

**SCIENTIFIC
LITERACY
CORE GROUP**

**MODULE – 4
Class-VII**

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1. EXPERIMENT TO TEST THE PRESENCE OF STARCH

AREA: Living System

CLASS: 7

CHAPTER : 2

CHAPTER NAME : NUTRITION IN PLANTS

CONCEPT: Photosynthesis

LEARNING OUTCOMES: Student will be able to

1. Conduct simple investigation to test the presence of starch in plants
2. Explain the process of photosynthesis and in which form food gets stored in plants
3. Explain the use of food in various life processes of plants.

Teacher conducted an experiment in the class. . She took a potted plant of croton (variegated leaves) and kept in a dark room for three days. She then kept it in sun for three hours again. Now She also took a beaker, alcohol, Bunsen burner, iodine solution & petridish to conduct the experiment.

While conducting the experiment, a leaf was plucked from the same plant and was put in the beaker containing water and was allowed to boil. After some time the beaker containing alcohol solution and leaf was made to boil. Then leaf was taken and put it in a petridish and iodine s solution was put on it. Leaf showed bluish black in colour at some patchy areas.

What is shown here is a variegated leaf (a) before the test the leaf was patchy green in colour and same leaf (b) after the test was patchy black in colour.



1. What is the objective of the experiment shown above or what is it testing?
-
-

2. What do you think could be the reason of such variegated pattern of leaves ?
 - a. Uneven spread of the stomata on leaf
 - b. Different chlorophyll pigmentation
 - c. Excessive increase of magnesium ions
 - d. Increase of carbon dioxide level in the leaves

3. What could be the reason of keeping the plant in dark for three days and then shifting again in sun for 3 hours ?
 - a. To make the plant consume all its starch for photosynthesis
 - b. To breakdown the end products of photosynthesis
 - c. To enhance the action of photosynthesis process
 - d. To produce more chlorophyll pigment

 4. Which products of photosynthesis may be present but not revealed by the test? Why? Choose the correct set of answer:
 - a. Organic compounds
 - b. Glucose, fructose ,sucrose
 - c. Fat ,fatty acid ,glycerol
 - d. Inorganic compounds only

 5. Why leaf is made to boil and what will be the colour of the alcohol solution?
-

Item description :

Q. no.	Question type	Competency	knowledge	context	Difficulty Level
1	Open ended	Explain phenomenon scientifically	Content & procedural	global	Medium
2	Simple multiple choice	Explain phenomenon scientifically	Content & procedural	global	Medium
3	Simple multiple choice	Explain phenomenon scientifically	procedural	global	Medium
4	Simple multiple choice	Explain phenomenon scientifically	epistemic	global	Low
5	Closed constructed	interpret the data & evidence scientifically	procedural	global	Medium

Answer Key :

Ans. 1 Objective of this experiment is to test the presence of starch .Plants through the process of photosynthesis make their own food and store it in the form of glucose. Glucose being soluble in nature dissolves into simpler forms thus is converted into starch which is insoluble in nature.

Starch gets stored in the cells and thus cannot escape, which is further more used for respiratory processes. The motive of keeping the plant in dark is to enable it to consume all of its starch and help us test the presence of starch with the iodine solution.

Ans 2: Option (b)

Ans 3: Option(a)

Ans 4: Option (b)

Ans 5: A chemical test for starch is to add iodine solution (yellow/brown) and look for a colour change. In the presence of starch, iodine turns a blue/black colour. It is possible to distinguish starch from glucose (and other carbohydrates)

Scoring Key:

