

# Items for Assessment of Learning Outcomes

## Science Class 7



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## CHAPTER I NUTRITION IN PLANTS

### Learning Objectives

- Examine different methods of nutrition in order to differentiate between autotrophic and heterotrophic nutrition

### Learning Outcome

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, et c., on the basis of their properties, structure and function

1. **Venus fly trap shown in the picture eats insects. Where would you place it?**



- (a) Autotrophic
  - (b) Decomposer
  - (c) Heterotrophic
  - (d) Partial Heterotrophs
2. **The cells of an autotroph are different from a heterotroph as they possess:**
    - (a) Chloroplast
    - (b) Endoplasmic reticulum
    - (c) Lysosomes
    - (d) Mitochondria

**3. Which among the following is not an autotroph?**

- (a) Algae
- (b) Bacteria
- (c) Insect
- (d) Plant

**Answers: 1(d)**

**2(a)**

**3(c)**

## Learning Objectives

- Evaluate other plants in their surroundings & classify them as autotrophs, heterotrophs, saprotrophs, parasitic or symbiotic based on their nutritional requirements.

## Learning Outcome

- Classifies materials and organisms based on properties /characteristics, e.g., plant and animal fibres; physical and chemical changes.
- 1. *Rhizobium* and *Nitrosomonas* are two microorganisms that fix atmospheric nitrogen. How are these two different?**
    - (a) *Rhizobium* divides very fast and *Nitrosomonas* divides slowly
    - (b) *Rhizobium* is symbiotic and *Nitrosomonas* lives in soil
    - (c) *Rhizobium* is a bacteria and *Nitrosomonas* is a virus
    - (d) Both are different names of the same microorganism
  - 2. Both Saprotrophs and Parasites derive nutrition from other organisms but the basic difference between the two is:**
    - (a) Saprotrophs live external to the other organism whereas Parasites live inside the other organism
    - (b) Saprotrophs are bacteria and Parasites are worms
    - (c) Saprotrophs feed on dead and decaying organisms and Parasites feed on bodies of living organisms
    - (d) There is not much difference between the two
  - 3. Pea, beans, lentils are \_\_\_\_\_plants whereas cactus, Kikar, Aloe are\_\_\_\_\_plants.**
    - (a) insectivorous, xerophytes
    - (b) leguminous, aquatic
    - (c) leguminous, xerophytes
    - (d) insectivorous, aquatic

Answers: 1(b)

2 (c)

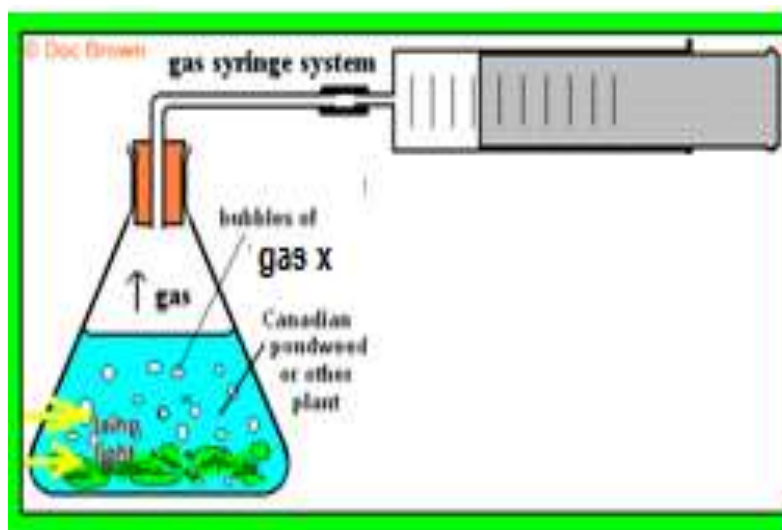
3 (c)

## Learning Objectives

- Categorize features of insectivores, saprophytes and symbionts, based on their similarities.
- Evaluate if leaves that are red, purple/colours other than green might show lesser photosynthetic activity than green leaves

## Learning Outcome

- Conducts simple investigations to seek answers to queries, e.g., can extracts of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?
- 1. While demonstrating an experiment the teacher took spirit in the test tube. Then she dipped the leaf in the spirit and boiled it. After washing the leaf, it was dipped in an iodine solution. The leaf showed blue black colour. What does this indicate? Choose the correct option.**
    - (a) In the process of photosynthesis food is manufactured
    - (b) The leaf is site of photosynthesis
    - (c) Starch is present in leaves
    - (d) Spirit removes starch from the leaves on boiling
  - 2. In an experimental set up shown in the picture, a gas piston was used to calculate amount of gas released in the process of photosynthesis. Identify the gas X-**



source- <http://www.docbrown.info/ebiology/photosynthesis.htm>

- |                    |                  |
|--------------------|------------------|
| (a) Carbon dioxide | (b) Nitrogen     |
| (c) Oxygen         | (d) water vapour |

- 3. In the same experiment another similar set up was done using a small Croton plant having purple leaves. It was seen that amount /volume of gas X released in both the set ups was the same. What does this observation indicate?**
- (a) both plants with green leaves as well as with purple leaves release the same amount of gas X
  - (b) the colour of the leaves does not impact the rate of photosynthesis as all leaves have the same amount of chlorophyll
  - (c) both a and b are true
  - (d) both a and b are untrue

**Answers: 1(c)**

**2 (c)**

**3 (c)**

## Learning Objectives

- Construct the cause & effect model of plant rotation done by farmers

## Learning Outcome

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

**1. Cereal crops are generally rotated with leguminous crops by the farmers because:**

- (a) Both are easy to grow
- (b) Both cereal crops and leguminous crops use nitrogen in the soil
- (c) Cereal crops deplete the soil of nitrogen and leguminous crops replenish the soil with nitrogen
- (d) Both a and c are correct

**2. Crop rotation is advantageous because it:**

- (a) Return nutrients to the soil
- (b) Interrupt pest and disease cycles
- (c) Increase biodiversity on the farm.
- (d) All of the above

**3. Crop rotation replenishes soil in a natural way, still it is avoided by most of the farmers now a days because:**

- (a) They do not know the process of crop rotation very well
- (b) Crop rotation needs more labour
- (c) Crop rotation is not a very easy process
- (d) The farmers are tempted to sow the fields nonstop with plants that yield more cash.

**Answers: 1(c)**

**2 (d)**

**3 (d)**

## Learning Objectives

- Recall details/definitions specific to autotrophic mode of nutrition in plants / photosynthesis / detection of photosynthetic activity of plants/nutrients other than carbohydrates, in plants
- Define Nutrition & its importance to living organisms
- Elaborate the photosynthetic process in plants
- List the nutrients and sunlight requirements in plants in order to explain how these are fulfilled through enquiry activity
- Relate the nutritional requirements of different organisms (plants & animals) to the environment or surroundings for survival

## Learning Outcome

- Explains processes and phenomenon, e.g., processing of plant fibers; movements in plants and animals; formation of shadows; reflection of light from plane mirror; variations in composition of air; preparation of vermicompost, etc

### 1. Identify the pair of organisms that live in a symbiotic relationship-

- (a) Plant shoots and *Rhizobium* bacteria
- (b) Algae and fungi in lichens
- (c) Plant roots and bacteria living around them in soil
- (d) None of these

### 2. Both fertilizers and manures add nutrients to the soil, however the environmentalists encourage farmers to use manures. Why?

- (a) Manures give bad odour.
- (b) manures are easy to store
- (c) manures are biodegradable and makes soil porous
- (d) fertilisers are not easily available

### 3. Statement A- Saprophytes live on dead decaying matter Statement B- Saprophytes have their advantages as well as disadvantages

- (a) Statement A is true but statement B is false
- (b) Both Statement A and B are true
- (c) Both statement A and B are false
- (d) Statement A and B are true and B is the correct explanation of A

Answers: 1(b)

2 (c)

3 (b)

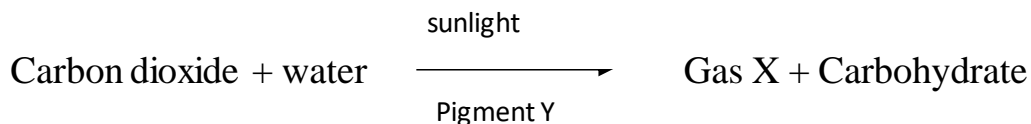


## Learning Objectives

- Describe the process of photosynthesis with the help of word/chemical equation

## Learning Outcome

- writes word equations for chemical reactions eg. acid base reactions; corrosion; photosynthesis; respiration



**1. Identify the process shown by the above equation:**

- (a) Photosynthesis
- (b) Respiration
- (c) Transpiration
- (d) Translocation

**2. Identify the pigment Y in the above equation:**

- (a) Chloroplast
- (b) Chlorophyll
- (c) Magnesium
- (d) Water

**3. If carbon dioxide is a reactant in the process shown in the equation above, then identify the gas X released:**

- (a) Carbon monoxide
- (b) Nitrogen
- (c) Oxygen
- (d) Vapours

**Answers: 1(a)**

**2 (b)**

**3 (c)**

## CHAPTER II

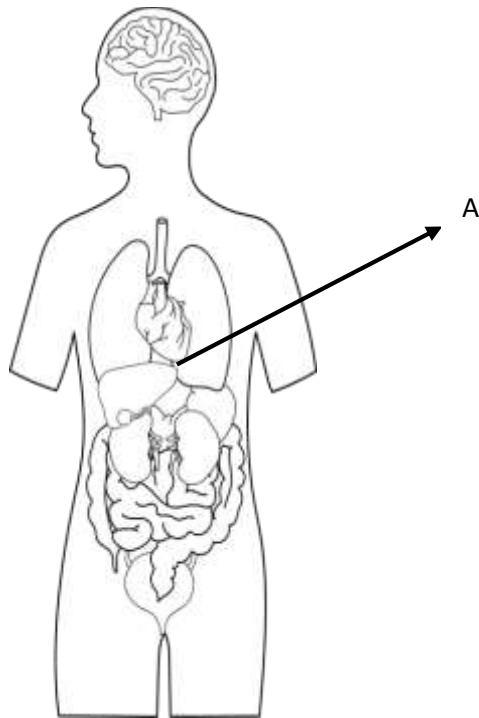
### NUTRITION IN ANIMALS

#### Learning Objectives

- Illustrate human digestive system with the help of a well labelled diagram & elaborate the process & function of each part

#### Learning Outcome

- Identifies materials and organisms, such as, animal fibres; types of teeth; mirrors and lenses, on the basis of observable features, i.e., appearance, texture, functions, etc.



#### 1. Identify the part A in the above diagram of human digestive system

- (a) Liver
- (b) Heart
- (c) Pancreas
- (d) Stomach

#### 2. Identify the largest part of the human digestive system

- (a) Large intestine
- (b) Rectum
- (c) Small intestine
- (d) Stomach

**3. Identify the part of the human digestive system missing in the above diagram:**

- (a) oesophagus
- (b) small intestine
- (c) large intestine
- (d) liver

**Answers: 1(a)**

**2 (b)**

**3 (c)**

## Learning Objectives

- Compare & contrast the features of digestive system of grass-eating animals with those of humans.

## Learning Outcome

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function

**1. Human beings lack the capacity to eat grass and digest it because:**

- (a) The grass eating animals are not able to cook hence they eat grass
- (b) humans lack cellulose digesting bacteria in their gut
- (c) human beings have a specialised organ for digesting cellulose
- (d) human beings leave the grass for the animals

**2. Animals like horse and rabbit have a specialised organ called \_\_\_\_\_ which is the site of digestion of cellulose.**

- (a) rectum
- (b) oesophagus
- (c) small intestine
- (d) caecum

**3. The grass eating animals swallow food quickly after chewing it partially, whereas as human beings chew food properly before ingesting it because (more than one option is correct):**

- (a) grass eating animals eat as much as they can and then take rest
- (b) grass eating animals have a rumen to store their food, which later returns to mouth for chewing.
- (c) human beings lack any such storage structure for food.
- (d) grass eating animals chew slowly as compared human beings

**Answers: 1(b)**

**2 (d)**

**3 (b, c)**

## Learning Objectives

- Classifies animals based on their modes of feeding.

## Learning Outcome

- Classifies materials and organisms based on properties /characteristics, e.g., plant and animal fibres; physical and chemical changes

### 1. Three groups of organisms on the on the basis of their mode of nutrition are:

- (a) ingestion, digestion, egestion
- (b) autotrophs, heterotrophs, oligotrophs
- (c) holozoic nutrition, saprozoic nutrition and parasitic nutrition
- (d) none of the above

### 2. Match the column 1 and 2

#### COLUMN 1

- (i) Amoeba
- (ii) Fungi
- (iii) Ring worm
- (iv) Human beings

#### COLUMN 2

- 1. saprophyte
- 2. phagocyte
- 3. heterotrophs
- 4. parasite

Identify the correct matching:

- (a) (i) 1, (ii) 2, (iii) 3, (iv) 4
- (b) (i) 1, (ii) 3, (iii) 2, (iv) 4
- (c) (i) 2, (ii) 1, (iii) 4, (iv) 3
- (d) (i) 2, (ii) 3, (iii) 4, (iv) 1

### 3. Identify the mismatched among the following:

Animal	Type of teeth that are well developed
(a) Cow	Molars
(b) Lion	Canines
(c) Rabbits	Premolars
(d) Giraffes	Incisors

Answers: 1(b)

2 (c)

3 (c)

## Learning Objectives

- Perform the starch test on raw and chewed food in order to infer the role of saliva.

