent the belt
of the hunter and called Orion belt.

2. First is comet and second is meteor.

Comets are icy bodies that orbit the sun, while meteors are pieces of space debris that burn up in the Earth's atmosphere.

Comets often called "dirty snowballs" and Meteor also known as "shooting stars"

VALUE AND LIFE SKILL BASED

Solar energy contributes to a sustainable environment by providing a clean, renewable energy source that significantly reduces greenhouse gas emissions when used in place of fossil fuels, thereby helping to protect natural resources like air and

water quality while mitigating climate change; it also minimizes the need for land extraction associated with traditional energy sources, preserving ecosystems and habitats.

CASE STUDY BASED ASSESSMENT

1. Scientists believe water is necessary for life because it acts as a universal solvent, allowing for crucial chemical reactions to occur within living organisms, and is a key component of cells, facilitating processes like nutrient transport, waste removal, and temperature regulation, making it vital for the functioning of all known life forms on Earth.

2. Venus is the hottest planet in the solar system because of its extremely thick atmosphere, primarily composed of carbon dioxide, which creates a strong greenhouse effect, trapping heat from the sun and causing surface temperatures to soar, even though it's not the closest planet to the sun.

3. Mars because it appears red due to iron oxide prevalent on its surface, which essentially looks like rust.

4. Neptune is the farthest gaseous planet from the Sun, that is why it is cold.

LEARN HOLISTICALLY

1. Jupiter's atmosphere is made up mostly of hydrogen and helium, while Earth's is made up mostly of nitrogen and oxygen. Jupiter's atmosphere is also layered differently than Earth's, and it has more intense auroras and weather.

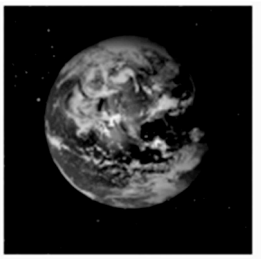
2. Do it yourself

3. Do it yourself

4. Do it yourself

PERFORMANCE METRICS (COMPETENCY BASED)

1. a.



Explanation : Because it is the only planet having life.

2. b. It reflects sunlight due to its thick clouds.

Explanation : Venus has a dense atmosphere filled with reflective clouds, which efficiently bounce back a large amount of sunlight towards Earth, making it appear very bright.

3. b. A collection of rocky bodies between Mars and Jupiter.

Explanation : There are some other small sized rocky bodies found in between the planets Mars and Jupiter, called as asteroids. They orbit around the Sun. The region where asteroids are found is called asteroid belt.

4. b. By helping locate the North Star and identify directions at night.

Explanation : In ancient times people were using stars and constellations for navigation purpose. Sailors and travellers were using them to find directions at sea or on land before the invention of magnetic compass.

5. d. presence of rust (iron oxide) on its surface

Explanation : Mars because it appears red due to iron oxide prevalent on its surface, which essentially looks like rust.