1. FULL CREDIT(2) Testing of the presence of starch with other explanation

NO CREDIT(0) if any other answer

2. FULL CREDIT (2)option b

NO CREDIT(0) any other answer

3. FULL CREDIT (2)option 1

NO CREDIT(0) any other answer

4. FULL CREDIT (2)option b

NO CREDIT(0) any other answer

5. FULL CREDIT (2)if answer is blue/black

NO CREDIT(0) any other answer

2. CONDUCTION IN PLANTS

AREA: Living System

CLASS: 7

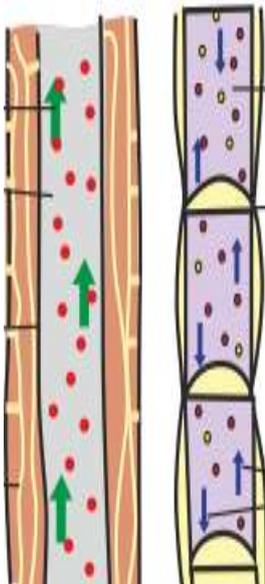
CHAPTER : 2

CHAPTER NAME : NUTRITION IN PLANTS

CONCEPT: Photosynthesis

LEARNING OUTCOMES:

Students will be able to explain the process and phenomenon of conduction of minerals, food & water relate the role of suction pressure and conduction in plants



Teacher was showing picture to its students on vessels which play major role in the transport of important nutrients in the plants. She explained how water , nutrients and food material gets transported in plants through these vessels which are similar to blood vessels in the human beings.

Vessel 1 tissues are used for transporting water from roots to stems and leaves and also some dissolved compounds. It has one way flow only and work against the gravity .It has no end walls between the cells .

vessel 2 is responsible for transporting food produced from photosynthesis from leaves to non-photosynthesizing parts of a plant such as roots and stems .It has two way flow and cell has the end walls with perforations ,

Vessel1 vessel2

Q1. Can you identify in the picture shown above the vessels we are referring to?

1. Chloroplasts and plastids
2. Fibres and tracheids
3. Xylem and phloem
4. Collenchyma and sclerenchyma

Q2. What is the reason of cells having no end walls in vessels 1 and cells having end walls in vessels2?

Q3. Why vessel1 has to work against the gravity to create a negative pressure? comment

Q4. Explain the two major processes associated with the functioning of both the vessels?(choose the appropriate process from the listed ones : respiration, photosynthesis , fermentation, transpiration ,aerobic respiration , glycolysis , osmosis , translocation)

Q5. Fill up the flowchart to explain the functioning of vessel 1

Roots -> absorbs _____ → creates _____-pressure→works against the _____-
 →creates an upward_____→further causes loss of _____→which is known as _____process

Item description :

Q. no.	Question type	Competency	knowledge	context	Difficulty level
1	Open ended	Explain the phenomenon scientifically	Content	global	low
2	Closed constructed	Explain the phenomenon scientifically	content	global	medium
3	Closed constructed	Explain the phenomenon scientifically	procedural	global	medium
4	Closed constructed	Explain phenomenon scientifically	procedural	global	medium
5	Open ended	Explain phenomenon scientifically	Content & procedural	global	medium

Answer Key:

Ans. 1: Option3

Ans 2: Sugar produced by photosynthesis in the leaves is transported up and down the plant to the meristems and other tissues in living phloem cells. Companion cells provide the energy for the sieve cells. The end walls of the sieve cells have pores through which sugar is transported from cell to cell.

Ans 3: The flow in vessel 1 is against the gravity as it has to carry water and minerals from the roots to all the other parts of the plant. Since there is a depiction of xylem cells in the figure 1 which does the same function, the pressure created is against the gravity.

