SCIENTIFIC LITERACY
CORE GROUP

MODULE – 5
Class - VI

INDEX

TROPHIC LEVELS

Area: Food and Health

Class: 6

Chapter: 1

Chapter Name: Food- Where Does It Come From?

Concept: Understanding Various Trophic Levels

Learning Outcomes: The student will be able to:

- Identify and classify organisms based on observable features.

- Conduct simple investigations to seek answers to queries.

- Apply learning of scientific concepts.

Read the following passage and answer the questions that follow:

Creatures in the food chain or web are also classified into a system called the trophic system. The trophic system has three levels. The top level includes omnivores and carnivores. The second level includes herbivores (animals that eat vegetation) and the bottom level includes living things that produce their own energy, like plants. When one level of the trophic system is removed, all of the trophic levels below them are affected.

Omnivores help keep in check both animal populations and vegetation growth. Removing an omnivore species can lead to vegetation overgrowth and an overabundance of any creatures that was part of its diet.

Q1. Which type of animals are found in various trophic levels?

Q2. Write AGREE/DISAGREE for the following statements:

i. Plants occupy the first trophic level.

ii. If herbivores are removed, the population of only the carnivores will be affected but nothing will happen to the plant population.

iii. By removing the top level of the trophic system, the population of herbivores will increase.

iv. All the trophic levels depend directly or indirectly on plants.

Q3. Which level of trophic system possesses maximum energy?

Item Description:

Q.no.	Question type	Competency	Knowledge	Context	Difficulty level
Q1	Open ended	Interpret data	Content	Global	Low
Q2	Closed constructed	Evaluate and design a scientific query	Content	Global	Medium
Q3	Closed constructed	Interpret data	Content	Global	Medium

Answer Key:

Answer 1. Omnivores like bears, crow, man and carnivores like lion, tigers, lizard at the topmost trophic level.

Herbivores like deer and cow at second trophic level

Plants at the first trophic level.

Answer 2. i. AGREE

ii. DISAGREE

iii. DISAGREE

iv. AGREE

Answer 3. First level/Plants

A HEALTHY BREAKFAST

Area: Food and Health

Class : 6

Chapter: 1

Chapter Name: Food - Where Does It Come From?

Concept: Sources Of Food

Learning Outcomes: The student will be able to:

- Conduct simple investigation and find out which components of food are present in which food item.
- Apply learning of scientific concept in day to day life, eg selecting food items for a balanced diet.

Egg whites can be a lower fat, calorie and cholesterol option for protein, but the yolk of a whole egg holds many of the vitamins and minerals. These add filling fibre, vitamins and minerals to your **healthy** diet. Breakfast, lunch or dinner, **omelette** can be a **healthy**, protein-packed meal choice.

Q1. The list of ingredients needed to make a cheese omelette is given below. Identify the ingredients as animal or plant product.

a. Eggs_____

b. Green chillies_____

c. Vegetable oil _____

d. Cheese _____

e. Onions _____

f. Pepper _____

Q2. There is one ingredient missing from the list, which is neither a plant nor an animal product. name the ingredient._____

Q3. Which nutrients would you obtain after eating the omelette?

Q4. Suppose one of your friends is a vegetarian and does not eat eggs. Which alternative would you suggest to him to supplement for the nutrient present in eggs? What is the role of the major nutrient present in eggs?

Q5. Is having only the omelette as breakfast sufficient for your body? If not, what would you include in your breakfast to get a balanced diet?

Item description:

Q.No.	Question type	Competency	Knowledge	Context	Difficulty level
Q1	Closed constructed	Interpret data	Content	Local	Low
Q2	Closed constructed	Interpret data	Content	Local	Low
Q3	Closed constructed	Interpret data	Content	Local	Low
Q4	Open ended	Evaluate and design a scientific query	Content	Local	Medium
Q5	Open ended	Evaluate and design a scientific query	Content	Local	Medium

Answer Key:

Answer 1. a. animal   b. plant   c. plant   d. animal   e. plant

Answer 2. salt

Answer 3. protein, fats, vitamins and minerals

Answer 4. Any protein rich vegetarian food item- pulses, tofu etc; Proteins help to build new cells, repair damaged cells and help in overall growth of the body.

Answer 5. No, source of carbohydrates is missing so I would add carbohydrate rich food item-for example bread, chapatti etc

HEALTHY DIET

Area: Health

Chapter: 2

Chapter name: Components Of Food

Class: VI

Concept – Balanced Diet

Learning Outcomes : Students will be able to learn the

● List the various deficiency diseases of Vitamins.

● Plan a balance diet

• Explain the role and source of various minerals

Fig. 2.6 Some sources of Vitamin A

Fig. 2.7 Some sources of Vitamin B

Fig. 2.8 Some sources of Vitamin C

Fig. 2.9 Some sources of Vitamin D

Some sources of iodine

Some sources of phosphorous

Some sources of iron

Some sources of calcium

Vitamin/Mineral	Deficiency disease/disorder	Symptoms
Vitamin A	Loss of vision	Poor vision, loss of vision in darkness (night), sometimes complete loss of vision
Vitamin B1	Beriberi	Weak muscles and very little energy to work
Vitamin C	Scurvy	Bleeding gums, wounds take longer time to heal
Vitamin D	Rickets	Bones become soft and bent
Calcium	Bone and tooth decay	Weak bones, tooth decay
Iodine	Goiter	Glands in the neck appear swollen, mental disability in children
Iron	Anaemia	Weakness

Source-NCERT

QUESTIONS

Q1. Essential Components of food in addition to Carbohydrates, Fats, Proteins are

a) Vitamins
b) Water
c) Minerals
d) All the above

Q2 Source of Vitamin B is
a) Amla
b) Spinach
c) Liver
d) Sunlight

Q3. Deficiency disease caused by Iodine is
a) Colour Blindness
b) Scurvy
c) Goitre
d) Obesity

Q4. Anaemia caused weakness in the body . It's due to the deficiency of

a) Iron

b) Vitamin K

c) Non availability of Sunlight

d) None of the above

Q5. State whether the following statement is true or not? (Answer - Yes/No)

a. Goitre is caused due to the deficiency of iodine and it appears as a swelling in the neck

b.In Rickets bones become weak and tend to bent.

c. Iron is found in milk banana and eggs.

d Night blindness is caused because of the vitamin B .

e. Orange guava lemon and Amla orange source of vitamin C.

Q6. Name two deficiency diseases caused by Vitamin C & Calcium

_____

_____ .

Item Description:

Q.no	Q.type	Competency	Knowledge	Content	Difficulty Level
1	Simple Multipe	Scientific	Enquiry	Global	Low
2	Simple Multipe	Scientific	Enquiry	Global	Medium
3	Simple Multipe	Scientific	Enquiry	Global	Medium
4	Simple Multipe	Scientific	Knowledge	Global	High
5	Open Ended	Interpret	Data	Global	High
6	Open Ended	Interpret	Data	Global	High

Answer Key :

1. d. full credit>2, any other option>0

2. c> full credit>2, any other option >0

3. c> full credit>2, any other option >0

4. a> full credit>2, any other option>0

5. a. True b. True c. False d. False e. True, All correct full credit>b any three correct>1 ,any

one correct>0   6. Scurvy, Reduced lmmunity ,Bone ,Tooth decay(Any other relevant