## Learning Outcome

- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?
- 1. Students took two test tubes. They crushed a piece of chapatti and mixed with water and put it in one test tube. In another test tube they put chewed piece of chapatti and added 3-4 ml water to it. Then they added a few drops of iodine solution to it. They observed that the colour of iodine solution turned blue black in the test tube containing chewed chapatti, but no such change was observed in the other test tube. The reason for this observation is:**
    - (a) chewed chapatti has some chemicals in it
    - (b) saliva converts starch to sugar
    - (c) iodine solution changes colour with starch
    - (d) saliva turns starch to water
  - 2. In the above experiment if you do litmus test of the mixture of chewed chapatti is done. What would be the result?**
    - (a) Red litmus turns blue
    - (b) Blue litmus turns red
    - (c) No change will take place
    - (d) Red litmus will turn purple
  - 3. Name the enzyme present in saliva:**
    - (a) Peptinase
    - (b) trypsin
    - (c) amylase
    - (d) protease

Answers: (c)

2 (c)

3 (c)

## Learning Objectives

- Recall details pertaining different modes of acquiring food.

## Learning Outcome

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.

**1. Assertion: Higher organisms are heterotrophic in nutrition**

**Reason: Higher organisms acquire food from other organisms at lower trophic levels**

- (a) assertion is true but reason is false
- (b) assertion is false but reason is true
- (c) both assertion and reason are false
- (d) both assertion and reason are true

**2. Holozoic mode of nutrition is not seen in:**

- (a) Amoeba
- (b) Homo Sapiens
- (c) Mucor
- (d) Yeast

**3. Mode of nutrition in bacteria is:**

- (a) autotrophic
- (b) heterotrophic
- (c) autotrophic and heterotrophic
- (c) none of these

**Answers: 1(d)**

**2 (b)**

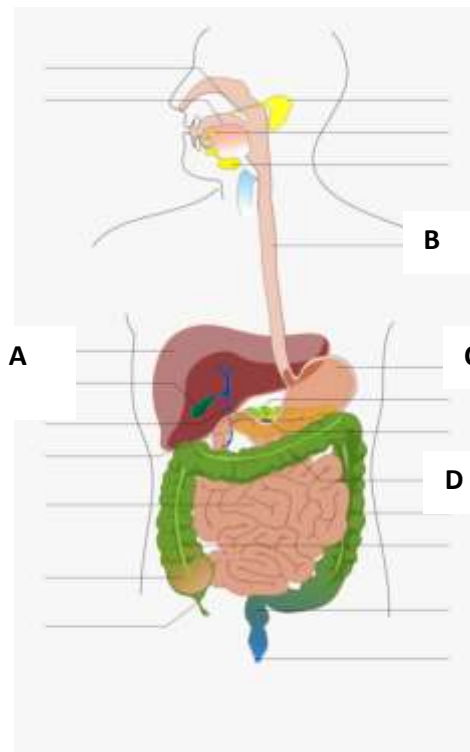
**3 (c)**

## Learning Objectives

- Summarize the functions of Human digestive system.
- Recall details pertaining to nutrition in amoeba
- Illustrate human digestive system with the help of a well labelled diagram & elaborate the process & function of each part

## Learning Outcome

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.



- 1. The largest gland of the human digestive system:**  
(a) A                      (b) B                      (c) C                      (d) D
- 2. The part of the digestive system with acidic environment:**  
(a) A                      (b) B                      (c) C                      (d) D
- 3. The part of the digestive system that does not secrete any enzyme and shows peristaltic movements:**  
(a) A                      (b) B                      (c) C                      (d) D

Answers: 1(a)

2 (c)

3 (b)



## CHAPTER III

### FIBRE TO FABRIC

#### Learning Objectives

- Examine selective breeding process for obtaining special characters in the offspring, e.g. soft under hair in sheep
- Compare coarse beard hair & soft under hair of animals based on their utility

#### Learning Outcomes

- Classifies materials and organisms based on properties/characteristics, e.g., plant and animal fibres; physical and chemical changes.

#### QUESTIONS

- 1. The under fur of \_\_\_\_\_ is woven into shawls called Pashmina Shawls.**
  - (a) Yak
  - (b) Sheep
  - (c) Camel
  - (d) Kashmiri Goat
  
- 2. Which type of wool is common in Tibet and Ladakh?**
  - (a) Yak
  - (b) Sheep wool
  - (c) Angora wool
  - (d) Pashmina wool
  
- 3. Certain breeds of sheep have thick coat of hair which is famous for:**
  - (a) Good quality of wool
  - (b) Coarse quality of wool
  - (c) Hosiery articles covering
  - (d) Milk giving animals

**ANSWERS: Q1 (d)                      Q2 (a)                      Q3 (a)**

## Learning Objectives

- Examine selective breeding process for obtaining special characters in the offspring, e.g. soft under hair in sheep.

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

## QUESTIONS

- 1. Silk worm secretes fibre which is made of a :**
  - (a) Fat
  - (b) Cellulose
  - (c) Protein
  - (d) Nylon
  
- 2. In the process of selective breeding, some breeds of sheeps are selected as parents for obtaining special character in their offspring. Select that special character of sheep from given options.**
  - (a) Soft under hair
  - (b) Coarse beard hair
  - (c) Fur
  - (d) None of the above
  
- 3. What is the maximum length of continuous silk thread that can be obtained from a cocoon?**
  - (a) About 1 m
  - (b) About 9 m
  - (c) About 100 m
  - (d) About 900 m

**ANSWERS: Q1 (c)                      Q2 (a)                      Q3 (d)**

## Learning Objectives

- Outline the steps involved in processing of fibres into wool
- Outline the steps involved in obtaining silk from cocoon

## Learning Outcomes

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.

## QUESTIONS

Shearing → A → Sorting → B → Dyeing → C

- 1. Which one is correct for part A in above flow chart of processing of fibres into wool .**
  - (a) The fleece of the sheep along with a thin layer of skin is removed from its body.
  - (b) The removed skin with hair is thoroughly washed in tanks to remove grease, dust and dirt.
  - (c) The hairy skin is sent to a factory where hair of different textures are separated
  - (d) The fibres can be dyed in various colours.
- 2. Which one is correct for part C in above flow chart of processing of fibres into wool .**
  - a) Scouring
  - b) Cleaning of burrs
  - c) Rolling
  - d) Rearing
- 3. Name the process in which threads are taking out from the cocoon for use as silk.**
  - a) Rolling
  - b) Reeling
  - c) Sorting
  - d) Scouring

**ANSWERS: Q1 (a)**

**Q2 (c)**

**Q3 (b)**

## Learning Objectives

- Describe and illustrate diagrammatically the life cycle of silk moth

## Learning Outcomes

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental setups; life cycle of silk moth, etc.

## QUESTIONS

1. **Identify the given image which is a part of life cycle of silk moth.**



- (a) Cocoon  
(b) Silkworm  
(c) Caterpillar  
(d) Sericulture
2. **In which situation bleaching and dyeing of silk fibres (adding colours) are usually done?**
- (a) Before the yarns are made in to fibres  
(b) After the yarns are made  
(c) After the fabrics are made  
(d) None of the above
3. **For how long do the caterpillars eat mulberry leaves?**
- (a) 10 to 15 days  
(b) 20 to 30 days  
(c) 25 to 30 days  
(d) 5 to 10 days

**ANSWERS: Q1 (a)            Q2 (a)            Q3 (c)**

## Learning Objectives

- Critique the risk factors associated with wool industry & appreciate the efforts of people involved in it
- Explain the significance of silk in textile industry
- Evaluate the contribution of silk in Indian Economy and appreciate our weavers for the intricate & dedicated efforts.

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries

## QUESTIONS

- 1. From where silk industry began ?**
  - (a) China
  - (b) India
  - (c) Tibet
  - (d) Africas
- 2. Name the bacterium by which the people working in wool industry get infected.**
  - (a) Rhizobium
  - (b) Bacillus
  - (c) Anthracis
  - (d) Streptococcus
- 3. From which of the following sheep do we obtain carpet wool?**
  - (a) Marwari sheep
  - (b) Merino sheep
  - (c) Lohi sheep
  - (d) Nali sheep

**ANSWERS: Q1 (a)                      Q2 (c)                      Q3 (c)**

## **CHAPTER IV**

### **HEAT**

#### **Learning Objectives**

- Distinguish the Clinical thermometer from Laboratory thermometer (range, least count, units of measurement)
- List precautions while using a clinical and laboratory thermometer in order to identify the role of a kink.
- Devise an activity or elaborate a situation to show the rate of thermal conduction, convection & radiation
- Devise an activity to show that woolen clothes are insulators/ poor conductors of heat

#### **Learning Outcomes**

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function.

#### **1. Fahrenheit scale divides two fixed point into-**

- (a) 180 parts
- (b) 212 parts
- (c) 100 parts
- (d) 32 parts

#### **2. Which of the following features are that of a clinical thermometer?**

- i) short temperature range
  - ii) wide temperature range
  - iii) alcohol filled glass tube
  - iv) constriction in glass tube
- (a) i and ii
  - (b) ii and iii
  - (c) i and iv
  - (d) ii and iv

**3. The capillary tube of a clinical thermometer has a kink :**

- (a) to increase the expansion of mercury
- (b) so that the level of mercury does not fall as soon as the thermometer is taken out of the mouth
- (c) to use less mercury
- (d) to help us see it better

**4. Which among of following is not a method of transfer of heat?**

- (a) Conduction
- (b) Radiation
- (c) Convection
- (d) Convection

**ANSWERS**

**Q1(A)**

**Q2 (C)**

**Q3 (B)**

**Q4 (D)**

## Learning Objectives

- Critique the need for Laboratory thermometer while doing experiments in the laboratories
- Explain why a substance remains in the same temperature in a Thermos flask or vacuum bottle
- Correlate the modes of transfer of heat to the usage of different clothes in different parts of the world (Polar, temperate, tropical, etc.)

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

### 1. What is the normal temperature of a healthy person?

- (a) 37°C
- (b) 37°F
- (c) 37 K
- (d) None of these

### 2. It is warmer to have two thin blankets than to have a single thick blanket because-

- (a) thick blanket cannot give more warmth
- (b) two blankets allow more heat to pass through them
- (c) air between the two blankets is a good conductor of heat
- (d) air between the thin blankets does not allow heat to pass through it since it is a bad conductor.

### 3. Which of the following statements is correct?

- (a) Metals are bad conductors.
- (b) Some metals conduct heat better than others.
- (c) Heat can be conducted from one metal to another even if they are not in contact with each other.
- (d) When two metal rods are placed in contact with each other, heat can flow from one to the other even if they are at the same temperature.

**ANSWERS**

**Q1 (A)**

**Q2 (D)**

**Q3 (D)**



## Learning Objectives

- Observe the heating and cooling of objects in order to describe
- Apply the concept of convection to heating of land and water in order to predict the description of land and sea Breeze
- Categorize a given substance as hot & cold by a reliable measure (using temperature without touching) thermometer (range, least count, units of measurement)

## Learning Outcomes

- conduction Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.
- Measures and calculates e.g., temperature; pulse rate; speed of moving objects; time period of a simple pendulum. Distinguish the Clinical thermometer from Laboratory pendulum, etc.

**1. Paheli and Boojho measured their body temperature. Paheli found her's to be 98.6°F and Boojho recorded 37°C. Which of the following statement is true?**

- (a) Paheli has a higher body temperature than Boojho.
- (b) Paheli has a lower body temperature than Boojho.
- (c) Both have normal body temperature.
- (d) Both are suffering from fever.

**2. The snow on the mountains does not melt all the at once when it is heated by the sun because it-**

- (a) becomes very hard
- (b) reflects most of the heat from the sun
- (c) has a low specific heat capacity
- (d) has a high latent heat of fusion

**3. Land and sea breezes are based on-**

- (a) the phenomenon of conduction of heat
- (b) the phenomenon of convection of heat
- (c) the phenomenon of absorption and radiation of heat
- (d) all of the above

**ANSWERS**

**Q1 (C)**

**Q2 (D)**

**Q3 (B)**

## CHAPTER V

### ACIDS, BASES AND SALTS

#### Learning Objectives

- Examine the common substance used at home based on taste and touch and classify them as acidic or basic
- Summarizes observations with respect to behavior of indicators in acidic and basic solutions

#### Learning Outcomes

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function

#### QUESTIONS

1. **If a student dip the strip of litmus paper in Tamarind solution. Then what will happen to litmus paper?**
  - (a) Blue changes to Red
  - (b) Red changes to purple
  - (c) Blue changes to purple
  - (d) Red changes to Blue
2. **Select the incorrect match.**
  - (a) Baking Soda - Acidic
  - (b) Orange - Acidic
  - (c) Soap - Basic
  - (d) Vinegar – Acidic
3. **What is nature of given substance?**



- (a) Neutral
- (b) Basic
- (c) Acidic
- (d) Alkaline

**ANSWERS: Q1 (a)**

**Q2 (a)**

**Q3 (c)**

## Learning Objectives

- Identify neutralization reactions and its characteristics.
- Summarizes observations with respect to behavior of indicators in acidic and basic solutions.