Ans 4: Transpiration and translocation

Ans 5: 1)water

(2)suction

(3)Gravitation

(4)Pull/ pressure

(5)Water

(6)Transpiration

Scoring Key:

1. FULL CREDIT(2) if correct answer is given

NO CREDIT(0) if any other answer

2. FULL CREDIT (2)if correct explanation given

NO CREDIT(0) any other answer

3. FULL CREDIT (2) if correct explanation given

NO CREDIT(0) any other answer

4.FULL CREDIT (2)if both options are given

PARTIAL CREDIT (1)If any 1 option given

NO CREDIT(0) any other answer

5. FULL CREDIT (2)if answer to all six options are correct

PARTIAL CREDIT (1)If any 3 options are correct

NO CREDIT(0) any other answer

3. NUTRITION IN ORGANISMS

AREA: Living System

CLASS: 7

CHAPTER : 2

CHAPTER NAME : NUTRITION IN ANIMALS

CONCEPT: Nutrition in unicellular & multicellular organisms

LEARNING OUTCOMES: Students will be able to

1. Identify the mode of nutrition in different organisms
2. Explain the phenomenon and relate to different organisms.

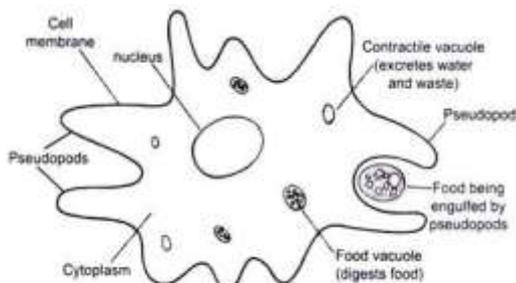
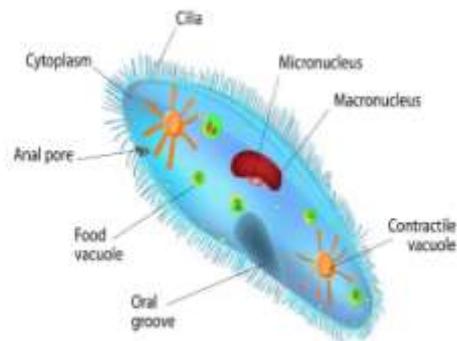


Fig. 9.7 Amoeba proteus



All these animals have same type of nutrition, holozoic nutrition which has five main steps :
Ingestion, digestion, absorption, assimilation and egestion.

Q.1 Name the body part where ingestion takes place in paramoecium.

Q.2 Where does the digestion of food takes place in amoeba?

Q.3 Name the carbohydrates which are not digested by the human body.

Q.4 The total number of teeth in a cow and human being are same. Do they both have same type of teeth?

Q.5 Name any two glands which are associated with the digestive system of a human being and write the name of

their juices.

Q. 6 If there are no villi in small intestine, which function will be disturbed?

Item description:

Question number	Question type	Competency	knowledge	context	Difficulty level
1	Open ended	Explain the phenomenon scientifically	Content	global	low
2	Open ended	Explain the phenomenon scientifically	content	global	Low
3	Open ended	Explain the phenomenon scientifically	content	global	low
4	Open ended	Explain phenomenon scientifically	content	global	low
5	Open ended	Explain phenomenon scientifically	content	global	low

Answer Key:

1. mouth pore
2. food vacuole
3. cellulose
4. No, in humans there are four types of teeth whereas cow has three types of teeth.
5. liver and pancreas bile and pancreatic juice
6. absorption of food gets disturbed

4. MICROWAVE

AREA: Living System

CLASS: 7

CHAPTER NO: 3

CHAPTER NAME : HEAT

CONCEPT: Transfer of Heat and conduction

LEARNING OUTCOMES:

Students will be able to relate the process of heating in microwave with its cause.

These have metal body, magnetron, the wave generator is present inside it. The magnetron takes electricity and produce high power radio waves. These waves travel to food compartment with the help of wave guide. We keep food on slowly spinning top so heating is even. The waves so produced are reflected by shiny interior and when they strike food, they penetrate the food. These high energy waves cause the food particles to vibrate and thus produce heat.

Q 1 The waves generated by magnetron are of short length. Do you agree? Give reason.