example) >full credit>2, any two>1 no answer >0

COTTON SPINNING

Area: Frontiers Of Science And Technology

Class: 6

Chapter: 3

Name Of The Chapter : Fibre To Fabric

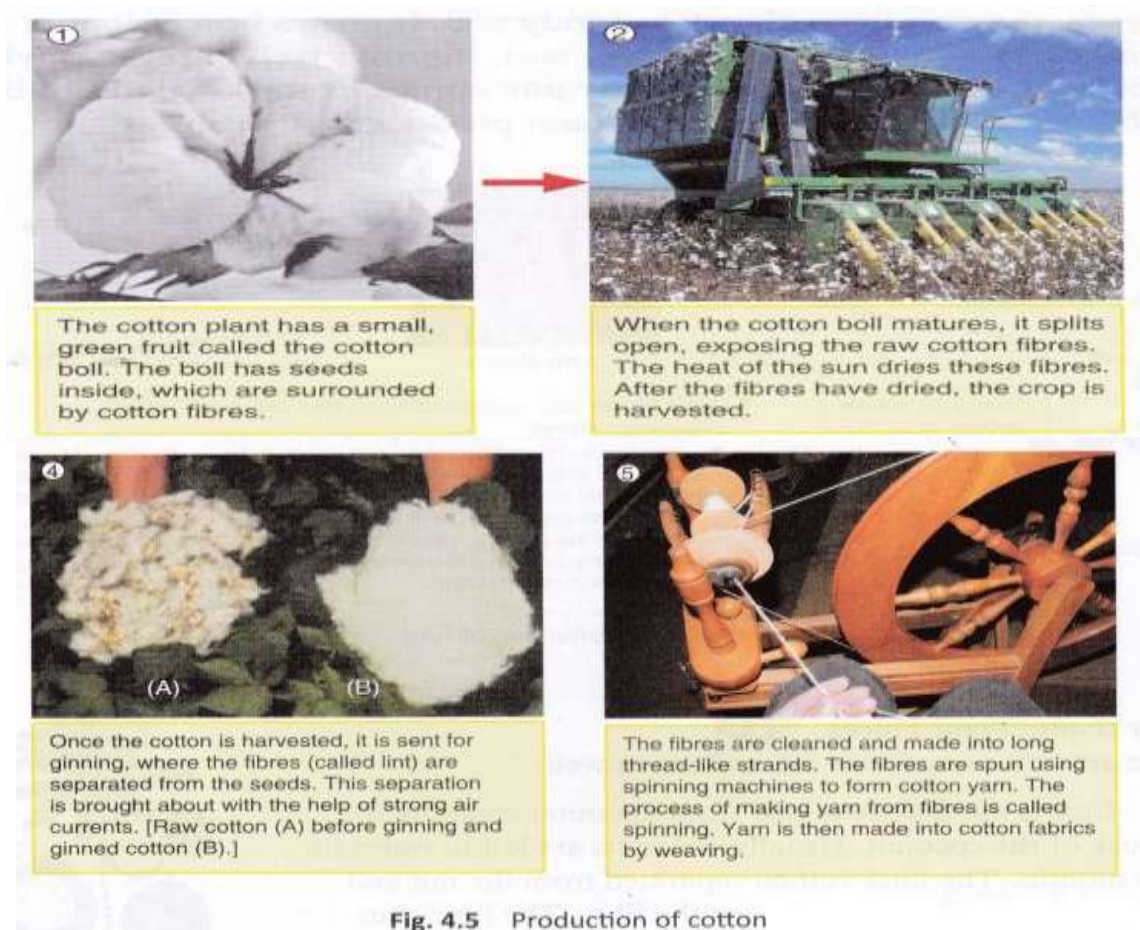**Concept:** Cotton Spinning

Learning Outcomes:

Student will be able to:

- Apply learning of scientific concepts .
- Conduct simple Investigations to seek answers to queries.
- Explain the steps involved in the formation of cotton fibre from cotton plant.

Cotton:

The cotton plant is a shrub. It grows well in black soil and warm climate. It needs moderate rainfall. Cotton is a soft fibre that grows around the seeds of the cotton plant. A variety of textile products are made from cotton. In India, 'lchadi', a coarse hand-woven cloth, is made from cotton.

① The cotton plant has a small, green fruit called the cotton boll. The boll has seeds inside, which are surrounded by cotton fibres.

② When the cotton boll matures, it splits open, exposing the raw cotton fibres. The heat of the sun dries these fibres. After the fibres have dried, the crop is harvested.

④ Once the cotton is harvested, it is sent for ginning, where the fibres (called lint) are separated from the seeds. This separation is brought about with the help of strong air currents. [Raw cotton (A) before ginning and ginned cotton (B).]

⑤ The fibres are cleaned and made into long thread-like strands. The fibres are spun using spinning machines to form cotton yarn. The process of making yarn from fibres is called spinning. Yarn is then made into cotton fabrics by weaving.

Fig. 4.5 Production of cotton

Production: Cotton is grown in Maharashtra, Gujarat, Punjab, Rajasthan, Tamil Nadu and Madhya Pradesh

1. The pod of cotton containing fibres and seeds is called a cotton _____

a. Flower

b. Fruit

c. Boll

d. bloom

2. Cotton is usually picked by hand. Fibres are then separated from the seeds by combing. This process is called _____ of cotton.

a. Machining

b. Ginning

c. Raining

d. Spinning

3.Cotton is grown in which of the following state

a) Karnataka

b) Bihar

c) Jammu and Kashmir

d) Maharashtra

4. Which fibre yielding plant should be grown in a field having black soil and warm climate?

(a) Cotton

(b) Wool

(c) Jute

(d) Coconut

5. Which of the following three processes are involved in converting fibre into fabric?

(a) Yarn → fibre → fabric

(b) Fibre → Yarn → fabric

(c) Both (a) and (b)

(d) None of the above

6, We wear different types of clothes in different seasons. Explain

Item description:

Q.No	Q.type	Competency	Knowledge	Context	Difficulty level
1.	Close constructed	Explain phenomenon scientifically	Content	local	Low
2.	Close constructed	Interpret data and evidence scientifically	Content	local	Medium
3.	MCQ	Explain phenomenon scientifically	Content	local	low
4.	Close constructed	Interpret data and evidence scientifically	Content	local	Medium
5.	Close constructed	Explain phenomenon scientifically	Procedural	local	Medium

Answer Key:

1.c

2.b

3.d

4.a

5. b

Scoring:

1.Full credit :c , No credit if Any other response

2.Full credit : b , No credit if Any other response

3.Full credit : d , No credit if Any other response

4.Full credit : a , No credit if Any other response

5.Full credit : b ,No credit if Any other response

CLASSIFICATION AND ITS IMPORTANCE

Area: Natural Resources

Class- VI

Chapter no.: 4

Chapter Name : Sorting Materials Into Groups

Concept: Various Objects

Learning Objectives: Students will

- understand the importance of classification of various objects
- understand the criteria of classification

We see a vast variety of objects around us. These objects are of different shape, colour, texture, properties and use. For proper understanding of these objects it is important to sort them into groups. Placing or sorting similar things together is called grouping. Grouping makes it easier for us to find things when we need them. Objects are made of different materials. One material can be used to make different objects. This is possible because different types of materials have different properties. We have to choose materials with the right properties based on what we want to use it for. Materials have different properties like roughness, flotation, attraction towards a magnet, conduction of heat, conduction of electricity etc. Grouping helps in gaining systematic knowledge of things. It also gives a general idea about all members of a group and difference between members of different groups. Based on the size, nature of the stem and the life span, plants are also classified into herbs, shrubs and trees.

Q 1: What makes the basis of sorting materials into groups?

  I.   Similarities in their properties
 II.   Difference in their properties
III.   Both (i) and (ii)
 IV.   None of these

Q2. How can you make a transparent paper translucent?

Q3. Choose the correct answer.

i) Which one of the following is not soluble in water:

Common salt, Alum, Alcohol, Turmeric powder

ii) Which of these objects shine:

Plastic toy, Cotton shirt, Steel spoon, Stone piece

iii) Which of these gases is soluble in water:

Hydrogen, Nitrogen, Carbondioxide

iv) Which of these objects is opaque:

Glass, Air, Water, Charcoal

v) The property of a substance that decides whether it will float or sink in water is :

Volume, Density, Refractive index, viscosity

vi) which of these is a shrub:

Tulsi, wheat, gram, Sunflower

Q4.Which of the following does not belong to the group and why?

Ink, Milk, Honey, Oil

Q5. If you have to select a handle made of different materials for your screw driver, which one would you prefer and why?

Steel, Wood, rubber, Thermocol

Answer Key:

1-III,2-by oiling the paper,3-(i) turmeric powder (ii) steel spoon (iii) carbondioxide (iv)charcoal

(v) density (vi) sunflower 4-oil - it does not dissolve in water others dissolve 5-wood, because it is a non conductor of heat and electricity.

Q No	Q type	Competency	knowledge	Context	Difficulty level
1	M.C.Q	Explain phenomenon scientifically	content	global	Medium
2	Close constructed	Explain phenomenon scientifically	epistemic	global	Medium
3	m.c.q	Explain phenomenon scientifically	content	global	Medium
4	Close constructed	Explain phenomenon scientifically	epistemic	global	High
5	Close constructed	Evaluate scientific enquiry	content	global	medium

CRYSTALLISATION

Area - Frontiers of Science & Technology
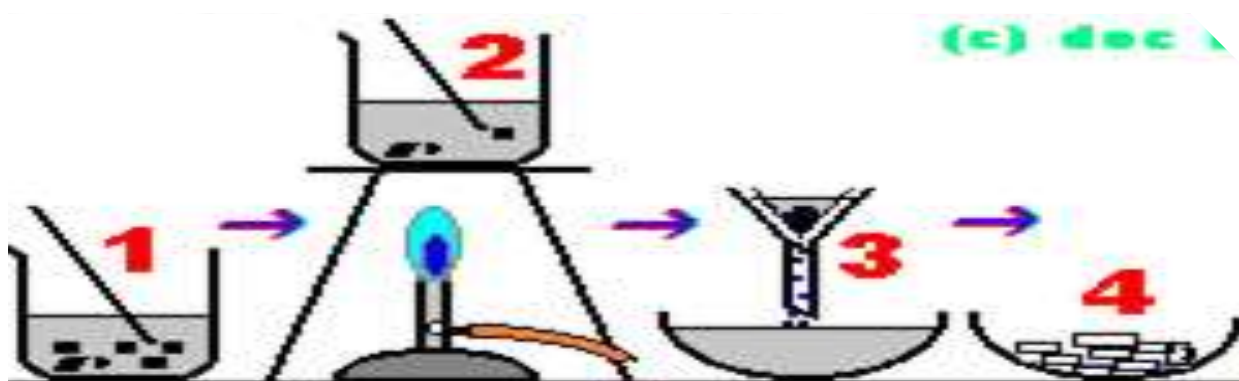
Class: 6

Chapter : 5

Chapter Name : Separation of substances.

Concept– Separation Methods

Learning Objectives:

Student will be able to :-

1. Conduct simple investigations to seek answers to queries.

2. apply learning of scientific concepts/ principles in daily life.

The above method is used to purify solids example the salt we get from sea water has many impurities in it. To remove this impurity the above process is carried out. This is a process which separates a pure solid in the form of its crystals from a saturated solution. However, this technique is better than evaporation technique. We can get an impure sample of a solid even after evaporation. Some solids decompose or some may get charred on heating to dryness during evaporation.