## Learning Outcomes

- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?

## QUESTIONS

- 1. Products of a neutralisation reaction are always:**
  - (a) An acid and a base
  - (b) A salt and water
  - (c) An acid and a salt
  - (d) A salt and base
- 2. On adding phenolphthalein indicator to a colourless solution, no change is observed. What is the nature of this solution?**
  - (a) Basic
  - (b) Either acidic or basic
  - (c) Either acidic or neutral
  - (d) Either basic or neutral
- 3. Phenolphthalein is a synthetic indicator and its colours in acidic and basic solutions, respectively are:**
  - (a) Red and blue
  - (b) Blue and red
  - (c) Pink and colourless
  - (d) Colourless and pink

**ANSWERS: Q1 (b)                      Q2 (c)                      Q3 (a)**

## Learning Objectives

- Identify neutralization reactions and its characteristics.
- Illustrates neutralization reactions seen in everyday life.

## Learning Outcomes

- Writes word equation for chemical reactions, e.g., acid-base reactions; corrosion; photosynthesis; respiration, etc.

## QUESTIONS

- 1. When the soil is too basic, plants do not grow well in it. To improve its quality, what must be added to the soil?**
  - (a) Organic matter
  - (b) Quicklime
  - (c) Slaked lime
  - (d) Calamine solution
  
- 2. Identify part A and B in given Chemical equation respectively.**  
$$\text{HCl} + \text{NaOH} \longrightarrow \text{A} + \text{B}$$
  - (a) NaCl and H<sub>2</sub>O
  - (b) NaCO and HCl
  - (c) H<sub>2</sub> and NaCl
  - (d) NaCO and H<sub>2</sub>O
  
- 3. When an ant bites, then which solution is applied on the skin?**
  - (a) Lime solution
  - (b) Baking soda
  - (c) Turmeric
  - (d) Dilute Hydrochloric acid

**ANSWERS: Q1 (c)                      Q2 (a)                      Q3 (b)**

## Learning Objectives

- Evaluate the effectiveness of certain neutralization reactions employed in everyday life, based on observed data

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries

## QUESTIONS

- 1. Turmeric is a natural indicator on adding its paste to acid and base separately, which colours would be observed?**
  - (a) Yellow in both acid and base
  - (b) Yellow in acid and red in base
  - (c) Pink in acid and yellow in base
  - (d) Red in acid and blue in base
  
- 2. If a person suffers from acidity then what should he take to neutralize the acidity?**
  - (a) Antacid
  - (b) Magnesium hydroxide, Aluminium hydroxide and Calcium Carbonate
  - (c) Both a and b
  - (d) None of the above
  
- 3. If a person suffered from Tooth decay then dentist recommended him to brush his teeth with toothpaste twice a day. What was reason behind it?**
  - (a) Tooth decay is caused by presence of an acid and tooth paste is basic in nature
  - (b) Tooth decay is caused by the presence of base and tooth paste is acidic in nature
  - (c) Tooth paste is unable to remove the bacteria exist in the mouth
  - (d) None of the above

**ANSWERS: Q1 (b)                      Q2 (c)                      Q3 (a)**

## CHAPTER VI

### PHYSICAL AND CHEMICAL CHANGES

#### Learning Objectives

- Infer the effects which help you to identify a physical change.
- Summarize various features accompanying chemical change.
- Evaluate a given set of changes (in everyday life) on attributes of physical or chemical changes to distinguish between them.
- Defend why rusting of iron is a chemical change.

#### Learning Outcomes

- Identifies materials and organisms, such as, animal fibres; types of teeth; mirrors and lenses, on the basis of observable features, i.e., appearance, texture, functions, etc.

#### QUESTIONS

1. **Which of the following is a physical change?**
  - (a) Rusting of iron
  - (b) Combustion of magnesium ribbon
  - (c) Burning of candle
  - (d) Melting of wax
  
2. **Which of the following is a chemical change?**
  - (a) Twinkling of stars
  - (b) Cooking of vegetables
  - (c) Cutting fruits
  - (d) Boiling of water
  
3. **A chemical change may involve:**
  - (a) Change in colour only
  - (b) Change in temperature
  - (c) Evolution of gas only
  - (d) Any or all of the above

**ANSWERS: Q1 (d)                      Q2 (b)                      Q3 (d)**

## Learning Objectives

- Design an experiment to prevent rusting by eliminating/ controlling a particular condition for rusting.
- Illustrate the usage of crystallization in purification of various salts.

## Learning Outcomes

- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?

## QUESTIONS

- 1. Suppose a person has an iron article and he wants to prevent it from rusting. Which one is correct option to prevent rusting of iron?**
  - (a) Apply a coat of paint or grease
  - (b) Deposit a layer of metal on iron article
  - (c) Both a and b
  - (d) None of the above
- 2. If you want to protect an iron article from rusting. Which of following condition should be taken care?**
  - (a) Iron article should come in contact with Oxygen
  - (b) Iron Article should not come in contact with oxygen and water.
  - (c) Iron Article should come in contact with water
  - (d) Iron Article should come in contact with oxygen and water
- 3. Crystallization is a process to obtain**
  - (a) Pure solids only
  - (b) Pure liquid only
  - (c) Pure solids and liquids
  - (d) Solids or powder

**ANSWERS: Q1 (c)                      Q2 (b)                      Q3 (d)**

## Learning Objectives

Differentiates physical changes from other changes (periodic changes etc) in order to characterize the common feature of physical changes.

## Learning Outcomes

- Classifies materials and organisms based on properties/characteristics, e.g., plant and animal fibres; physical and chemical changes.

## QUESTIONS

- 1. Which of the following statements are incorrect?**
  - (a) When a candle burns both physical and chemical changes take place
  - (b) An aerobic bacteria digests animal waste and produces biogas
  - (c) Ships suffer a lot of damage through they are not pointed
  - (d) Stretching of rubber band is not a physical change
- 2. In which of the following statements is or are correct?**
  - (a) Dissolving common salt in water is a physical change
  - (b) During rusting iron reacts with moist oxygen to form iron oxide
  - (c) Tearing of paper is a physical change it cannot be reversed
  - (d) All the above
- 3. Which of the following changes are not associated with physical change?**
  - (a) Melting of wax or butter or ghee
  - (b) Glowing of an electric bulb or tube
  - (c) Dissolved common salt or sugar in water
  - (d) Growing of a seed into a plant

**ANSWERS: Q1 (d)                      Q2 (d)                      Q3 (c)**



## Learning Objectives

- Judge why better crystallization occurs at lower temperatures

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

## QUESTIONS

- 1. If you boil the sea water then what will you get?**
  - (a) Sugar
  - (b) Salt
  - (c) Water
  - (d) Salt and sugar
  
- 2. Which of the following factors are responsible for the process of crystallization**
  - (a) High Pressure and Low Temperature
  - (b) Low Pressure and Low Temperature
  - (c) High pressure and high temperature
  - (d) Low Pressure and High temperature
  
- 3. Crystallization is an example of :**
  - (a) Physical Change
  - (b) Chemical Change
  - (c) Galvanization
  - (d) Rusting

**ANSWERS: Q1 (b)                      Q2 (a)                      Q3 (a)**

## Learning Objectives

- Extrapolate the understanding of chemical change to new term Chemical Reaction & Chemical Bonding
- Illustrates chemical change with specific examples

## Learning Outcomes

- Writes word equation for chemical reactions, e.g., acid-base reactions; corrosion; photosynthesis; respiration, etc.

## QUESTIONS

**Carbon dioxide (CO<sub>2</sub>) + Lime water [Ca(OH)<sub>2</sub>] → A + Water (H<sub>2</sub>O)**

- 1. Identify A in the above chemical Equation.**
  - (a) CaCO<sub>3</sub>
  - (b) Ca(OH)<sub>2</sub>
  - (c) CaCO<sub>2</sub>
  - (d) CaCO<sub>5</sub>
- 2. Which of the following statement is incorrect?**
  - (a) Mixing of metals with other metal or nonmetals in molten form is called alloying
  - (b) In an endothermic change heat is absorbed
  - (c) Dissolution of sugar in water is a physical change we get back sugar and water by evaporation
  - (d) Reaction between baking soda and vinegar oxygen is evolved
- 3. What is the formula of rust?**
  - (a) Fe<sub>2</sub>O<sub>3</sub>
  - (b) Fe<sub>3</sub>O<sub>4</sub>
  - (c) FeO
  - (d) None of these

**ANSWERS: Q1 (a)                      Q2 (d)                      Q3 (a)**

## CHAPTER VII

### WEATHER, CLIMATE AND ADAPTATIONS OF ANIMALS TO CLIMATE

#### Learning Objectives

- Demonstrate an experiment in order to conclude that high speed winds are accompanied by low air pressure by the method of scientific inquiry.
- Demonstrate an experiment in order to conclude that air moves from a region of high pressure to a region of low pressure.
- Demonstrate an experiment in order to conclude that air expands on heating.

#### Learning Outcomes

- Conducts simple investigations on his/her own in order to seek answers to queries: (such as, can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carryout photosynthesis? Is white light composed of many colours?)

#### QUESTIONS



1. **Humidity is the amount of water vapour present in the air. The teacher asked the students to collect the weather forecast for one week and find out the days on which the humidity was maximum. The correct response of the students would be:**
  - (a) Monday, Tuesday
  - (b) Wednesday, Thursday
  - (c) Friday, Saturday
  - (d) Sunday, Monday

2. **As per the above forecast which day had maximum variation of temperature?**
- (a) Monday
  - (b) Tuesday
  - (c) Wednesday
  - (d) Thursday
3. **The wind speed in the above forecast has been recorded in Km/hr, on conversion of the wind speed in SI unit, the value would be:**
- (a) 4.45 m/s
  - (b) 16000 m/h
  - (c) 444.45cm/s
  - (d) 0.0045km/s

**ANSWERS: Q1 (b)**

**Q2 (a)**

**Q3 (a)**

## Learning Objectives

- Apply the knowledge that air exerts pressure in order to explain phenomenon of cyclones.
- Attribute the direction of movement of wind currents to the uneven heating of atmosphere at various regions of earth & rotation of earth.
- Recall the concept of land breeze and sea breeze in order to describe monsoon winds.
- Suggest the possible reasons for absence of cyclones/thunderstorms in certain areas whereas their abundance in others.
- Describe the structure of a cyclone in order to list factors that contribute to its development and explain the damage it causes.

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

## QUESTIONS

### 1. The wind velocity is related to:

- (a) The direction of wind
- (b) Pressure gradient in the direction of their flow
- (c) Moisture content of the wind
- (d) The nearness to the sea

### 2. Changes in the weather is caused by:

- (a) moon
- (b) planets
- (c) sun
- (d) stars

### 3. Low pressure is created by air which is

- (a) colder
- (b) less dense
- (c) more dense
- (d) coldest

**ANSWERS: Q1 (b)**

**Q2 (c)**

**Q3 (b)**

## Learning Objectives

- Recall details pertaining to air & effects of air pressure.

## Learning Outcomes

- Explains processes and phenomena in order to relate to science behind the phenomena/processes and develop scientific thinking skills:(such as, processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.)

## QUESTIONS

- 1. Sea breeze and land breeze are caused due to:**
  - (a) By convection currents
  - (b) By conduction
  - (c) By radiations
  - (d) By rains
  
- 2. Winds from north and south travel towards the equator because:**
  - (a) Earth is spherical and round in shape
  - (b) It is hotter in and around the equator
  - (c) Wind does not flow from the east or the west
  - (d) It is hotter in and around the north and the south
  
- 3. The organism adapted to live in the tropical rainforest is:**
  - (a) Camel
  - (b) Penguin
  - (c) Polar bear
  - (d) Red-eyed frog

**ANSWERS: Q1 (a)                      Q2 (b)                      Q3 (d)**

## Learning Objectives

- Recall details about safety measure & precautions against Cyclones, Thunderstorms & Tornadoes
- Implement knowledge of storms/cyclones/tornados and safety measure and precautions against them in order to devise new safety measures and precautions.
- Summarize the consequences of absence of precautionary measures against storms/cyclones/tornados, etc.

## Learning Outcomes

- Applies learning of scientific concepts in daily life/real life situations in order to solve problems/give solutions/take preventive measures/etc.: (such as, dealing with acidity; testing and treating soil; taking measures to prevent corrosion; cultivation by vegetative propagation; connecting two or more electric cells in proper order in devices; taking measures during and after disasters; suggesting methods for treatment of polluted water for reuse, etc.)