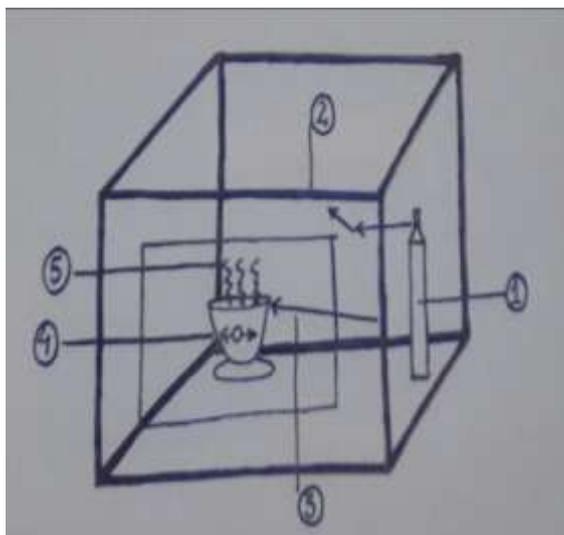
Q 2 If we compare the reflection of light rays with waves in microwave, then which part of it will act as mirror?

Q 3 Cite a reason for placing food on tunable top

Q 4 Mark ' yes' or 'no'. Also give reason to support your answer.

S.NO	STATEMENT	YES OR NO
1	We can use a dull substance to be used as interior of microwave	
2	The food particles which are loosely held will be heated more	
3	The waves used inside the microwave and mobile are same	

Q 5 Label the diagram shown below:



Item description :

Q. no.	Question type	Competency	knowledge	context	Difficulty level
1	Closed constructed	Interpret data and evidence scientifically	epistemic	global	Medium
2	Closed constructed	Evaluate and design scientific enquiry	epistemic	global	High
3	Closed constructed	Interpret data and evidence scientifically	procedural	global	Medium
4	Complex multiple choice	Explain phenomenon scientifically	epistemic	global	Low

Answer key:

Answer 1 yes as these are radio waves.

Answer 2 The shiny interior.

Answer 3 For even heating

Answer 4 no, yes, yes

5. MICROWAVE VERSUS CONVENTIONAL OVEN

AREA: Frontiers Of Science & Technology

CLASS: 7

CHAPTER NO: 3

CHAPTER NAME : HEAT

CONCEPT: Transfer of Heat and conduction

LEARNING OUTCOMES: Students will be able to

1. **Relate the process of heating in microwave with its cause.**
2. **Explain the process of heating in microwave oven and conventional oven.**
3. **Differentiate between two type of oven**

In conventional oven either we use electric heating element or gas burner. These heat the food either from bottom or sides by conduction. Whereas the food particles are heated in microwaves due to their vibration. The liquid molecules are excited strongly as compared to solids. These waves start losing energy, the moment they enter the food stuff so many times in solid foods the outer layers are cooked by vibration heat energy and inner one by conduction. The same process accounts for the standing time during microwave cooking.

Q 1 Give reason for burning of cake bottom in conventional oven.

Q 2 When we heat a food substance with liquid core, which part of it will be most heated and why?

Q 3 In microwave, the food material is always heated inside out. Do you agree?

Q 4 Tick the correct option:

- (a)The standing time during microwave cooking ensure proper use of all energy used in cooking.
- (b)Liquid foods will be more heated as compare to solid in microwave cooking.
- (c)Less is the water content of food, more easy will be its cooking.
- (d)Conduction, convection and radiation all are used in microwave cooking.

Item description

Q. no	Question type	Competency	knowledge	context	Difficulty level
1	Closed constructed	Interpret data and evidence scientifically	epistemic	global	medium
2	Closed constructed	Evaluate and design scientific enquiry	epistemic	global	high
3	Closed constructed	Interpret data and evidence scientifically	procedural	global	medium
4	Complex multiple choice	Explain phenomenon scientifically	epistemic	global	low

Answer key:

Answer 1 During conduction, the food stuff in direct contact with hear gets more energy.

Answer 2 The liquid core part as liquid particles are loosely held and vibrate strongly to produce more heat.