1. The process used to separate a pure solid from its saturated solution is called -
   (a) Distillation
   (b) Sedimentation
   (c) Fractional distillation
   (d) Crystallization

2. The process shown in the diagram can be used -
   (a) For purification of salt we get from sea water
   (b) To separate out crystals of alum from impure sample
   (c) To separate blue vitriol from impure sample
   (d) All of above

3. The process shown above is a better technique for purification of solids than evaporation because –

(a) Some solids decompose on heating

(b) We get impure sample of solid

(c) We get pure sample of solid

(d) It takes lesser time

4. This technique is used to –
    (a) Separate solids that dissolve in liquids
    (b) Separates solids that do not dissolve in liquids
    (c) Separate two immiscible liquids
    (d) Separate two different types of solids

Scoring key

Answer 1

   Score 2 if response is (d)
   Score0 for any other response

Answer2

   Score 2 if response is (d)
   Score 1 if response is a or (b) or (c)

Answer3

   Score 2 if response is (c) and (d)
   Score 1 if response is (c) or (d)
   Score 0 for any other response

Answer4

   Score 2 if response is(a)
   Score 0 for any other response

Item description:

Q.No	Q.type	Competency	Knowledge	Context	Difficulty level
1.	Simple multiple choice	Interpret data and evidence scientifically	Procedural	Global	Medium
2.	Close constructed	Explain phenomenon scientifically	Content	Global	Medium
3.	Close constructed	Explain phenomenon scientifically	Content	Global	Medium
4.	Close constructed	Interpret data and evidence scientifically	Content	Personal	Medium

ANALYSING PHYSICAL AND CHEMICAL CHANGES

Area - Frontiers of Science & Technology

Class: 6

Chapter : 6

Chapter Name : Changes around us

Concept–Types Of Change

Learning Outcomes: Student will be able to

- Distinguish between physical and chemical changes
- Classify changes as physical or chemical, reversible or irreversible.
- Apply scientific knowledge in daily life.

Changes occurring around us can be physical or chemical a physical change is one in which physical properties of substance change without a change in its chemical composition. As a result a substance changes its form, but not its chemical composition.

Physical changes are usually reversible and temporary. Everyday examples of physical changes are drying of wet clothes tearing papers into pieces, melting of wax, chopping of wood and freezing of water to get ice.

A chemical change is one in which new and different substances are formed. The substance or substances formed have properties different from those of the materials that combined during the change. The change is usually irreversible and permanent.

Based on above information answer the following questions –

Q.No.1 Which are the following changes cannot be reversed?

a) Hardening of cement   b) Freezing of ice cream

c) Opening of a door   d) Melting of chocolate.

Q.No.2 Pick the change that can be reversed?

a) Cutting of tree   b) Melting of Ghee

c) Burning of candle   d) Blooming of flower.

Q.No.3While lighting a candle, Ria observed the following changes-

i) Wax was melting   ii) Candle was burning

iii) Size of the candle reducing   iv) Melted wax as getting solidified

   Of the above, the changes that can be reversed are

a) i& ii   b) ii & iii

c) iii& iv   d) i& iv

Q.No.4 Salt can be separated from its solution as
a) Mixing of salt in water is a change that can be reversed by heating and melting of salt.

b) Mixing of salt in water is a change that can't be reversed.
c) It is permanent change.
d) It can be reversed by evaporation.

Item description:

Q.No	Q.type	Competency	Knowledge	Context	Difficulty level
`					
1.	Close constructed	Explain phenomenon scientifically	Content	Global	Medium
2.	Open ended	Interpret data and evidence scientifically	Content	Personal	Low
3.	Open ended	Explain phenomenon scientifically	Content	Global	Medium
4.	Close constructed	Interpret data and evidence scientifically	Content	Personal	Medium

Answer Key:

1.a

2.b

3.d

4.d

Scoring:

1.Full credit :a ; No credit if Any other response

2.Full credit :b; No credit if Any other response

3.Full credit : d)i and iv; No credit if Any other response

4.Full credit :d ; No credit if Any other response

THE GREEN CITY

Area: Natural Resources

Class: 6

Chapter : 7

Chapter Name: Getting to know Plants

Concept: Herbs, Shrubs and Trees

Learning Outcome:

- Classifies organism based on their observable characteristics

- Plants as herbs Shrubs and Trees

Chandigarh is a perfect example where several outstanding varieties of trees are planted on city roads. These include trees that are structurally big, have tall strong trunks and spreading crowns. Most of the important roads have been planted with single kind of tree species in a well-planned manner.

Dr MS Randhawa, the first Administrator of the city was a plant lover and played a key role in beautifying the city.

Chandigarh proudly maintains the status of the Garden City and is considered the greenest city in India.

A large variety of outstanding trees have been used to beautify Chandigarh. Some examples with their scientific names are:

Swietenia macrophylla (Mahogani),
 Azadirachta indica (Neem),
 Terminalia bellirica (Bahera)
Terminalia arjuna (Arjun tree) and\
 Eucalyptus citriodora (Eucalyptus)

They show the structure, form, and texture. These are hardy and stand pollution abuse, are easy to grow and possess all qualities for making them suitable for city plantation.

Source: India Architecture News - Oct 2, 2017

Questions

1. How will you identify a that a plant growing in your city is a tree.
2. The Plants growing in the divider between the two roads are smaller in height, but strong and bushy. Which category do they belong to.
3. Match the scientific name with the common name

Scientific name	Common name
Eucalyptus citriodora	Neem
Azadirachta indica	Eucalyptus
Terminalia bellirica	Arjun tree
Terminalia arjuna	Bahera

4. What makes these trees suitable for city.

5. Which eminent administrator was instrumental in greening the city.

Item Description

Q.no	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	Close ended	Explaining phenomenon scientifically	Content	Local	Medium
2	Open ended	Explaining phenomenon scientifically	Content	Local	Medium
3	Close ended	Explaining phenomenon scientifically	Content	Local	Medium
4	Close ended	Explaining phenomenon scientifically	Content	Local	Medium
5	Close ended	Explaining phenomenon scientifically	Content	Local	Medium

Answer Key:

1. Trees are structurally big, have tall strong trunks and spreading crowns.

2. The plants growing between the two roads are shrubs as they are small and bushy.

3. Correct match

Scientific name	Common name
Eucalyptus citriodora	Eucalyptus
Azadirachta indica	Neem
Terminalia bellirica	Bahera
Terminalia arjuna	Arjun tree

4. These are hardy and stand pollution abuse, are easy to grow and possess all qualities for making them suitable for city plantation.

5. Dr MS Randhawa, the first Administrator of the city was a plant lover and played a key role in beautifying the city.

MOVEMENT AND LOCOMOTION

Area : Health

Chapter : 8

Chapter Name: Body Movement

Class : VI

Concept : Human Body

Learning Outcomes :

Students will be able to learn the

- What is a skeleton and how many bones are present in the human skeleton?
- How can the image of bones be taken to check the injuries?
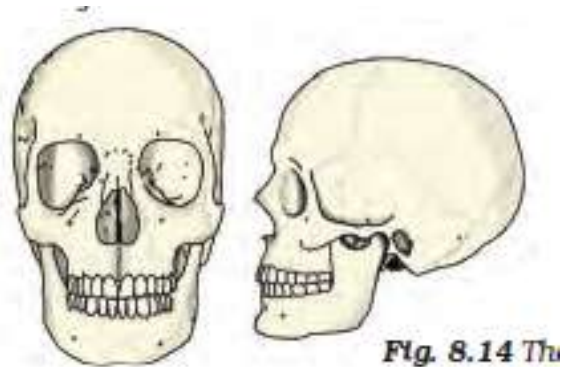- Explain how the brain is protected by the skull .

Fig. 8.11

Fig. 8.14 Th

The human skeleton is composed of around 305 bones at birth. The number of bones in the skeleton changes with age. It decreases to 206 bones by adulthood after some bones have fused together This framework is called the skeleton (Fig. 8.7.) How do we know that this is the shape of a human skeleton? How do we know the shapes of the different bones in our body? We can have some idea about the shape and number of bones in some parts of our body by feeling them. One way we could know this shape better would be to look at Xrayimages of the human body. Did you or anyone in your family ever have an X-ray of any part of your body taken? Sometimes when we are hurt or have an accident, doctors use these X-ray images to find out about any possible injuries that might have happened to the bones. The Xrays show the shapes of the bones in our bodies. Feel the bones in your forearm, the upper arm, lower leg and upper leg. Try to find the number of bones in each Bend your fingers. Are you able to bend them at every joint? How many bones does your middle finger

have? Feel the back of your palm. It seems to have many bones, isn't it (Fig. 8.9)? Is your wrist flexible? It is made up of several small bones called carpals. What will happen if it has only one bone The skull is made up of many bones joined together (Fig. 8.14). It encloses and protects a very important part of the body, the brain.

Source - NCERT

Questions:

Q1.Number of bones present in adult human being are
   a) 102
   b) 206
   c) 75
   d) 305

Q2   Name the part of the body which encloses the brain

   a) Pectoral girdle
   b) Rib cage
   c) Pelvic girdle
   d) Skull

Q3   Name the technique used to get the picture of bones

   a) X-Ray
   b) Ultrasound
   c) Photographs
   d) All the above

Q4. Bones of fingers can bend due to the presence of ------- and in its absences bones

      --------------------------------.