## QUESTIONS

### 1. Anemometer is a device which is used to measure:

- (a) Atmospheric pressure
- (b) Atmospheric temperature
- (c) humidity
- (d) wind speed

### 2. Eye of cyclone is:

- (a) Area of high pressure
- (b) Area of low pressure
- (c) Area of high temperature
- (d) Area having clouds and rains

### 3. On conversion of water vapors to raindrops:

- (a) Heat is absorbed
- (b) Heat is evolved
- (c) Heat is first absorbed and then evolved
- (d) Heat is first evolved and then absorbed

**ANSWERS: Q1 (a)**

**Q2 (b)**

**Q3 (b)**

## CHAPTER VIII

### WINDS, STORMS AND CYCLONES

#### Learning Objectives

- Demonstrate an experiment in order to conclude that high speed winds are accompanied by low air pressure by the method of scientific inquiry.
- Demonstrate an experiment in order to conclude that air moves from a region of high pressure to a region of low pressure.
- Demonstrate an experiment in order to conclude that air expands on heating.

#### Learning Outcomes

- Conducts simple investigations to seek answers to queries, e.g., can extract of colored flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colors?

#### QUESTIONS

- 1. In which year was Orissa hit by a cyclone?**
  - (a) 1999
  - (b) 2000
  - (c) 2001
  - (d) 2004
  
- 2. Leaves of trees, banner or flags flutter when wind is blowing why?**
  - (a) Air occupies space
  - (b) Air is mixture of gases
  - (c) Air exerts pressure
  - (d) Air is colorless
  
- 3. Following are precautions one must not take in case a storm is accompanied by lightning:**
  - (a) Do not take shelter under an umbrella with a metallic end
  - (b) Do not take shelter in a bus in the open
  - (c) Do not take shelter under a tree
  - (d) Do not take shelter in an open shed etc.

**ANSWERS: Q1 (a)                      Q2 (c)                      Q3 (d)**



## Learning Objectives

- Apply the knowledge that air exerts pressure in order to explain phenomenon of cyclones.
- Attribute the direction of movement of wind currents to the uneven heating of atmosphere at various regions of earth & rotation of earth.
- Recall the concept of land breeze and sea breeze in order to describe monsoon winds.
- Suggest the possible reasons for absence of cyclones/thunderstorms in certain areas where as their abundance in others.
- Describe the structure of a cyclone in order to list factors that contribute to its development and explain the damage it causes.

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

## QUESTIONS

- 1. Which of the following will rise the highest in the atmosphere?**
  - (a) Air at 10<sup>0</sup>C
  - (b) Air at 40<sup>0</sup>C
  - (c) Air at 20<sup>0</sup>C
  - (d) Air at -5<sup>0</sup>C
- 2. What is an anemometer?**
  - (a) A device for measuring atmospheric pressure
  - (b) A device for measuring wind speed
  - (c) A device for measuring atmospheric temperature
  - (d) A device for measuring humidity
- 3. Which of the following plays an important role in the early- warning systems for cyclones?**
  - (a) Helicopters
  - (b) Submarines
  - (c) Satellites
  - (d) Stars

**ANSWERS: Q1 (b)                      Q2 (b)                      Q3 (c)**

## Learning Objectives

- Recall details pertaining to air & effects of air pressure.

## Learning Outcomes

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.

## QUESTIONS

- 1. Which of the following place is most likely to be affected by a cyclone?**
  - (a) Mumbai
  - (b) Puri
  - (c) Goa
  - (d) Port bandar
- 2. A fire alarm usually detects smoke in case of fire where should such an alarm be placed in a room?**
  - (a) Near the door
  - (b) On the floor
  - (c) On any wall
  - (d) On the ceiling
- 3. The winds from oceans carry water and bring rain these winds are called:**
  - (a) Typhoon
  - (b) Monsoon
  - (c) Cyclone
  - (d) None of these

**ANSWERS: Q1 (b) Q2 (d) Q3 (b)**

## Learning Objectives

- Recall details about safety measure & precautions against Cyclones, Thunderstorms & Tornadoes
- Implement knowledge of storms/cyclones/tornados and safety measure and precautions against them in order to devise new safety measures and precautions.
- Summarize the consequences of absence of precautionary measures against storms/cyclones/tornados, etc.

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries

## QUESTIONS

- 1. On what principle does a syringe work?**
  - (a) Variance in pressure
  - (b) Variance in temperature
  - (c) Variance in humidity
  - (d) Variance in mass
  
- 2. In which of the following areas does the climate remain almost the same throughout the year?**
  - (a) Desert area
  - (b) Coastal area
  - (c) Mountainous area
  - (d) All of the above
  
- 3. What causes wind currents across the globe?**
  - (a) The rotation of the earth
  - (b) Change in season
  - (c) Uneven heating between the equator and poles
  - (d) Gravitational pull of the sun

**ANSWERS: Q1 (a)                      Q2 (c)                      Q3 (a)**

## CHAPTER IX

### SOIL

#### Learning Objectives

- Compare different types of soils in connection with properties started along with contrasting features.
- Determine the percolation of given soil using the time of percolation.
- Examine different soil samples in order to infer that moisture is contained in soil.
- Examine different soil samples in order to calculate the percentage of water absorbed and assess moisture absorbing property of the soil.

#### Learning Outcomes

- Differentiates materials and organisms, such as, digestion in different organisms, unisexual and bisexual flowers, conductors and insulators of heat, acidic, basic and neutral substances, images formed by mirrors and lenses, etc. on the basis of their properties, structure and functions.

#### QUESTIONS

1. **Which one of the following is a step in the formation of soil?**
  - (a) Earthquakes or volcanic eruptions
  - (b) Weathering of rocks
  - (c) Addition of humus
  - (d) All are involved in the formation of soil
  
2. **In which horizon of soil minerals are found:**
  - (a) A
  - (b) B
  - (c) C
  - (d) None of above
  
3. **Which physical property of soil is important to us:**
  - (a) Texture
  - (b) Water holding capacity
  - (c) Both of these
  - (d) None of these

**ANSWERS: Q1 (d)                      Q2 (a)                      Q3 (c)**

## Learning Objectives

- Classify soil into different categories based on its properties.
- Describe all the layers in the soil profile in order to classify them into A, B, C horizon sand bedrocks.

## Learning Outcomes

- Classifies materials and organisms based on properties/ characteristics, e.g. plant and animal fibres, physical and chemical changes.

## QUESTIONS

- 1. Which factor influences soil formation?**
  - (a) Climate
  - (b) Vegetation
  - (c) Parent rock
  - (d) All of these
  
- 2. The proportion of sand, salt and clay in a soil sample determines.**
  - (a) Structure
  - (b) Texture
  - (c) Nutrient potential
  - (d) Fertility level
  
- 3. The micro-organisms present in the soil require moisture (water) and nutrients for growth and survival. choose the correct option regarding the habitat (place) where the soil has plenty of water and nutrients:**
  - (a) Desert
  - (b) Forest
  - (c) Open field
  - (d) Cricket ground

**ANSWERS: Q1 (d)                      Q2 (b)                      Q3 (b)**

## Learning Objectives

- Determine the percolation of given soil, using the time of percolation
- Examine different soil samples in order to infer that moisture is contained in soil.
- Examine different soil samples in order to calculate the percentage of water absorbed and assess moisture absorbing property of the soil.

## Learning Outcomes

- Conducts simple investigations to seek answer to queries, e.g. can extract of colored flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colors?

## QUESTIONS

- 1. Availability of water and minerals in the soil for maximum absorption by roots is in the :**
  - (a) A-horizon
  - (b) C-horizon
  - (c) B-horizon
  - (d) Surface of soil
- 2. Soil conservation measures are mainly aimed at protecting :**
  - (a) Plants
  - (b) Topsoil
  - (c) Subsoil
  - (d) Soil organisms
- 3. Name the soil in which more than half of the parent mineral matter is volcanic ash and appear very dark in color.**
  - (a) Desert soil
  - (b) Volcanic soil
  - (c) Clayey soil
  - (d) Alluvial soil

**ANSWERS: Q1 (a)                      Q2 (b)                      Q3 (b)**

## Learning Objectives

- Predict the consequences of absences of soil on life on earth.
- Construct a cause and effect model of effects of soil pollution on life on earth.

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries

## QUESTIONS

- 1. The top most soil:**
  - (a) Is soft
  - (b) Is a porous layer
  - (c) Can retain more water
  - (d) All of the above
  
- 2. Soil best suited for cultivation of wheat, rice and sugarcane is:**
  - (a) Alluvial soil
  - (b) Laterite soil
  - (c) Mountain soil
  - (d) None of these
  
- 3. Humus refers to the:**
  - (a) Top most layer
  - (b) Bottom layer
  - (c) Rotting dead matter in soil
  - (d) None of these
  
- 4. Which of the following does not cause soil pollution:**
  - (a) Fertilizers
  - (b) Trees
  - (c) Plastics
  - (d) Polyethene

**ANSWERS: Q1 (d)                      Q2 (a)                      Q3 (c)                      Q4 (b)**

## Learning Objectives

- Construct a cause and effect model of effects of soil pollution on life on earth.
- Evaluate the characteristics of soil that will support a particular type of crop with reasons.

## Learning Outcomes

- Relates processes and phenomenon with causes, e.g., wind speed with air pressure, crops grown with types of soil, depletion of water table with human activities, etc.

## QUESTIONS

- 1. A well-developed soil profile is the result of**
  - (a) Physical process
  - (b) Chemical process
  - (c) Organic process
  - (d) All of the above
  
- 2. Soil contain rock particle and-----**
  - (a) Water and air
  - (b) Water and plants
  - (c) Minerals, organic matter, air and water
  - (d) Water air and plants
  
- 3. Out of the four different layers or sections of soil profile, organic matter is found in**
  - (a) Topsoil
  - (b) Second layer from the top
  - (c) Third layer from the top
  - (d) The bottom layer

**ANSWERS: Q1 (d)                      Q2 (c)                      Q3 (a)**



## CHAPTER X RESPIRATION IN ORGANISM

### Learning Objectives

- Define cellular respiration in order to differentiate between aerobic and anaerobic respiration.

### Learning Outcome

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function

#### 1. **Site of cellular respiration in a cell is:**

- (a) Chloroplast
- (b) Lysosomes
- (c) Nucleus
- (d) Mitochondria

#### 2. **12 Galactic years ago (1 galactic year = 225 million years), when the life first originated, our atmosphere lacked oxygen. Identify the organisms that could have survived then:**

- (a) Algae
- (b) Bacteria
- (c) Lichens
- (d) Mosses

#### 3. **Statement: Breathing is not required in unicellular organisms.**

**Reason: Breathing is the phenomenon of uptake of oxygen and removal of carbon dioxide with the help of respiratory organs.**

- (a) Both statement and reason are true
- (b) Both statement and reason are false
- (c) Both statement and reason are true and reason is the true explanation for the statement.
- (d) Both statement and reason are true and reason is not the true explanation for the statement.

**Answers: 1 (d)**

**2 (b)**

**3 (c)**

## Learning Objectives

- Examine inhalation, exhalation and breathing rate in own body in order to analyse the effect of various activities on breathing rate.
- Observe the reaction of exhaled air with lime water in order to infer the gas exhaled.

## Learning Outcome

- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?
1. **The class was divided into groups of 4 students. Each group was instructed to find how many times each member of the group breathed in and breathed out during different activities. Below is the data collected by one group:**

Name of the student	Breathing rate			
	Normal walk	After brisk walk of 10 min	After running fast 100m	At rest
Sonia	25	32	44	20
Rita	20	25	32	15
Raju	21	24	30	14
Sham	22	25	31	15

1. **From the above, what inference do you get regarding the breathing rate?**
- (a) breathing rate is affected by the number of students
  - (b) breathing rate is affected by the level of activity
  - (c) both a and b
  - (d) none of the above

- 2. Breathing rate of Sonia in the above group seems to be higher than other members of the group. What could be the probable reasons for the observation?**
- (a) Sonia has lung problems
  - (b) Sonia may be anxious to participate
  - (c) Sonia must be obese and lethargic
  - (d) all of the above
- 3. What would you suggest Sonia for improving her breathing rate, if you know that she is not suffering from any lung disorder?**
- (a) Sonia to eat balanced diet
  - (b) Sonia to do breathing exercise
  - (c) Sonia to relax
  - (d) all of the above

**Answers: 1(b)**

**2 (d)**

**3 (d)**

## Learning Objectives

- Examine inhalation, exhalation and breathing rate in own body in order to analyse the effect of various activities on breathing rate
- Construct a cause and effect model of respiratory processes in animals and plants, as an extension of available resources and respiratory organs/features

## Learning Outcome

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

**1. The pores on the body of insects which have the same function as the stomata on the surface of the leaves are:**

- (a) spirochetes
- (b) spirulina
- (c) spiracles
- (d) spirometers

**2. Statement: We yawn when we are bored and tired .**

**Reason: We yawn to balance the oxygen intake and carbon dioxide removal from our body.**

- (a) Both Statement and reason are true
- (b) Both Statement and reason are false
- (c) Both Statement and reason are true and reason is the right explanation of the statement.
- (d) Both Statement and reason are true and reason is not the right explanation of the statement.

**3. Hiccup is a reflex action of our respiratory system. Which part of the respiratory system contracts to cause a hiccup?**

- (a) diaphragm
- (b) lungs
- (c) ribs
- (d) trachea

**Answers:1 (c)**

**2 (c)**

**3 (a)**

## Learning Objectives

- List the functions performed by a cell in order to infer the need of energy for various processes
- Recall details/definitions of terminology related to respiration in humans.
- Describe the process of breathing in humans in order to explain the role of nostrils (hair and mucus), trachea, lungs, ribs and diaphragm.
- Describe the process of respiration in cockroach, earthworm, fish and plants in order to predict consequences of absence of respiratory organs/features, in animals or plants.
- Select distinguishing features and categorize them as belonging to respiratory systems in plants and human beings (stomata & lungs).

## Learning Outcome

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.
- 1. Why is Pranayam recommended as a lung exercise?**
    - (a) all traditions must be followed
    - (b) deep breathing helps pass our time
    - (c) it increases the capacity of lungs to take in more air.
    - (d) because media recommends doing it
  
  - 2. Statement: Only animals undergo respiration  
Reason: Only plants undergo photosynthesis**
    - (a) Both statement and reason are true
    - (b) Both statement and reason are false
    - (c) Statement is true and reason is false
    - (d) Statement is false and the reason is true
  
  - 3. It is important that the skin of earthworms and frogs remains moist, otherwise they die. The correct reason for this observation is:**
    - (a) moist skin ensures longer life
    - (b) exchange of gases takes place through the moist skin
    - (c) moisture makes skin slippery
    - (d) none of these

**Answers: 1 (c)**

**2 (b)**

**3 (b)**

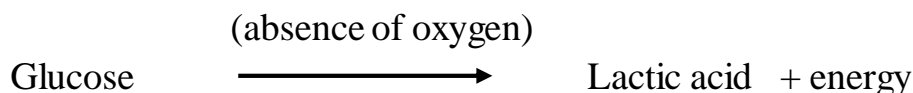
## Learning Objectives

- Define cellular respiration in order to differentiate between aerobic and anaerobic respiration.

## Learning Outcome

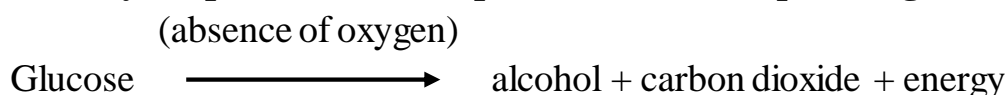
- Writes word equation for chemical reactions, e.g., acid-base reactions; corrosion; photosynthesis; respiration, etc.

**1. Identify the type of respiration and site of respiration represented in the following equation:**



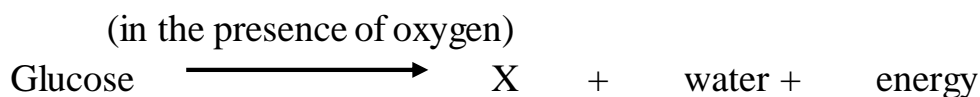
- (a) Aerobic, skin
- (b) Anaerobic, Muscles
- (c) Aerobic, Muscles
- (d) Anaerobic, Skin

**2. Identify the process that is represented in the equation given below:**



- (a) pasteurisation
- (b) baking
- (c) fermentation
- (d) harvesting

**3. Name the product X in the given chemical equation:**



- (a) Nitrogen
- (b) carbon
- (c) carbon dioxide
- (d) carbon monoxide

**Answers: 1(b)**

**2 (c)**

**3 (c)**

## Learning Objectives

- Examine inhalation, exhalation and breathing rate in own body in order to analyse the effect of various activities on breathing rate.

## Learning Outcome

- Measures and calculates e.g., temperature; pulse rate; speed of moving objects; time period of a simple pendulum, etc.

**The class was divided into groups of 4 students. Each group was instructed to find how many times each member of the group breathed in and breathed out during different activities. Below is the data collected by one group:**

Name of the student	Breathing rate			
	Normal walk	After brisk walk of 10 min	After running fast 100 m	At rest
Sonia	25	32	44	20
Rita	20	25	32	15
Raju	21	24	30	14
Sham	22	25	31	15

- 1. Average breathing rate at rest of this group will be:**  
(a) 15  
(b) 16  
(c) 64  
(d) 32
- 2. On calculating the increase in breathing rate (in percentage) of Raju from normal walk to fast running will be (approx)**  
(a) 40  
(b) 50  
(c) 60  
(d) 70
- 3. In the above in which of the following there are maximum chances of getting cramps in the team members?**  
(a) during normal walk  
(b) during brisk walk  
(c) during running  
(d) during rest

**Answers: 1(b)**

**2 (b)**

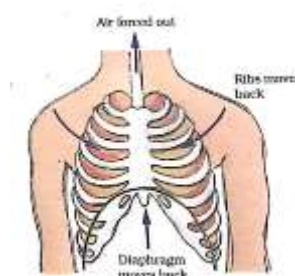
**3 (d)**

## Learning Objectives

- Describe the process of breathing in humans in order to explain the role of nostrils (hair and mucus), trachea, lungs, ribs and diaphragm.

## Learning Outcome

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.



- 1. Identify the process that is being represented in the above diagram:**
  - (a) inhalation
  - (b) exhalation
  - (c) breathing
  - (d) pranayam
- 2. Name the muscles that help the ribs to move back in the above process:**
  - (a) lung muscles
  - (b) heart muscles
  - (c) intercostals muscles
  - (d) stomach muscles
- 3. During human respiration, an individual has his nose blocked and respire through only his mouth, which of the following process would be impacted?**
  - (a) exchanges of gases at the alveolar surface
  - (b) decrease in lung capacity
  - (c) filtration of air by hairs in respiratory tract
  - (d) moistening of air.

Answers: 1 (b)

2 (c)

3 (c)



## CHAPTER XI

### TRANSPORTATION IN ANIMALS AND PLANTS

#### Learning Objectives

- Draw a contrast between the functions of arteries and veins, in the functioning of the circulatory system.

#### Learning Outcome

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function.
- 1. Blood vessels have varied thickness of their walls. Identify the blood vessels that have thicker walls as compared to the others**
    - (a) Arteries
    - (b) Capillaries
    - (c) Veins
    - (d) all of the above
  - 2. When blood samples from the body are collected, blood is drawn from which of the following blood vessels usually?**
    - (a) Arteries
    - (b) Capillaries
    - (c) Veins
    - (d) all of the above
  - 3. Arteries carry oxygen rich blood, however there is one artery in the body that carries carbon dioxide rich blood, Identify it:**
    - (a) Aorta
    - (b) pulmonary artery
    - (c) pulmonary vein
    - (d) capillary

Answers: 1 (c)

2 (c)

3 (b)

## Learning Objectives

- Analyse the implications of intermixing of oxygenated and deoxygenated blood in order to explain the existence of four chambers in the heart.
- Interpret reasons for discrepancies in the process of urine formation and expulsion.
- Predict reasons for decreased absorption of water by plants.

## Learning Outcome

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.
- 1. Pale yellow to amber colour of urine is associated with a pigment named urochrome. One of the reasons why does the colour of urine keep changing could be:**
    - (a) mood of the person
    - (b) age of the person
    - (c) hydration level of the person
    - (d) none of the above
  - 2. Double circulation is an adaptation characteristic of organisms having a constant body temperature because:**
    - (a) it makes the circulatory system more efficient
    - (b) it ensures that oxygen rich blood reaches to all parts of body
    - (c) both a and b
    - (d) none of the above
  - 3. What are the factors affecting the rate of absorption of water by plants?**
    - (a) wind speed
    - (b) humidity
    - (c) temperature
    - (d) all of the above

Answers: 1 (c)

2 (c)

3 (d)

## Learning Objectives

- Outline functions carried out by parts of the circulatory system as being contributory to proper circulation of oxygen.
- Describe the function of blood and its constituents.
- Describe the location and function of the heart.
- Recall details/functions of parts of the excretory system
- Explain the process of transport of water, minerals and food in plants in order to differentiate between xylem and phloem.
- Explain the process of transpiration in order to infer its advantages.
- Study excretion in other organisms.

## Learning Outcomes

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.
- 1. The heart rate of an individual can be found from the pulse rate. What does a faster pulse rate indicate?**
    - (a) the heart is pumping less blood
    - (b) the heart is pumping
    - (c) the heart is pumping faster
    - (d) there is no connection between the heart and the pulse
  - 2. How does the process of transpiration impact the rate or transportation of water?**
    - (a) faster the transpiration slower is the rate of transportation of water
    - (b) slower the transpiration slower is the rate of transportation of water
    - (c) faster the transpiration faster is the rate of transportation of water
    - (d) there is no impact of transpiration on transportation of water
  - 3. Both transpiration in plants and sweating in human beings perform the same function. Identify the correct one:**
    - (a) transportation
    - (b) thermoregulation
    - (c) translocation
    - (d) respiration

**Answers: 1 (c)**

**2 (c)**

**3 (b)**

## Learning Objectives

- Examine own pulse in order to infer the pulse rate and define it.
- Define heartbeat in order to design a model of a stethoscope to measure it.
- Observe own heartbeat and pulse rate after different activities in order to draw a relationship between them.

## Learning Outcomes

- Measures and calculates e.g., temperature; pulse rate; speed of moving objects; time period of a simple pendulum, etc.

**A student places her middle and index finger of her right hand on the inner side of left wrist of her two friends to feel the pulse rate. She documents her observations in the table given below:**

S. No	Name	Pulse per minute
1.	Geeta	80
2	Reema	100

- 1. Name the blood vessel that is examined to calculate the pulse rate.**
  - (a) Arteries
  - (b) Capillaries
  - (c) Veins
  - (d) all of the above
- 2. If the normal pulse rate ranges between 72-80 pulse per minute, then what could be the reason for Reema's higher pulse rate?**
  - (a) higher activity
  - (b) anxiety
  - (c) infection in the body
  - (d) all of the above
- 3. The pulse rate is the direct indicative of working of ..... of the body.**
  - (a) kidney
  - (b) brain
  - (c) lungs
  - (d) heart

**Answers: 1 (a)**

**2 (d)**

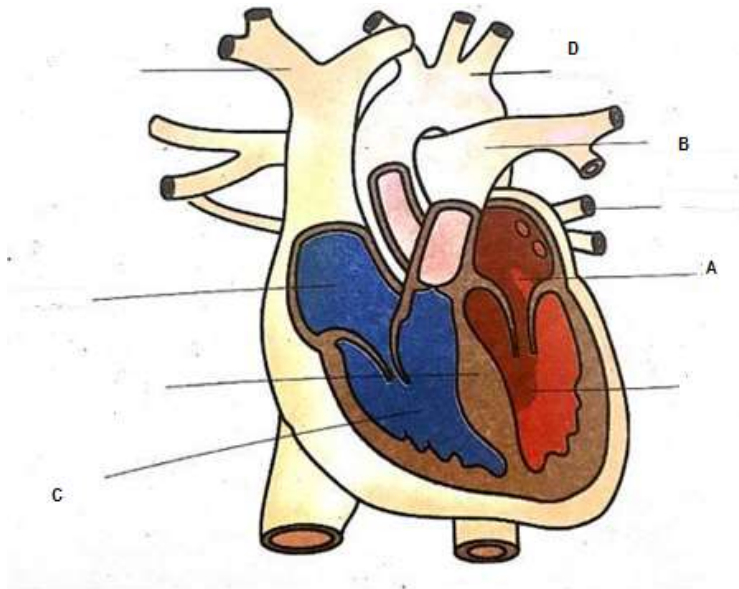
**3(d)**

## Learning Objectives

- Describe the location and function of the heart.

## Learning Outcomes

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.



- 1. The correct sequence of labelling of A, B, C and D is:**
  - (a) Left auricle, Right ventricle, Aorta, Pulmonary artery
  - (b) Right ventricle, Aorta, Pulmonary artery, Left auricle
  - (c) Left auricle, Pulmonary artery, Right ventricle, Aorta
  - (d) Right ventricle, Left auricle, Pulmonary artery, Aorta
- 2. The blood vessels of the heart that carry deoxygenated blood to the heart is labelled as:**
  - (a) A
  - (b) B
  - (c) C
  - (d) D
- 3. The blood vessels of the heart that carry oxygenated blood from the heart to the rest of the body is labelled as:**
  - (a) A
  - (b) B
  - (c) C
  - (d) D

Answers: 1 (a)

2 (b)

3 (d)

## Learning Objectives

- Recall details/functions of parts of the excretory system
- Define heartbeat in order to design a model of a stethoscope to measure it.