Q5. State whether the following statement is true or not? (Answer - Yes/No)

   a) Shapes of bones can be seen with the help of X-Ray.
   b) The human skull has joined bones which cannot move..
   c) Many bones present in the wrist are called carpels which help in its movement.
   d) All the bones present in the human skeleton are alike.
   e) Bones are responsible for the shape and movement of the body.

Q6. Give one functions each of skull and backbone.---

Item description:

Q.no	Q.type	Competency	Knowledge	Content	Difficulty Level
1	Simple Multiple	Scientific	Enquiry	Global	Low
2	Simple Multiple	Scientific	Enquiry	Global	Medium
3	Simple Multiple	Scientific	Enquiry	Global	Medium
4	Open-Ended	Scientific	Knowledge	Global	High
5	Open-Ended	Interpret	Data	Global	High
6	Open-Ended	Interpret	Data	Global	High

Answer Key:

1. b>. full credit>2, any other option >0

2. d> full credit>2, any other option >0

3. a> full credit>2, any other option >0

4. Joints ,cannot move. Both correct.>2,Any one correct>1

5. a. True b. True c.True d.False e. True, All correct full credit>b any three correct>1 ,any one correct>0

6. Protecting the   brain, balancing the body weight, (Any other relevant example) >full credit>2, any   one>1 no

     answer >0

Role Of Bones And Muscles In Movement

Area : Health

Chapter : 8

Chapter Name: Body Movement

Class: VI

Concept : Animal Movements

Learning Outcomes :

Students will be able to learn the

- Name the parts of the body that help in movement.
- Why snake can not move in a straight line
- Explain how streamlined body helps the fishes to survive in water

The head and tail of the fish are smaller then the middle portion of the body – the body tapers at both ends. This body shape is called streamlined The shape is such that water can flow around it easily and allow the fish to move in the water. The skeleton of the fish is covered with strong muscles. During swimming, muscles make the front part of the body curve to one side and the tail part swings towards the opposite side. The fish forms a curve as shown in Fig. 8.24. Then, quickly, the body and tail curve to the other side. This makes a jerk and pushes the body forward. A series of such jerks make the fish swim ahead. This is helped by the fins of the tail. Fish also have other fins on their the body which mainly help to keep the balance of the body and to keep direction, while swimming. Did you ever notice that underwater divers wear fin-like flippers on their feet, to help them move easily in the water? How do snakes move? Have you seen a snake slither? Does it move straight(Fig. 8.25)? Snakes have a long backbone. They have many thin muscles. They are connected to each other even though they are far from one another. Muscles also interconnect the backbone, ribs and skin. The snake's body curves into many loops. Each loop of the snake gives it a forward push by pressing against the ground. Since its long body makes many loops and each loop gives it this push, the snake moves forward very fast and not in a straight line

Source - NCERT

QUESTIONS

Q1. Movement of the body of a vertebrate is controlled by
       A. Bones
       B. Muscles
       C. Muscles and bones
       D. None of the above

Q2 Name the animal with a streamlined body

       A. Dog
       B. Horse
       C. fish
       D. Crow

Q3   What role is played by the fins in fishes

       A. Balance the body during swimming
       B. helps in turning the body
       C. Helps to keep the directions
       D. All the above

Q4. Both fishes and snakes are vertebrates and have muscles and bones which of them have strong muscles and why?

Q5. State whether the following statement is true or not? (Answer - Yes/No)

       A. Snake can move straight.
       B. Fins have no role to play in balancing the body.
       C. The snake has a long backbone but lacks the muscles.
       D. The streamlined body of fish plays a major role in its movement in the water
       E. Bones and muscles together help in the movement of organisms

Q6. Give two functions of fins in fishes---

_____

_____

Item description:

Q.no	Q.type	Competency	Knowledge	Content	Difficulty Level
1	Simple Multiple	Scientific	Enquiry	Global	Low
2	Simple Multiple	Scientific	Enquiry	Global	Medium
3	Simple Multiple	Scientific	Enquiry	Global	Medium
4	Open-Ended	Scientific	Knowledge	Global	High
5	Open-Ended	Interpret	Data	Global	High
6	Open-Ended	Interpret	Data	Global	High

Answer Key:

1. c>. full credit>2, any other option>0

2. c> full credit>2, any other option >0

3. d> full credit>2, any other option >0

4. Fishes have strong muscles as they have to move in the water and also have to balance themselves.>2

5. a. False b. False c. False d. True e. True, All correct full credit>b any three correct>1 ,any one correct>0

6. Balancing the body,helps in turning, (Any other relevant example) >full credit>2, any one>1 no

   answer >0

COMPONENTS OF HABITAT

Area :- Natural Resources

Class :- 6th

Chapter :- 9

Chapter Name :- The living organisms and their surroundings

Concept :- Habitat And Adaptation

Learning Outcomes:- The student will able to

- classify organisms and processes
- to know about components of habitat

Answer the following questions:

Q1. Which is the right combination of predator and prey?

	Predator	Prey
(a)	Lion	Deer
(b)	Snake	Eagle
(c)	Eagle	Snake
(d)	Deer	Lion

(i)Only (a) is correct

(ii) Only (b) is correct

(iii) Both (a) and (c) are correct

(iv) Both (a) and (d) are correct

27

Q2. How dolphins and whales breath?

   (i)   With gills
   (ii)   With lungs connected to blow hole
   (iii)   With skin
   (iv)   With pair of well developed limbs

Q3. Which is the correct statement for desert plants?

   (a)   Skin is fleshy and green
   (b)   Plants are usually cone shaped
   (c)   Leaves are reduced to spine to prevent water loss
   (d)   Roots are well developed and proportional to plants
   (i)   only (b)
   (ii)   (a), (b) and (c)
   (iii)   (b) , (c) and (d)
   (iv)   (a) and (d)

Q4. This statement is true about which habitat?

Animals having thick fur and trees having conical shapes and pointed leaves.

   (i)   Mountains
   (ii)   Desert
   (iii)   Grassland
   (iv)   Plains

Q5. Penguin is the animal of which habitat?

   (i)   Grassland
   (ii)   Desert
   (iii)   Mountains
   (iv)   Polar

Item description :

Q.No.	Question type	Competency	Knowledge	Content	Difficulty level
Q1.	M.C.Q	Evaluate and design a scientific enquiry	Content	Local	Low
Q2.	M.C.Q	Evaluate and design a scientific enquiry	Content	Local	Low
Q3.	M.C.Q	Evaluate and design a scientific enquiry	Content	Local	Low
Q4.	M.C.Q	Evaluate and design a scientific enquiry	Content	Local	Low
Q5.	M.C.Q	Evaluate and design a scientific enquiry	Content	Local	Low

Answer key :

Answer 1. (iii) Both (a) and (c)

Answer2. (ii) with lungs connected to blow hole

Answer3. (iii) (b) , (c) and (d)

Answer4. (i) Mountains

Answer5. (iv)Polar

FORMULA 1 RACING CARS

Area: Frontiers Of Science And Technology

Class: 6

Chapter: 10

Concept: Measurement of Distance

Learning Outcomes:

Student will be able to:

- apply scientific concepts to various sport activities
- evaluate the need to design different objects in a specific way
- express physical quantities in SI units

Formula 1 is most technologically advanced sport in the world. F1 Cars are the fastest single seater racing cars where the teams from around the world compete in Grand Prix races around the world to win the World Drivers' Championship and the Constructors' Championship.

IMAGE SOURCE : https://i.pinimg.com/originals/

The F1 cars are designed to go fast around a race track. These cars are one of quickest accelerating cars in the world and top speed achieved by them depends on the circuits on which they are driven. Their shape is such that there is smallest possible frontal area which gives them an added advantage in increasing speed. The holes in both sides of the car and above the head of the driver allow cold air to filter into the car to cool down the engine.

Answer the following questions:

Q1. If a racing car has to circle a track which is 5 km long and it maintains a constant speed of 380km/h, how many times will it be able to cover the entire track in one hour?

Q2. The F1 racing car is traveling at a speed of 380km/h , the distance covered by it in 2 seconds would be

a) 105.5 km

b) 105.5 m

c) 211.1 km

d) 211.1 m

Q3. Locate the word meaning ' increase in speed with time ' in the above paragraph.

Q4. The smallest frontal area of these cars allows

a) them to cut through the air

b) reduces drag

c) helps in keeping the speed high

d) all of the above

Item Description :

Q. No.	Q. TYPE	COMPETENCY	KNOWLEDGE	CONTEXT	DIFFICULTY
1	Close Constructed	Evaluate and Design Scientific Enquiry	procedural	global	High
2	Simple MCQ	Evaluate and Design Scientific Enquiry	content	global	Medium
3	Close Constructed	Explaining phenomena scientifically	content	global	Easy
4	Simple MCQ	Interpret data and evidence scientifically	epistemic	global	Medium

Scoring Key :

Q1. The speed of the car = 380km/h

The length of the track = 5km

Distance covered in 1 hour = 380 km

No. of times the car will circle the track = 380 / 5 = 76 times

FC for correct answer and **NC** for incorrect answer

Q2. d

FC for correct answer and **NC** for incorrect answer

Q3. accelerating

FC for correct answer and **NC** for incorrect answer

Q4. d

FC for correct answer and **NC** for incorrect answer

SHADOW FORMATION

Area: Frontiers Of Science And Technology

Class: 6

Chapter: 11

Concept: Shadows

Learning Outcomes:

Student will be able to:

- identify objects that can create a shadow.
- evaluate the size of shadow formed.
- correlate the size of the shadow with changing position of the light source.