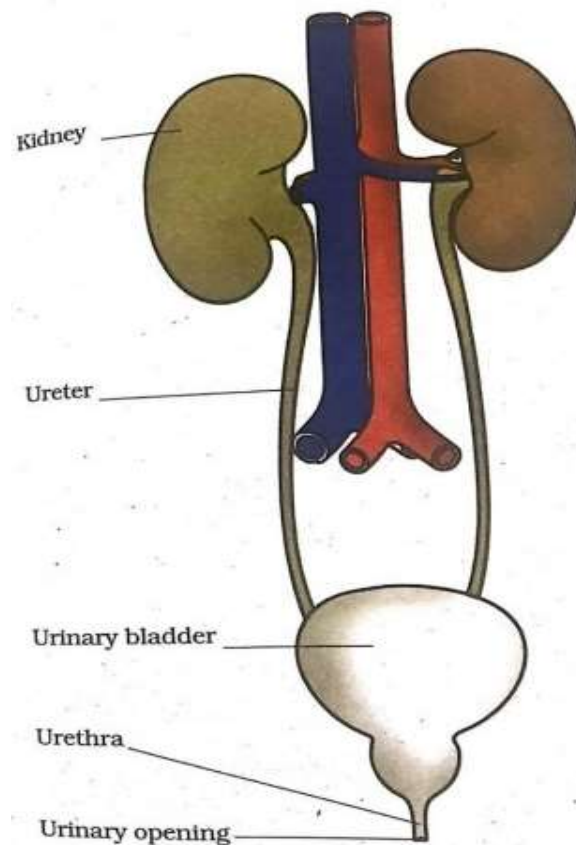
## Learning Outcome

- Construct models using materials from surroundings and explains their working eg, stethoscope, anemometer, electromagnets, Newton's colour disc.



- 1. Identify the instrument in the model given in the above picture:**
  - (a) Gyro meter
  - (b) Manometer
  - (c) Stethoscope
  - (d) Thermometer
- 2. If we know the values of pulse rate and the heart rate of a person, Do you think there will be relationship between the two? The reason of your answer is:**
  - (a) No, Pulse rate and heart rate are not related
  - (b) Yes, the pulse is generated by beating of heart
  - (c) There is not sufficient information
  - (d) Values of pulse rate and heart rate are not comparable quantities

3. In the given model of the human excretory system. Why are the two blood vessels represented in red and blue colours?



- (a) to make model colourful
- (b) red colour represents vessels carrying deoxygenated blood and vessels carrying oxygenated blood as blue.
- (c) red colour represents vessels carrying oxygenated blood and vessels carrying deoxygenated blood as blue.
- (d) so that the two vessels can be distinguished

**Answers: 1(c)**

**2 (b)**

**3 (c)**

## Learning Objectives

- Compare situations of effective and ineffective functioning of the excretory system, in connection with functions of the parts of the system
- Attribute reasons for ineffective transportation of materials in plants, to functions of their parts.
- Explain the importance and need for blood donations.
- Analyse the condition of kidney failure in order to explain the process of dialysis.

## Learning Outcome

- Discusses and appreciates stories of scientific discoveries
1. **In 1937 Bernard Fantus, established one of the first hospital blood banks in the United States where blood was preserved, refrigerated and stored in the "blood bank". On what basis is the blood transfusion between the donor and the recipient takes place?**
    - (a) blood thickness
    - (b) blood colour
    - (c) blood group
    - (d) blood temperature
  2. **The first artificial kidney, was built in 1943 by Dutch physician Willem Kolff who first got the idea of developing a machine to clean the blood after watching a patient suffer from kidney failure. Name the type of waste that a haemodialysis machine particularly cleans.**
    - (a) faecal matter
    - (b) respiratory waste
    - (c) nitrogenous waste
    - (d) metabolic waste
  3. **Haemodialysis machine works on the basis of which phenomenon?**
    - (a) diffusion
    - (b) osmosis
    - (c) endocytosis
    - (d) exocytosis

**Answers: 1(c)**

**2 (c)**

**3 (b)**



## CHAPTER XII

### REPRODUCTION IN PLANTS

#### Learning Objectives

- Infer the mode of reproduction from the features of a plant

#### Learning Outcomes

- Identifies materials and organisms, such as, animal fibres; types of teeth; mirrors and lenses, on the basis of observable features, i.e., appearance, texture, functions, etc.
- 1. Plants like sugarcane and rose can reproduce without the formation of seeds. This type of reproduction can be referred to as:**
    - (a) Asexual reproduction
    - (b) Sexual reproduction
    - (c) Fission
    - (d) Budding
  
  - 2. Identify the plant that cannot develop from a bud:**
    - (a) Potato
    - (b) Ginger
    - (c) Garlic
    - (d) Turmeric
  
  - 3. Just like potato plant yeast also develops buds for reproduction, but they both differ as:**
    - (a) Potato is a vegetable, yeast is fruit
    - (b) Potato is multi cellular, yeast is unicellular
    - (c) Potato grows faster than yeast
    - (d) All of the above

Answers: 1(a)

2 (a)

3 (b)

## Learning Objectives

- Observe and recall how different types of plants grow new ones in order to differentiate between asexual and sexual modes of reproduction
- Distinguish between any two modes of asexual reproduction, in connection with parts involved, etc.
- Compare the outcomes of sexual reproduction in unisexual plants with those in bisexual plants

## Learning Outcomes

- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function
- 1. Spores are mode of asexual reproduction in each of the following except:**
    - (a) Algae
    - (b) Fungi
    - (c) Fern
    - (d) Virus
  - 2. In papaya plants both male and female flowers occur on different plants. This implies that:**
    - (a) All papaya plants produce fruits
    - (b) Only male papaya plants produce fruits
    - (c) Only female papaya plants produce fruits
    - (d) None of the above
  - 3. The characteristic feature of sexual mode of reproduction in plants is:**
    - (a) Spore formation
    - (b) Gamete formation
    - (c) Seed formation
    - (d) Bud formation

Answers: 1 (d)

2 (c)

3 (b)

## Learning Objectives

- Define reproduction in order to identify its need

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

- 1. Among the plants, the petals are brightly coloured parts of flowers to.**
  - (a) Please the human eye
  - (b) Look beautiful
  - (c) Attract their pollinators
  - (d) All of the above
  
- 2. Among the plants that undergo wind pollination, a large number of pollen grains are formed. Choose the correct reason from the following.**
  - (a) It creates a pollen shower
  - (b) Many insects can be fed
  - (c) Many pollens are wasted while transportation
  - (d) All of the above
  
- 3. Identify the plants that are not pollinated by wind.**
  - (a) Aak
  - (b) Drumstick
  - (c) Maple
  - (d) Rose

Answers: 1 (c)

2 (c)

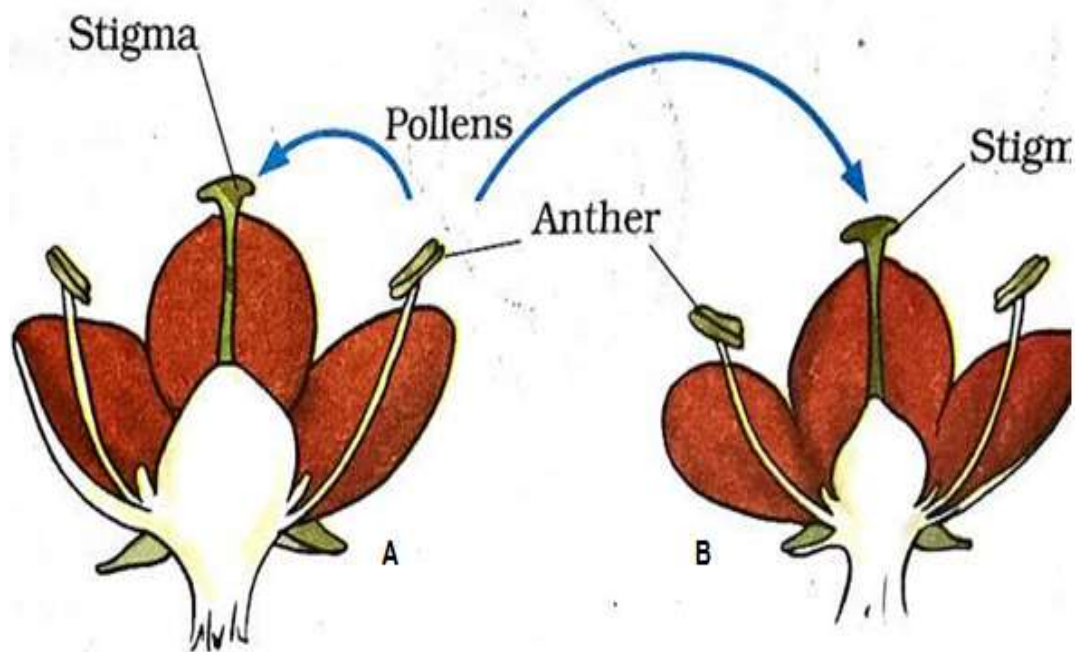
3 (a)

## Learning Objectives

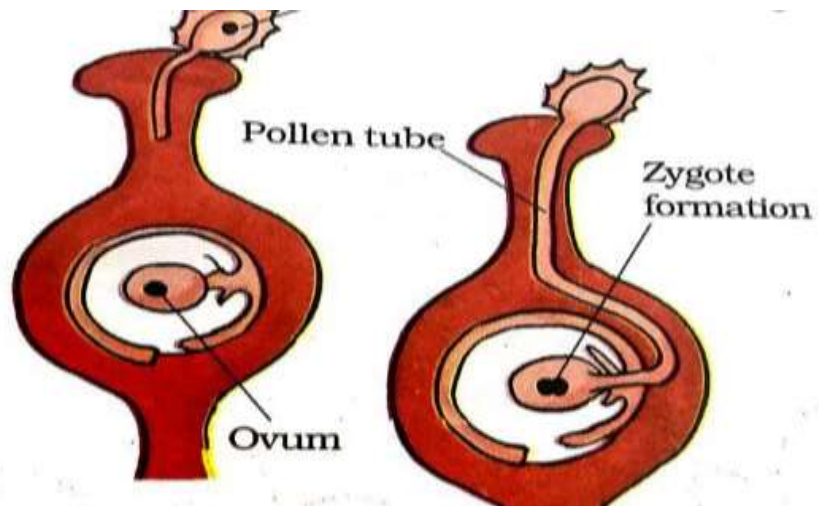
- Recall details/definitions pertaining to sexual mode of reproduction in plants.

## Learning Outcomes

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc



- Type of pollination represented in flower B is**
  - Self pollination
  - Cross pollination
  - Closed pollination
  - None of the above
- Identify the plant that shows pollination as represented by flower A**
  - Apple
  - Lemon
  - Rose
  - Papaya



3. Observe the above picture and identify the site of seed formation in a flower

- (a) Anther
- (b) Ovary
- (c) Style
- (d) Stigma

Answers: 1(b)

2 (b)

3 (b)

## Learning Objectives

- Draw a contrast between any two modes of asexual reproduction, in connection with parts involved, etc.
- Critique the idea that any one of the categories of seeds might disperse better than another category, in connection with reference to their features

## Learning Outcome

- Discusses and appreciates stories of scientific discoveries
- 1. Camerarius discovered the roles of the different parts of a flower in seed production. Select the part of the flower that receives pollen grains:**
    - (a) Anther
    - (b) Ovary
    - (c) Stigma
    - (d) Style
  - 2. Tissue culture is the latest technique of plant production. It is a type of method which has the same characteristics as:**
    - (a) sexual reproduction
    - (b) vegetative propagation
    - (c) seed dispersal
    - (d) none of these
  - 3. Double fertilization was discovered in 1898 by Nawashin. The site of double fertilisation is:**
    - (a) Embryo
    - (b) Stamen
    - (c) Sepals
    - (d) Thalamus

**Answers:1 (c)**

**2 (b)**

**3 (a)**

## CHAPTER XIII

### MOTION AND TIME

#### Learning Objectives

- Paraphrase the to and fro motion of simple pendulum/metallic bob suspended by a string is known as oscillatory motion.
- Recall change in position of the body with respect to surroundings as motion.
- Identify repetition of natural events at definite/regular intervals of time/fraction of second in order to describe periodicity.
- Infer from the given data that time taken to complete one oscillation as time period of simple pendulum.
- Paraphrase the to and fro motion of simple pendulum/metallic bob suspended by a string is known as oscillatory motion

#### Learning Outcomes

- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?
- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.

1. **In this picture, which one of the path shows the displacement?**

- (a) Dotted path
- (b) Path 1
- (c) Path 2
- (d) Path 3



2. **A boy whose position with respect to surrounding does not change, is said to be in a state of -**

- (a) Rest
- (b) Motion
- (c) Vibration
- (d) Oscillation

- 3. The duration of the day from the moment the sun is over head today to the moment the Sun is overhead tomorrow is determined by-**
- (a) the rotation of Earth around the sun
  - (b) the revolution of Earth on its axis
  - (c) the inclination of the axis of rotation of the Earth from its plane of revolution
  - (d) the rotation and revolution of Earth around the sun.
- 4. Which one is the correct relation between the time period and the frequency?**
- (a) Time = 1/ frequency
  - (b) Frequency = 1/ time period
  - (c) Both A & B
  - (d) None of these
- 5. In five minutes distance between a pole and a car change progressively. What is true about the car?**
- (a) Car is at rest
  - (b) Car is in motion
  - (c) Nothing can be said with this information
  - (d) None of the above
- 6. In case of a moving body-**
- (a) Displacement > Distance
  - (b) Displacement < Distance
  - (c) Displacement  $\leq$  Distance
  - (d) Displacement  $\geq$  Distance
- 7. When the amplitude of vibrations of a simple pendulum is increased, then its time period:**
- (a) Decreases
  - (b) Increases
  - (c) Remains same
  - (d) first increases and then decreases

**ANSWERS :1(A)**

**Q2 (A)**

**Q3(B)**

**Q4 (C)**

**Q5 (B)**

**Q6 (D)**

**Q7 (C)**



## Learning Objectives

- Recall the definition of speed (average speed) as distance covered in unit time.
- Recall the instrument used to measure speed.
- Derive the mathematical formula to calculate speed in order to compare the speeds of various moving objects (uniform and non-uniform motion).
- Calculate speed or distance or time taken if any two of these three are quantities are provided
- Utilize data given in odometer to measure distance travelled, average speed for a given time.
- Record data for distance covered in fixed intervals of time for a moving object in order to plot a distance-time graph and interpret the shape.

## Learning Outcomes

- Measures and calculates e.g., temperature; pulse rate; speed of moving objects; time period of a simple pendulum, etc.
- Plots and interprets graphs e.g., distance- time graph

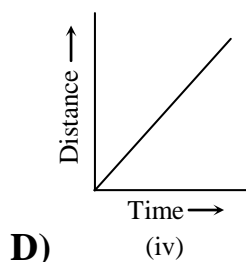
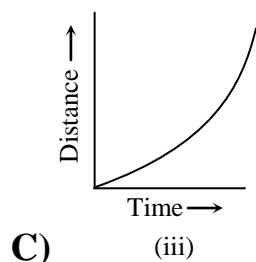
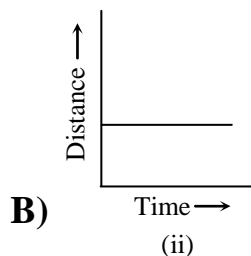
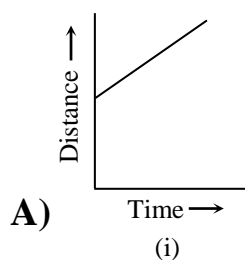
**1. The instrument installed in a car for measuring the distance travelled by it is called**

- (a) Barometer
- (b) Speedometer
- (c) Anemometer
- (d) Odometer

**2. A particle is travelling with a constant speed. This means-**

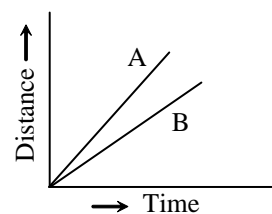
- (a) Its position remains constant as time passes
- (b) It covers equal distance in equal interval of time
- (c) Its acceleration is zero
- (d) It does not change its direction of motion

3. Which of the following distance-time graphs shows a truck moving with speed which is not constant?



4. Figure shows the distance-time graph for the motion of two vehicles A and B. Which one of them is moving faster?

- (a) Car A
- (b) Car B
- (c) Both are moving with same speed
- (d) None of these



Distance time graph for the motion of two cars

5. A body is moving with uniform velocity of  $10\text{ms}^{-1}$ . The velocity of the body after 10s is
- (a)  $100\text{ms}^{-1}$
  - (b)  $50\text{ms}^{-1}$
  - (c)  $10\text{ms}^{-1}$
  - (d)  $5\text{ms}^{-1}$
6. A body is moving along a straight line at  $20\text{ms}^{-1}$  undergoes an acceleration of  $4\text{ms}^{-2}$ . After 2s, its speed will be
- (a)  $8\text{ms}^{-1}$
  - (b)  $12\text{ms}^{-1}$
  - (c)  $16\text{ms}^{-1}$
  - (d)  $28\text{ms}^{-1}$

**ANSWERS**

**Q1( A)**

**Q2 ( B)**

**Q3(C)**

**Q4( A)**

**Q5 (C)**

**Q6 (D)**

## CHAPTER XIV

### ELECTRIC CURRENT AND ITS EFFECTS

#### Learning Objectives

- Examine how that an electric current can be used as a magnet in order to list its uses.
- Outline the construction and uses of electromagnets and electric bell.
- Translate a circuit with actual components into a circuit diagram.

#### Learning Outcomes

- Explains processes and phenomena, e.g., processing of animal fibres; modes of transfer of heat; organs and systems in human and plants; heating and magnetic effects of electric current, etc.
- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.

#### 1 A moving charge produces -

- (a) neither electric field nor magnetic field
- (b) electrostatic field only
- (c) magnetic field only
- (d) both magnetic and electrostatic field

#### 2. The process by which chemical change takes place in a substance when electric current is passed through it is called -

- (a) electrolysis
- (b) electroplating
- (c) electrodes
- (d) thermionic conduction

#### 3 Strength of an electromagnet increases by -

- (a) increasing the number of turns of the coil
- (b) increasing the current flowing through the coil
- (c) using soft iron core for the coil
- (d) all of the above

**ANSWERS Q1 (D)**

**Q2 (A)**

**Q3 (D)**

## Learning Objectives

- Observe heating effect of current in order to enlist its uses and compare it for conductors of different material, length and thickness.
- Perform a simple activity to demonstrate the magnetic effect of an electric current.

## Learning Outcomes

- Constructs models using materials from surroundings and explains their working, e.g., stethoscope; anemometer; electromagnets; Newton's colour disc ,etc.

### 1. Cathode is -

- (a) positively charged electrode
- (b) negatively charged electrode
- (c) a positively charged ion formed in the electrolyte
- (d) a negatively charged ion formed in the electrolyte.

### 2. Electric bell works on the principle of -

- (a) chemical effect of current
- (b) magnetic effect of current
- (c) heating effect of current
- (d) all of the above

### 3. A long wire has ..... resistance than a short wire

- (a) Small
- (b) Large
- (c) Zero
- (d) Infinite

**ANSWERS**

**Q1(B)**

**Q2 (B)**

**Q3 (A)**

## Learning Objectives

- Recall the precautions to be observed while working with electricity.
- Summarize the benefits of using CFLs over ordinary electric bulbs.
- Evaluate the role of a fuse wire and MCBs provide for electrical safety in a circuit.

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries

### 1. Which is the false statement?

- (a) Fuse wire has low resistance and melting point
- (b) Heater wire has high specific resistance and melting point
- (c) In these day M.C.B. is used in place of fuse wire
- (d) Current does not flow in close circuit

### 2. To make a battery of 9 volts, how many 1.5 V cells are needed?

- (a) 6
- (b) 5
- (c) 4
- (d) 3

### 3. What is the full form of the MCB?

- (a) Miniature circuit breakers
- (b) Mini circuit breaker
- (c) Minimum current breaker
- (d) None of these

**ANSWERS**

**Q1 (D)**

**Q2(A)**

**Q3(A)**

## CHAPTER XV

### LIGHT

#### Learning Objectives

- Recall reflection as change in direction of light by polished surfaces/mirrors.
- Observe and describe image formed by a plane mirror in order to enlist its uses. (image/object, erect/inverted, virtual/real, distance from the mirror)
- Conclude from observations that concave mirror forms real, inverted image at all places except when the object is too close whereas convex mirror is erect, virtual & smaller size than the object.

#### Learning Outcomes

- Identifies materials and organisms, such as, animal fibres; types of teeth; mirrors and lenses, on the basis of observable features, i.e., appearance, texture, functions, etc.
- 1. The position of image formed by the plane mirror is**
    - (a) on the screen
    - (b) behind the screen
    - (c) both A & B
    - (d) none of these
  
  - 2. What type of image is formed of a tree or other object in a lake?**
    - (a) real and inverted
    - (b) virtual and erect
    - (c) real and erect
    - (d) virtual and inverted
  
  - 3. The shining back side surface of a spoon represent which type of mirror?**
    - (a) plane mirror
    - (b) convex mirror
    - (c) concave mirror
    - (d) none of these

**ANSWERS Q1 (B)**

**Q2 (D)**

**Q3 (B)**

## Learning Objectives

- Differentiate between convex and concave lenses based on the image formed when object is placed at different positions.
- Explain the formation of a rainbow.
- Analyse why virtual image cannot be obtained on the screen but still can be photographed.

## Learning Outcomes

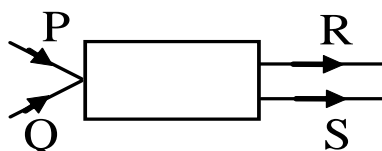
- Differentiates materials and organisms such as, digestion in different organisms; unisexual and bisexual flowers; conductors and insulators of heat; acidic, basic and neutral substances; images formed by mirrors and lenses, etc., on the basis of their properties, structure and function
- Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?

1. **If the angle of incidence is  $60^\circ$ , then calculate the angle between the incident ray and the reflected ray-**

- (a)  $60^\circ$
- (b)  $80^\circ$
- (c)  $130^\circ$
- (d)  $120^\circ$

2. **The diagram below shows two incident rays P and Q which emerge as parallel rays R and S. The appropriate device used in the box A is-**

- (a) convex lens
- (b) concave lens
- (c) prism
- (d) concave mirror



3. **If we mix lights of the colours of the rainbow, we will get**

- (a) pink light
- (b) brown light
- (c) white light
- (d) black light

**ANSWERS Q1 (D)**

**Q2 (D)**

**Q3 (C)**



## Learning Objectives

- Analyse the reason behind 'AMBULANCE' written as its mirror image on the hospital vehicles/ambulances.
- Attribute to the type of image formed by convex mirror for its utility as rear-view mirror in the vehicles
- Outline the important uses of spherical mirrors & lenses.

## Learning Outcomes

- Constructs models using materials from surroundings and explains their working, e.g., stethoscope; anemometer; electromagnets; newton's colour disc ,etc
  - Discusses and appreciates stories of scientific discoveries
- 1. Whatever the position of the object, the image formed by a mirror is virtual, erect and smaller than the object. The mirror must be**
    - (a) concave mirror
    - (b) convex mirror
    - (c) plane mirror
    - (d) either concave or convex mirror
  
  - 2. David is observing his image in a plane mirror. The distance between the mirror and his image is 5m. If he moves 1m towards the mirror, then the distance between David and his image will be-**
    - (a) 3 m
    - (b) 5 m
    - (c) 6 m
    - (d) 8 m
  
  - 3. The rear-view mirror of a car is a plane mirror. A driver is reversing his car at a speed of 2 m/s. The driver sees in his rear view mirror the image of truck parked behind his car. The speed at which the image of the truck appears to approach the driver will be-**
    - (a) 1 m/s
    - (b) 2 m/s
    - (c) 4 m/s
    - (d) 8 m/s

**ANSWERS**

**Q1 (B)**

**Q2 (D)**

**Q3 (C)**

## CHAPTER XVI

### WATER: A PRECIOUS RESOURCE

#### Learning Objectives

- Recall process that generate wastewater that goes down the drains from sinks, showers, toilets, laundries etc.

#### Learning Outcomes

- Identifies materials and organisms such as, animal fibres types of teeth, mirrors and lenses, on the basis of observable features, i.e appearance, texture functions, etc.

#### QUESTIONS

- 1. On which day the world water day is celebrated**
  - (a) 23 march
  - (b) 22 march
  - (c) 21 march
  - (d) None of these
- 2. Which year was observed as international year of fresh water?**
  - (a) 2003
  - (b) 2004
  - (c) 2006
  - (d) 2002
- 3. Seas and oceans are full of water on earth. However, a very small percentage of water present on earth is available for us this percentage is roughly**
  - (a) 0.006%
  - (b) 0.06%
  - (c) 0.6%
  - (d) 60%

**ANSWERS: Q1 (b)                      Q2 (a)                      Q3 (a)**

## Learning Objectives

- Examine the role of plants in water management.

## Learning Outcomes

- Conducts simple investigations to seek answer to queries, e.g. can extract of colored flowers be used as acid-base indicator?

## QUESTIONS

**1. Which of the following is a way to use water economically?**

- (a) Construction of bawris
- (b) Rainwater harvesting
- (c) Drip irrigation
- (d) Infiltration

**2. The amount of water recommended by the United Nations for drinking, washing, cooking and maintaining proper hygiene per person per day is a minimum of:**

- (a) 5 litres
- (b) 15 litres
- (c) 30 litres
- (d) 50 litres

**3. Some definitions are given which can be corrected by changing one word to correct them:**

- (a) Aquifer is ground water stored between layer of hard rock above the water table.
- (b) The process of evaporation of water in the ground water is called infiltration.
- (c) The evaporation of water from oceans and its arrival back in to oceans is called infiltration.
- (d) All of these

**ANSWERS: Q1 (c)                      Q2 (d)                      Q3 (d)**

## Learning Objectives

- List the means of access of water in order to trace their origin to the water cycle.
- Describe infiltration i.e. seepage of water into the ground in order to define the water table and aquifer.
- Construct a Cause and effect model of depletion of ground water table.
- Analyse the rainfall map of India in order to attribute regions and factors leading to shortage and excess of water in major areas.

## Learning Outcomes

- Relates processes and phenomenon with causes, e.g., wind speed with air pressure, crops grown with types of soil, depletion of water table with human activities, etc.

## QUESTIONS

- 1. Which sector is major user of water in India?**
  - (a) Textile sector
  - (b) Agricultural sector
  - (c) Leather sector
  - (d) Petrochemical sector
- 2. The purest form of water is:**
  - (a) Hand pump water
  - (b) Sub soil water
  - (c) Spring water
  - (d) Rainwater
- 3. Which of the following inhibits the seepage of rain water in to ground?**
  - (a) A pukka floor
  - (b) Play ground
  - (c) Grass lawn
  - (d) forestland

**ANSWERS: Q1 (a)      Q2 (d)      Q3 (a)**

## Learning Outcomes

- Discusses and appreciates stories of scientific discoveries.