The light rays travel in a straight line at nearly 300,000 kilometers per second. Sunlight that travels towards the Earth takes just over 8 minutes to reach us. When the rays reach Earth, they hit whatever is in their path. If the object they hit is opaque, the light cannot pass through, and a shadow forms.

Simply speaking, a shadow is an absence of light. If light cannot get through an object, the surface on the other side of that object (for example, the ground or a wall) will have less light reaching it.

IMAGE SOURCE : https://static.scientificamerican.com/

A shape of an object always determines the shape of its shadow. However, the size and shape of the shadow can change. These changes are caused by the position of the light source.

When we are outside on a sunny day, we can see how our shadows change throughout the day. The Sun's position in the sky affects the length of the shadow. When the Sun is low on the horizon, the shadows are long. When the Sun is high in the sky, the shadows are much shorter. We can create the same effects indoors by changing the position of a torch as it shines on an object.

Answer the following questions:

Q1. Sun rises in the east and will form a shadow of an object in the

    a) East
    b) West

c) North
d) South

Q2. An opaque object usually forms a shadow when placed in the path of light because

a) the opaque object acts as a source of light
b) the opaque object does not allow light to pass through it
c) light gets reflected
d) light is a form of energy

Q3. The long shadow outside is most likely formed around

I. Sunrise
II. Noon
III. Sunset
IV. Midnight

a) I and II
b) I and III
c) II and III
d) III and IV

Q4. One evening, two friends A and B are standing face to face and talking to each other. If the shadow of B was exactly to his right, which direction is A facing in? Draw a sketch to explain your answer.

Item Description :

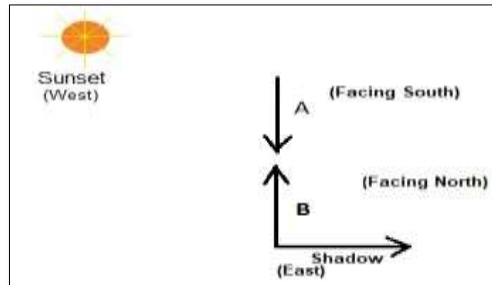| Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty
1	Simple MCQ	Explaining phenomena scientifically	procedural	global	Easy
2	Simple MCQ	Evaluate and Design Scientific Enquiry	procedural	global	Easy
3	Binary choice MCQs	Evaluate and Design Scientific Enquiry	content	global	Medium
4	Close Constructed	Evaluate and Design Scientific Enquiry	epistemic	global	High

Scoring Key:

Q1.b (**FC** for correct answer and **NC** for incorrect answer)

Q2.b (**FC** for correct answer and **NC** for incorrect answer)

Q3. b (**FC** for correct answer and **NC** for incorrect answer)

Q4. A is facing south (**FC** for correct answer and **NC** for incorrect answer)

ELECTRIC CELL AND CIRCUITS

Area: Frontiers of Science and Technology

Class: 6

Chapter No. : 12

Chapter Name: Electricity and Circuits

Topic: Electric cell and circuit.

Concept : Electric cell

Learning Objectives:

- to make effort to conserve energy.
- to apply knowledge of electric circuits in day to day life.

Source:http://samplehcplan.weebly.com/other-resources.html

Q1   Paolo wants to conserve energy as

    a)   it will save money.

b) we have limited sources of energy.

c) it can be used by future generations.

d) excessive use of TV and computer is harmful.

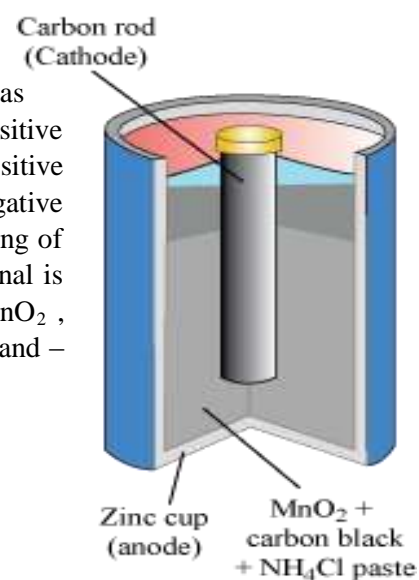Q2   Do you agree with the following statement? Give reason to justify the answer:

Statement	Agree/Disagree
Saving energy save the planet.	
Reason:	

Q3   Electricity to bulb is generally provided by electric cell.

Carbon rod (Cathode)

Electric cells are used in camera, watches and many other devices. The cell has a metal cap on one side and metal disc on the other side. There are also positive (+) and negative (-) signs are marked on the cell. The metal cap is marked positive and metal disc is marked negative. All electric cells have positive and negative terminals. The positive terminal is made up of zinc that also form the covering of cell and the negative terminal is made up of carbon rod. The positive terminal is called anode and negative terminal is called cathode. The mixture of MnO_2 , carbon black and NH_4Cl act as an electrolyte. For completion of circuit +ive and –ive terminals are needed.

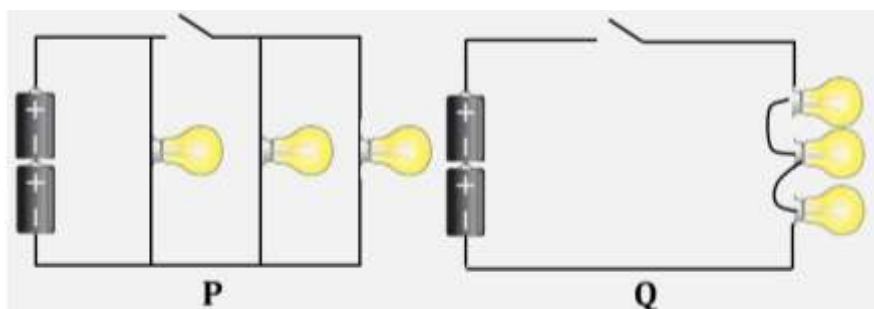Zinc cup (anode)

MnO_2 + carbon black + NH_4Cl paste

Cathode and anode can't be interchanged because

a) Zinc has malleable property and can change to sheet to form the

   covering.

b) Carbon reacts with the electrolyte, so get consumed.

c) Zinc form +ive charge as it lose electron, Carbon forms -ive charge as it

   gains electrons.

d) They can be interchanged under specific condition.

Q4   The two electric circuits given here consist of similar bulb and dry cells. Which of the following statement about the given circuit is correct?
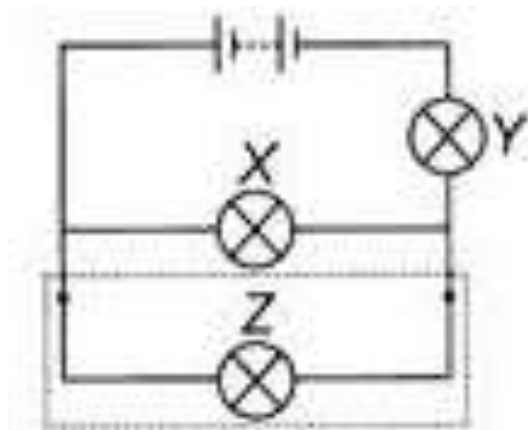
P   Q

a) If the middle bulb in the circuit Q blows, at least one bulb will still be able to light up.

b) The bulbs in circuit Q are brighter than those in circuit P when all the switches are closed.

c) One bulb in circuit P will light up when the switch is open.

d) All the bulb in circuit P will not light up when the switch is open.

Q5 The diagram shows identical lamps X and Y connected in series with a battery. The lamps light with normal brightness.

https://edurev.in/question/1393626/The-diagram-shows-identical-lamps-X-and-Y-connecte

If a third lamp Z is connected in parallel with lamp X, then what will happens to the brightness of the lamp V?

a)   Brighter than normal

b)   Normal

c)   Dimmer than normal

d)   Very dim (cannot be seen)

Item description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
i	MCQ	Explain phenomenon scientifically	content	personal	low
ii	MCQ	Interpret data and evidence scientifically	procedural	personal	medium
iii	MCQ	Explain phenomenon scientifically	procedural	personal	medium
iv	MCQ	Interpret data scientifically	epistemic	personal	High
V	MCQ	Interpret data scientifically	epistemic	personal	High

Answer Key.

1.   b   Full Credit = 2, No credit if any other response.

2.   Yes. By saving we can reduce the pollution caused while generation of energy in thermal plants. It also helps   to save our natural resources.

      Full Credit = 2   for complete answer.

      Partial credit = 1   if either response or reason is correct.

      No credit for any other response.

3.   c   Full Credit = 2, No credit if any other response.

4.   d   Full Credit = 2, No credit if any other response.

5.   a   Full Credit = 2, No credit if any other response.

MAGNETIC PROPERTIES

Area: Frontiers of Science and Technology

Class: 6

Chapter No. : 13

Chapter Name: Fun With Magnet

Topic: Attraction And Repulsion Between Magnets.

Learning Objectives:

a)   to make effort to conserve energy.

b)   to apply knowledge of electric circuits in day to day life.

A **magnet** is a material or object that produces a magnetic field. This magnetic field is invisible and is the area around magnet where magnetic force can be felt and attracts other magnetic substances such as iron and attracts or repels other magnets.

A **permanent magnet** is an object that retains its magnetic property for longer time and creates its own persistent magnetic field. An everyday example is a refrigerator magnet used to hold notes on a refrigerator door. Materials that can be magnetized, which are also the ones that are strongly attracted to a magnet, are called magnetic materials. These include the elements iron, nickel and cobalt and their alloys.

Materials can be divided into magnetically "soft" materials like iron which can be magnetized but do not tend to stay magnetized, and magnetically "hard" materials, which do. Permanent magnets are made from "hard".

An electromagnet is made from a coil of wire that acts as a magnet when an electric current passes through it but stops being a magnet when the current stops. Often, the coil is wrapped around a core of "soft" magnetic material such as soft iron, which greatly enhances the magnetic field produced by the coil.

Q1 The soft iron is used to make electromagnet because

   i)   it retains magnetic properties for longer time.

   ii) it can magnetise and demagnetize easily.

   iii) it forms a temporary magnet.

   iv)   it allows current to pass through it.

   a) i and ii   b)   ii, iii and iv   c)   ii and iii   d)   i and iv

Q2   The magnets can be of different shapes as shown in the picture. Each magnet has two poles, North-pole and South-pole. These poles are inseparable. Is it true for circular magnet too? Where do we have north and south poles in a circular magnet?
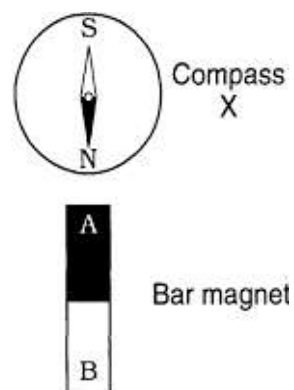
Q3 **Rust** is an iron oxide, a usually reddish brown oxide formed by the reaction of iron and oxygen in the presence of water or air moisture. Do you agree or not agree with the following statement. Write reason to justify your answer.

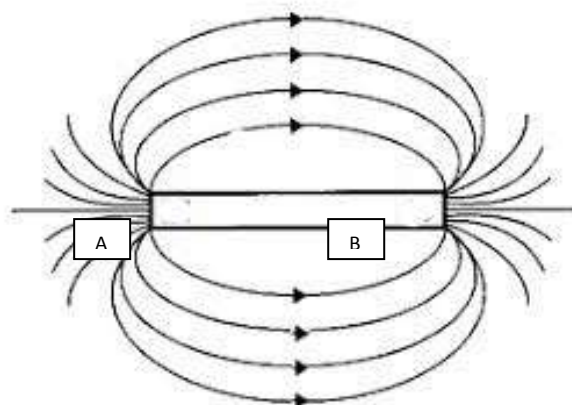| Statement	Agree/Disagree
Rust is made from iron so it also attracted towards a magnet.	
Reason:	

Q4 A bar magnet is kept close to two compass needles. Mark the poles A and B of bar magnet .

a)   A: N-pole   B : S-Pole

b)   A: S-pole   B : N-pole

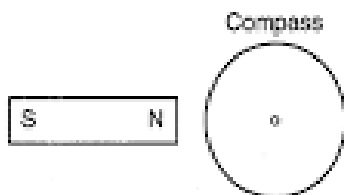**Q5** Magnetic lines are shown in the picture below. Choose poles A and B of the magnet.

a)   A : N-pole   B : S-Pole

b)   A : S-pole   B: N-pole

40

Q6   The diagram below shows that a compass is placed near the N-pole of a bar magnet.

Compass

| S | N | (o) |

Which option best represents the position of the needle of the compass as it responds to the magnetic field of the bar magnet.

a)

N
S

b)

N ◀▬▶ S

b)

S ◀▬▶ N

d)

S
N

Answer key:

Q1.   c

Q2   The one side of circular disc is N-pole and the other side is S-pole.

Q3   Disagree. As rust is a compound formed by reaction of iron with moist air and its properties are different from iron.

Q4   b

Q5   a

Q6   c

CONDITION OF RIVERS IN INDIA

Class : 6

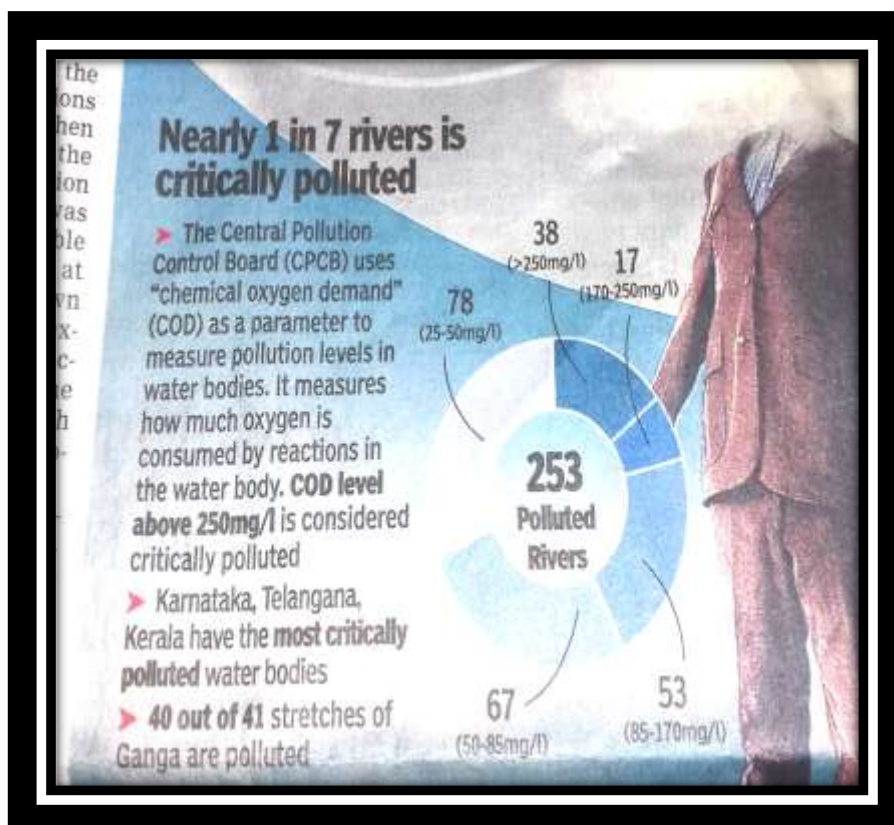**Area :** Natural Resources

Chapter No.: 14

Chapter Name: water

Concept : Sources of Water

Topic : Water Pollution

Learning Objectives: Students will be able to

- identify the causes of water pollution .
- know the status of India in world scenario regarding pollution level in our rivers.
- find the major efforts that can be taken to reduce the pollution level.
- understand the BOD and COD

As can be seen from the data given above the critical condition of rivers in India due to pollution issues. In order to understand the issue we should know what is BOD and COD..

The Biological Oxygen Demand **BOD** is a measure of the amount of oxygen required to remove waste organic matter from **water** in the process of decomposition by aerobic bacteria (those bacteria that live only in an environment containing oxygen). A **water** supply with a **BOD** level of 3-5 ppm is considered moderately **clean**.

The chemical oxygen demand (**COD**) on the other hand is a measure of **water** and wastewater quality. The **COD** test is often used to monitor **water** treatment plant efficiency.

This test is based on the fact that a strong oxidizing agent, under acidic conditions, can fully oxidize almost any organic compound to carbon dioxide.

Questions

1. Looking at the data given above which states in south India have critically polluted river.
2. What is the parameter of measuring the pollution level in the rivers ?
3. As per the data how many rivers in India are critically polluted?
4. Is high BOD in water good for aquatic life ?
5. Why water with BOD level 6-9 ppm not considered clean ?
6. What will happen when large amounts of organic matter from sewage or other discharges are present in the water
7. What will happen if COD level is high in water?
8. Why is COD normally higher than BOD?

Item Description

Q.No	Q.Type	Competency	Knowledge	Context	Difficulty Level
1	Open ended	Interpret the data & evidence scientifically	Content	Global	low
2	Open ended	Interpret the data & evidence scientifically	Content	Global	low
3	Open ended	Interpret the data & evidence scientifically	content	Global	low
4	Closed constructed	Explain the phenomenon scientifically	Procedural	Global	Medium
5	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium
6	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	High
7	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	High
8	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	High

Answer key:

1. Kerela , Telangana , Karnataka

2. COD : Chemical Oxygen demand is the main parameter of measuring the pollution level in rivers.

3. As per the data 253 rivers are critically polluted in India.

4. Many animals need **high** oxygen amounts to survive. If **BOD level is high**, in water it means that microorganisms are using most of the Oxygen   if the **B.O.D.** is low, there is an abundance of Oxygen which leads to **good water** quality.

5. In water with a BOD level of 6-9 ppm, the water is considered somewhat polluted because there is usually organic matter present and bacteria are decomposing this waste.

6. Dissolved oxygen (DO) is consumed by bacteria when large amounts of organic matter from sewage or other discharges are present in the water.

7. Higher COD levels mean a greater amount of oxidizable organic material in the sample, which will reduce dissolved oxygen (DO) levels

8. COD is normally higher than BOD because more organic compounds can be chemically oxidised than biologically oxidised. This includes chemicals toxic to biological life, which can make COD tests very useful when testing industrial sewage as they will not be captured by BOD testing.