## QUESTIONS

**1. Place the following statements in a proper order to form a meaningful paragraph:**

- 1. Which in turn decreases the seepage of rainwater into the ground**
- 2. This decreases the open areas like parks and play grounds**
- 3. increasing population creates demand for construction of houses, shops, offices, roads and pavements**
- 4. this results in depletion of water table and creates scarcity of more water**

- (a) – 1,2,3,4
- (b) – 2,3,1,4
- (c) – 3, 2,1,4
- (d) – 4,3,2,1

**2. The region covered by water is called:**

- (a) Hydrosphere
- (b) Ionosphere
- (c) Atmosphere
- (d) Water park

**3. Water is chlorinated to:**

- (a) kill germs
- (b) change colour
- (c) soften it
- (d) improve its taste

**ANSWERS: Q1 (c)**

**Q2 (a)**

**Q3 (a)**

## Learning Objectives

- visualise the percentage of freshwater available on earth in order to conclude the need for water conservation
- suggest some (of his/her own) methods for recharging ground water table.
- Suggest the steps for efficient water management at individual/ community level.
- Elaborate the steps to be taken by the public/ private authorities for improved water supply/debate on steps taken/to be taken by the govt for the supply of clean drinking water to people.

## Learning Outcomes

- Applies learning of scientific concepts in day to day life, e.g. dealing with acidity, testing soil, taking measures to prevent corrosion, cultivation by vegetative propagation, connecting two or more electric cells in proper order in devices, taking measures during and after disasters, suggesting methods for treatment of polluted water for reuse etc.

## QUESTIONS

- 1. The process of ground water getting stored between the layers of hard rock below the water table is known as:**
  - (a) infiltration
  - (b) aquifer
  - (c) water table
  - (d) bawri
- 2. Indira point was in:**
  - (a) Kerala
  - (b) Lakshadweep
  - (c) Tamil Naidu
  - (d) Andaman and Nicobar island
- 3. Water exists in:**
  - (a) 5 forms
  - (b) 3 forms
  - (c) No forms
  - (d) 2 forms

**ANSWERS: Q1 (a)                      Q2 (d)                      Q3 (b)**

**CHAPTER XVII**  
**FORESTS: OUR LIFELINE**

**Learning Objective**

- Infer reasons for the aerial appearance of forests (as shown in the chapter), in connection with types of trees/shapes of trees.

**Learning Outcome**

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.
- 1. At higher altitudes trees have conical shapes. Identify the correct reason for this from the following.**
    - (a) Due to higher gravity
    - (b) To shed snow efficiently
    - (c) Cone shape looks better in higher regions
    - (d) No particular reason for the occurrence
  - 2. Variations in the type of trees in different forests is dependent on the following except**
    - (a) type of soil
    - (b) temperature
    - (c) altitude
    - (d) people
  - 3. Dark coloured substance that forms a natural manure for the growth of forest is called**
    - (a) synthetic chemicals
    - (b) leachate
    - (c) gyre
    - (d) humus

**Answers: 1 (c)**

**2 (c)**

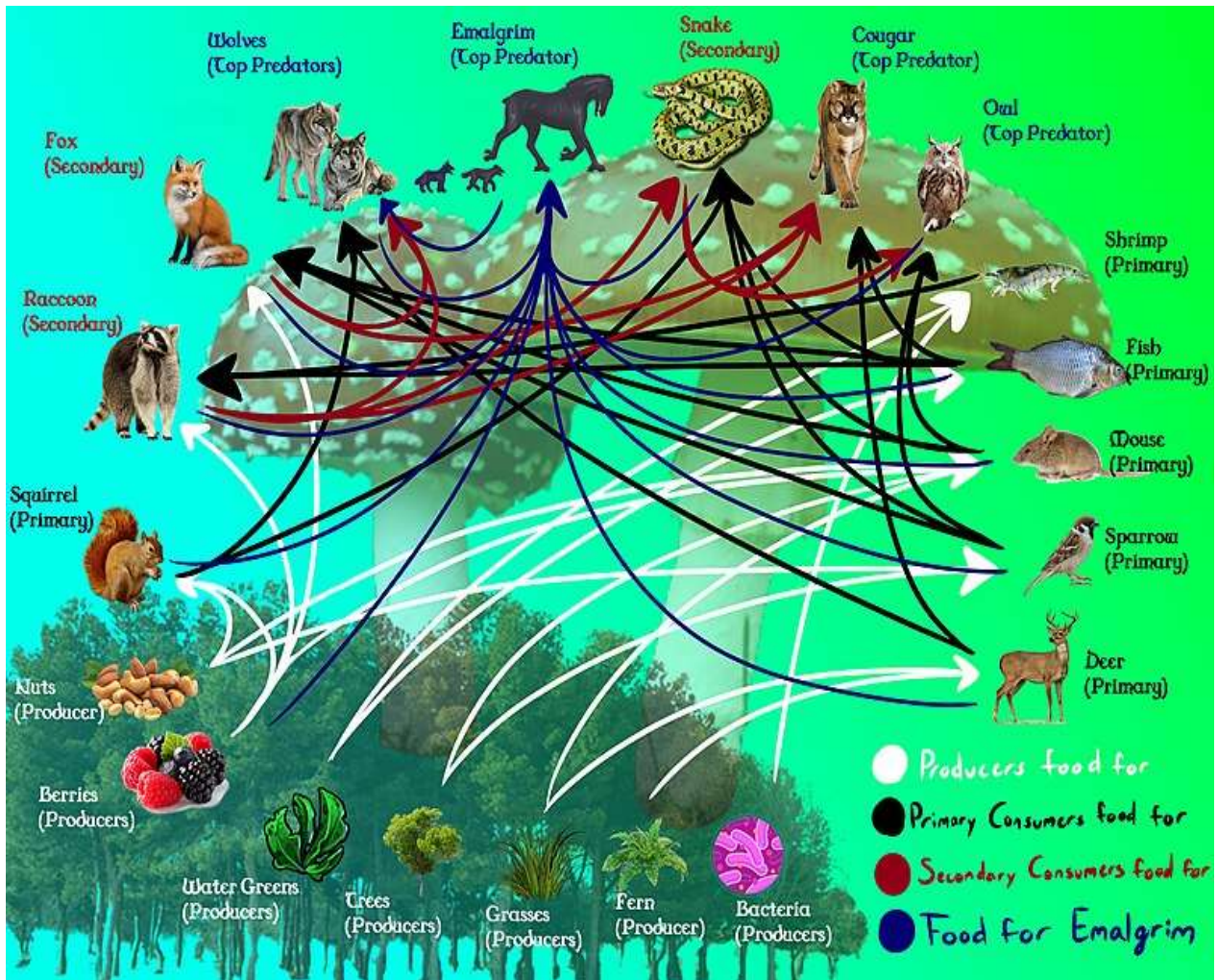
**3 (b)**

## Learning Objective

- Create a flowchart of the food web, taking into consideration some examples of living beings, used in the chapter

## Learning Outcome

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.



1. Identify the impact on this food web if the poachers kill all the top predators?

- population of the secondary consumers will decrease
- forest will become a happier place
- population of primary consumers will decrease
- There will be no impact at all



- 2. An important member of the food web is not represented in the above food web. Select them from the options given below:**
- (a) Detritivore
  - (b) Decomposers
  - (c) Saprophytes
  - (d) All of the above
- 3. In the various trophic levels that form the food web in a forest, the maximum biomass can be found at \_\_\_\_\_ trophic level.**
- (a) Primary producers
  - (b) Primary consumers
  - (c) Secondary consumers
  - (d) Tertiary consumers

**Answers: 1 (a)**

**2 (d)**

**3 (a)**

## Learning Objectives

- Outline features of forests that are responsible for sustenance of life.
- Designs a forest ecosystem by considering a few plants and animals and explaining how they support one another.

## Learning Outcome

- Applies learning of scientific concepts in day-to-day life, e.g., dealing with acidity; testing and treating soil; taking measures to prevent corrosion; cultivation by vegetative propagation; connecting two or more electric cells in proper order in devices; taking measures during and after disasters; suggesting

### 1. If you visit Shimla, What kind of vegetation do you expect to see?

**Select the correct option.**

- (a) trees with broad leaved
- (b) trees with needle like leaves
- (c) only creepers
- (d) only shrubs

### 2. Closed canopy and many layers of vegetation are beneficial for increase in water table as:

- (a) such trees have deep roots and absorb water faster from the ground
- (b) such trees slow down the speed of rain drops and improve seepage
- (c) more the trees lesser the rate of transpiration
- (d) water table depends on amount of rainfall and not on type of trees

### 3. Forests are beneficial to us because

- (a) They can be cut to form industries
- (b) They can be cut to make roads
- (c) They provide oxygen to us
- (d) All of the above

**Answers: 1 (b)**

**2 (b)**

**3 (c)**

## CHAPTER XVIII

### WASTEWATER STORY

#### Learning Objectives

- Recall the journey of used water as waste water/ water that goes down the drains from sinks, showers, toilets, laundries
- Perform various processes related to treatment of wastewater in order to describe processes inside a Wastewater Treatment Plant.

#### Learning Outcomes

- Identifies materials and organisms, such as, animal fibres; types of teeth; mirrors and lenses, on the basis of observable features, i.e., appearance, texture, functions, etc. Conducts simple investigations to seek answers to queries, e.g., can extract of coloured flowers be used as acid-base indicator? Do leaves other than green also carry out photosynthesis? Is white light composed of many colours?

**1. Waste water containing human excreta is known as -**

- (a) Sewage
- (b) Sewer
- (c) Sewerage
- (d) None

**2. Which among the following statements about ozone are correct?**

- (a) it is essential for the breathing of living organisms
- (b) it is used to disinfect water
- (c) it absorbs ultraviolet rays
- (d) its proportion in air is about 3%

**3. Sludge in separate tanks is decomposed to get biogas by**

- (a) yeasts
- (b) aerobic bacteria
- (c) anaerobic bacteria
- (d) none of these

**ANSWERS**

**Q1 (A)**

**Q2 (B)**

**Q3 (C)**

## Learning Objectives

- List the uses of water in everyday life in order to identify various source of contamination.
- Define sewage and list its components in order to identify their points of origin

## Learning Outcomes

- Relates processes and phenomena with causes, e.g., wind speed with air pressure; crops grown with types of soil; depletion of water table with human activities, etc.

### 1. Sewage is mainly a

- (a) liquid waste
- (b) Solid waste
- (c) gaseous waste
- (d) Mixture of solid and gas

### 2. Sewage refers to waste water that is released by

- (a) homes
- (b) industries
- (c) offices
- (d) all of the above

### 3. The impurities present in sewage may consist of

- (a) organic substances
- (b) inorganic substances
- (c) nutrients
- (d) all of these

**ANSWERS Q1 (A)**

**Q2 (D)**

**Q3 (D)\**

## Learning Objectives

- Make a flow chart/line diagram of sewage route from all the various sources of generation to the treatment plant.
- Outline factors responsible for scarcity of clean water and list some waterborne diseases in order to suggest methods of their prevention
- Conduct a water contamination survey in order to devise a plan for good sanitation practices and avoidance of contagious diseases
- Devise and execute a step wise plan for treatment of waste water

## Learning Outcomes

- Draws labelled diagrams / flow charts e.g., organ systems in human and plants; electric circuits; experimental set ups; life cycle of silk moth, etc.
- Makes efforts to protect environment, e.g., following good practices for sanitation at public places; minimising generation of pollutants; planting trees to avoid soil erosion; sensitising others with the
- consequences of excessive consumption of natural resources, etc.

### 1. Treatment plants

- (a) reduce pollutants in waste water to a level where nature can take care of it.
- (b) makes the waste water free of all pollutants
- (c) both A & B
- (d) none of these

### 2. Better housekeeping practices include

- (a) cooking oil and fats should not be thrown down the drain.
- (b) Chemicals like paints, solvents, insecticides should not be thrown into the drain.
- (c) Used tea leaves, solid food, cotton should not be thrown in the drain.
- (d) All of these

### 3. Which type of waste are plastics and polyethenes?

- (a) Non-biodegradable and very harmful
- (b) Non-biodegradable and not harmful
- (c) Which do not cause any odor
- (d) Which decompose easily in the environment

4. \_\_\_\_\_ are suitable for places where there is no sewerage system for hospitals, isolated buildings and cluster of 4-5 houses.
- (a) Septic tanks
  - (b) Chemical toilets
  - (c) Composting pits
  - (d) Dustbins
5. One of the following type of trees are said to help in purifying wastewater quite rapidly when planted all along the sewage ponds. These are:
- (a) Eucalyptus plant
  - (b) Ficus plant
  - (c) Neem plant
  - (d) Peepal plant

**ANSWERS      Q1 (A)      Q2 (D)      Q3 (A)      Q4 (A)      Q5 (A)**

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*“Live as if you were to die  
tomorrow. Learn as if you were  
to live forever”*

*- Mahatma Gandhi*

**2021**



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