Scoring Key:

1. FULL CREDIT (2)   if all answers are correct
   PARTIAL CREDIT(1) If any two answers correct
   NO CREDIT(0) if no answer given
2. FULL CREDIT (2) if correct answer given
   NO CREDIT(0) any other answer
3. FULL CREDIT (2) If proper reason given
   NO CREDIT(0) any other answer
4. FULL CREDIT (2)   ) If proper reason given
   NO CREDIT(0) no correct answer
5. FULL CREDIT (2)) If proper reason given
   NO CREDIT(0) if no correct answer
6. FULL CREDIT (2)   If proper explanation not given
   NO CREDIT(0) If proper explanation not given
7. FULL CREDIT (2) if proper explanation is given
   NO CREDIT(0 If proper explanation not given

8. FULL CREDIT (2)   if proper explanation is given

   NO CREDIT(0) If proper explanation not given .

GREEN GOALS OF INDIA

Area : Environment
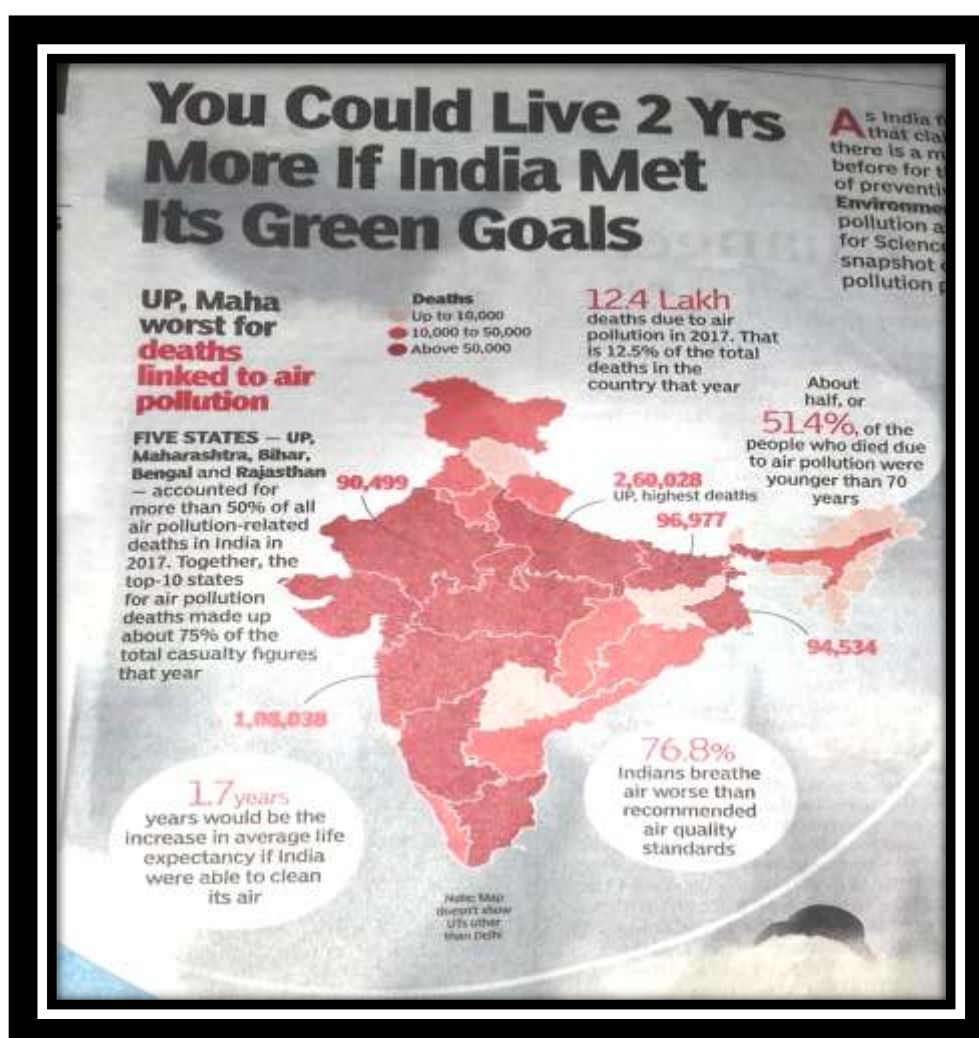
Class : 6

Chapter: 15

Chapter Name: Air Around Us

Concept: Air

Learning Objectives: Students will be able to

- identify the causes of air pollution .
- status of India in world scenario regarding pollution level
- major efforts that can be taken to reduce the pollution level.

Air pollution in India is a serious health issue. Of the most polluted cities in the world, 21 out of 30 were in India in 2019. As per a study based on 2016 data, at least 140 million people in India breathe air that is 10 times or more over the WHO safe limit and 13 of the world's 20 cities with the highest annual levels of air pollution are in India. The 51% of pollution is caused by the industrial pollution, 27% by vehicles, 17% by crop burning and 5% by diwali fireworks.

Above given data shows the condition of various states in India in terms of air pollution and death casualities .

QUESTIONS

1. Name any 5 states which are worst hit due to air pollution and deaths are more the 50,000 per year .
2. What do you mean by life expectancy ? How much expectancy can be increased if India is able to achieve its green goals?
3. Major pollution caused in our country is due to industries. what do you think are the major reasons ?any two
4. Which gases are released into atmosphere due to the burning of crop biomass residue?
5. What is packed inside a fire cracker , which causes lot of pollution during festivals?

Item Description:

Q.NO	Q.TYPE	COMPETENCY	KNOWLEDGE	CONTEXT	DIFFICULTY LEVEL
1	Open ended	Interpret the data & evidence scientifically	Content	Global	low
2	Open ended	Interpret the data & evidence scientifically	Content	Global	low
3	Open ended	Interpret the data & evidence scientifically	content	Global	Medium
4	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium
5	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium

Answer key:

1. UP , Rajasthan , Maharashtra , MP , West Bengal

2. Life expectancy is a statistical measure of the average time an organism is expected to live, based on the year of its birth, its current age, and other demographic factors including gender. Life expectancy can be increased by 1.7 years

3. Causes of Industrial Pollution

1. Inefficient Waste Disposal.
2. Lack of government Policies to Control Pollution.
3. Unplanned Industrial Growth.
4. Use of Outdated Technologies.
5. Presence of a Large Number of Small Scale Industries. ...
6. Leaching of Resources From Our Natural World.

4.Air pollutants emitted from biomass open burning, include common greenhouse gases , such as carbon dioxide (CO_2), carbon monoxide (CO), methane (CH_4) and nitrous oxide (N_2O) as well as volatile organic compounds (VOCs), ammonia (NH_3), sulphur dioxide (SO_2), nitrogen oxides .

5. In the fire crackers, there are certain chemical compounds packed inside which combust with oxygen in the air and convert them into other chemicals, further releasing smoke and harmful exhaust gases like Carbon Dioxide, Carbon Monoxide and Nitrogen in the process.

Scoring Key:

1. FULL CREDIT (2)   if all 5 answers are given
   PARTIAL CREDIT(1) If any two answers are correct
   NO CREDIT(0) if no answer given

2. FULL CREDIT (2) If proper calculations is done and correct years given.
   PARTIAL CREDIT(1) If any one part answered correctly.
   NO CREDIT(0) any other answer

3. FULL CREDIT (2) If any three reasons are given
   PARTIAL CREDIT(1) If any one reason given
   NO CREDIT(0) any other answer or no answer.

4. FULL CREDIT (2)   ) If any three gases names are mentioned
   PARTIAL CREDIT(1) If any one gas name given
   NO CREDIT(0) no correct answer

5. FULL CREDIT (2)) If correct reason given
   NO CREDIT(0) if correct reason given answer

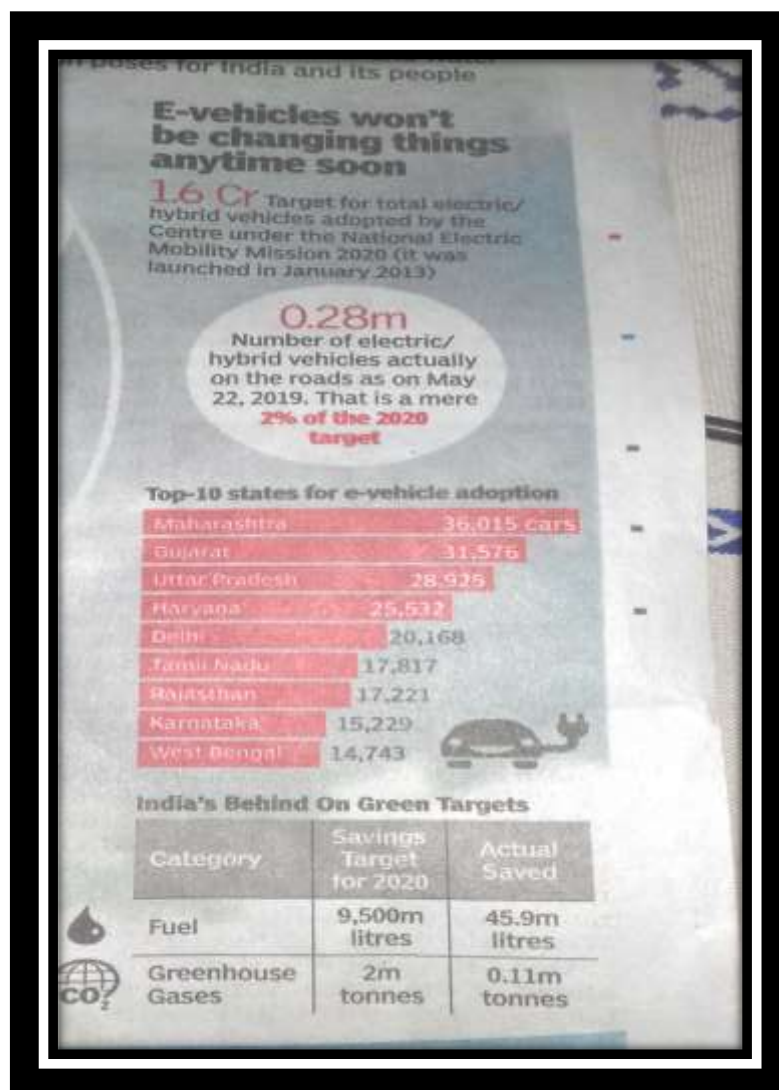# e-VEHICLES THE NEED OF THEN HOUR

Area : Environment

Class : 6

Chapter : 15

Chapter name: Air Around Us

Concept: Oxygen In Atmosphere

Learning Objectives: Students will be able to

- identify the causes of air pollution .
- undersatnd the Importance of using Electric vehicles.
- status of India in world scenario regarding pollution level
- major efforts that can be taken to reduce the pollution level.
- Understand the importance of low emission and its indirect impact on human health.

An electric vehicle (EV) is a vehicle that uses one or more electric motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery , solar panels , fuel cells or electric generator to convert fuel to electricity.

EVs include, but are not limited to, road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.

EVs generate considerably lower emissions over their lifetime than vehicles running on fossil fuels, irrespective of the source that generates the electricity. This becomes extremely advantageous when we factor in how the lower emissions are helpful in saving the pedestrians and the local people from breathing in poisonous gases.

Questions

Q1. What was the total target of the Govt of India to launch e-vehicles in the country by year 2020.How much they have been able to achieve in number and what % is still left behind?

Q2. Which 3 states have achieved the target below 20,000 vehicles as per the target given .

Q3. How much percentage India has not been able to achieve in terms of greenhouse gases and fuel consumption ?

Q4. In terms of the % which target is better achieved.

Q5. What are the advantages of using E-vehicles.

Q6. Increasing demand of fossil fuels is harmful for the environment. Justify the statement.

Item Description:

Q.No	Q.Type	Competency	Knowledge	Context	Difficulty Level
1	Open ended	Interpret the data & evidence scientifically	Content	Global	low
2	Open ended	Interpret the data & evidence scientifically	Content	Global	low
3	Open ended	Interpret the data & evidence scientifically	content	Global	Medium
4	Open ended	Explain the phenomenon scientifically	Content	Global	Medium
5	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium
6	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium

Answer key:

Ans1: The total target of the Govt of India to launch e-vehicles in the country by year 2020 was 1.6 crores. We have been able to achieve in number is 0.28 m and 98 % is still left behind.

Ans2:Tamilnadu , Rajasthan , Karnataka , WestBengal .

Ans3:

   a. Fuel :

      saving target :9500 m

      Actually saved :45.9 m

      % saved =45.9/9500 * 100=0.48%

      % not been able to save = 100-0.48=99.52%

   b. Green house gases

      saving target :2 m

      Actually saved :0.11 m

      % saved =0.11/2 * 100= 5.5%

      % not been able to save = 100-5.5=94.5%

Ans4: In terms of target achieved Green house gases target is better achieved .

Ans 5.: .Environment friendly .

Electricity is cheaper than fossil fuels.

Maintenance is less frequent and less expensive.
Makes less noise

Ans 6. When fossil fuels are burned, they release carbon dioxide and other greenhouse gases, which in turn trap heat in our atmosphere, making them the primary contributors to global warming and climate change.

SCORING KEY:

1. FULL CREDIT (2)   if all answers are correct
   PARTIAL CREDIT(1) If any two answers correct
   NO CREDIT(0) if no answer given
2. FULL CREDIT (2) if all correct answer given
   PARTIAL CREDIT(1) If any two answers correct
   NO CREDIT(0) any other answer
3. FULL CREDIT (2) If proper calculations is done for both answers
   PARTIAL CREDIT(1) If any one calculation is correct
   NO CREDIT(0) any other answer
4. FULL CREDIT (2)   ) If proper answer is given
   NO CREDIT(0) no correct answer
5. FULL CREDIT (2)) If any three reasons are given
   PARTIAL CREDIT(1) If any two answers are given
   NO CREDIT(0) if no correct answer
6. FULL CREDIT (2)   If proper explanation not given
   NO CREDIT(0) If proper explanation not given

THINK BEFORE YOU WASTE

Area : Natural Hazards

Class 6

Chapter No. : 16

Chapter: Garbage In Garbage Out

Concept : Dealing With Garbage

Topic: Waste Managment

Learning Objectives: Students will be able to

- identify the causes of waste generation and its various forms
- explain the importance of waste generation management.
- know status of various cities in India
- understand the major efforts that can be taken to reduce the waste generation
- Understand the importance of landfill areas what impact does it have on the environment.

DUBIOUS DISTINCTION FOR DELHI

INDIA

Uncollected plastic waste **10,376** TPD (40% of total)

Plastic waste generation **25,940** TPD

Plastic waste collection **15,564** TPD (60% of total)

TOP 10 CITIES:

City	Value
Delhi	689
Chennai	429
Kolkata	425
Mumbai	408
Bengaluru	313
Ahmedabad	241
Hyderabad	199
Surat	149
Kanpur	106
Pune	101

Plastic waste generation in 60 major cities of India **4,059**

TPD: Tonnes Per Day; (Figures are rounded off); (Source: CPCB)

Waste generation includes all materials discarded, whether or not they are later recycled or disposed in a landfill. Many different types of waste are generated, including municipal solid waste, agricultural and animal waste, medical waste, radioactive waste, hazardous waste, industrial non-hazardous waste, construction and demolition debris, extraction and mining waste, oil and gas production waste, fossil fuel combustion waste, and sewage sludge

About 0.1 million tonnes of municipal solid waste is generated in India every day. That is approximately 36.5 million tonnes annually. Per capita waste generation in major Indian cities ranges from 0.2 Kg to 0.6 Kg.

India produces 277 million tonnes of municipal solid waste every year, according to a 2016 estimate. That's more than 80% of the 334 million tonnes of waste generated across South Asia and about 13% of the global waste generated every year.

Urban India generates 62 million tonnes of waste (MSW) annually, and it has been predicted that this will reach 165 million tonnes in 2030. 43 million tonnes of municipal solid waste is collected annually, out of which 31 million is dumped in landfill sites and just 11.9 million is treated

Questions

1. Looking at the data given above which city has the major plastic waste production in our country and which produces the least.

2. What is the parameter of measuring the waste level in any city or country?

3. What does the green symbol given on the picture mean?

4. What is the actual status of the waste generation and collection in Delhi as per the data given?

5. What is the role of landfill areas ?

6.By 2030 what would be the increase % of waste generated in urban areas in tonnes

Item Description

Q.NO	Q.TYPE	COMPETENCY	KNOWLEDGE	CONTEXT	DIFFICULTY LEVEL
1	Open ended	Interpret the data & evidence scientifically	Content	Global	low
2	Open ended	Interpret the data & evidence scientifically	Content	Global	Medium
3	Open ended	Explain the phenomenon scientifically	content	Global	Medium
4	Closed constructed	Interpret the data & evidence scientifically	Epistemic	Global	Medium
5	Closed constructed	Explain the phenomenon scientifically	Epistemic	Global	Medium
6	Closed constructed	Interpret the data & evidence scientifically	Epistemic	Global	Medium

Answers Key:

5. Highest :Delhi , Lowest :Pune

6. The parameter of measuring waste level in any city or country is
    a. waste generated=waste collected is good level
    b. waste generated –waste collected >waste uncollected is bad level

   3. green symbol in the picture is the symbol of waste minimization which includes   3 R's Reduce , Reuse & recycle

4. The actual status of waste generation in new Delhi as per the data given is that

Total plastic waste generation > waste collection

Waste collection is 60% and waste which gets uncollected is 40%

5.The purpose of a landfill is to bury the trash in such a way that it will be isolated from groundwater, will be kept dry and will not be in contact with air. Unlike a compost pile, a landfill is designed to keep the trash away from people, but does not allow it to decompose quickly.

6. current waste generation =62 MT

Expected waste generation in 2030=165MT

% increase = 165-62=103/62*100=166.12%

Scoring Key:

8. FULL CREDIT (2)   if all answers are correct
    PARTIAL CREDIT(1) If any one answer is correct
    NO CREDIT(0) if no answer given
9. FULL CREDIT (2) if correct answer given
    NO CREDIT(0) any other answer
10. FULL CREDIT (2) If proper symbol explanation is given mentioning 3 R
    PARTIAL CREDIT (1) If 2R are mentioned
    NO CREDIT(0) any other answer
11. FULL CREDIT (2)   ) If proper reason given
    NO CREDIT(0) no correct answer
12. FULL CREDIT (2)) If proper reason given
    NO CREDIT(0) if no correct answer
13. FULL CREDIT (2)   If correct answer is given
    NO CREDIT(0) If wrong answer is given