Answer 3 No, process of heating depends on physical state of food stuff.

Answer 4 true, true, false, false

6. HIBISCUS A natural indicator

AREA: Environment

CLASS:7

CHAPTER NO : 5

CHAPTER NAME :ACID BASES & SALTS

CONCEPT: Natural Indicators

LEARNING OUTCOMES: Students will be able to

1. Differentiate between acidic , basic & neutral substances .
2. Classify the material on the basis of properties and characteristics.
3. Conduct simple investigations to find if flower can be used as indicator.



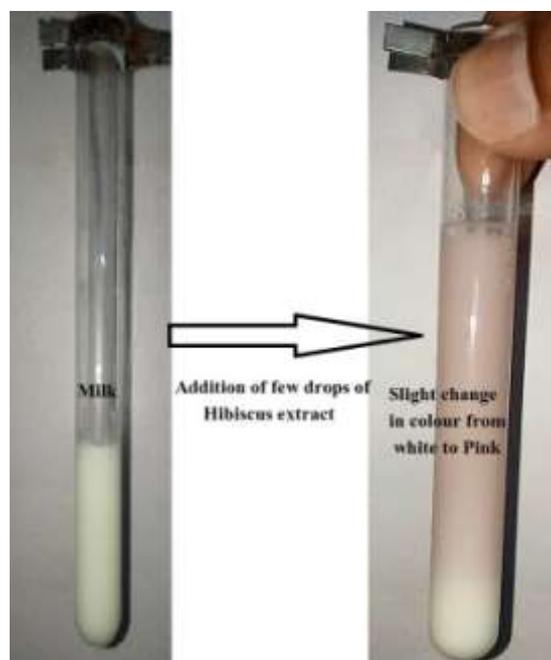
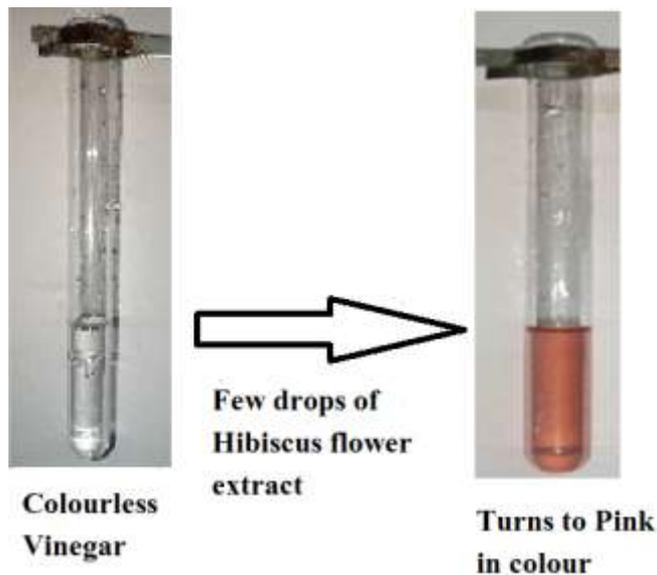
Hibiscus Flower

There are many natural indicators which help us to differentiate between acids, bases and neutral solutions. The extract of Hibiscus flower can also be used to indicate acidity, basicity or neutrality. It contains several plant pigments like Anthocyanin, Flavonoids which acts like natural indicator. These pigments occur in the petals of the flower. Natural indicators are not only more economical but also have almost same accuracy of result as that of given by synthetic indicators. The other positive aspect of using natural indicators is that they are not hazardous to health and don't cause environmental pollution as done by synthetic indicators.



Changes taking place in the colour of Hibiscus flower extract while heating of petals of Hibiscus flower in the water.

When few drops of Hibiscus flower extract were added in the colorless solution of vinegar (approximately 10 ml) then the solution turns pink. This change from colourless to pink indicates the acidity of vinegar. Similarly, you can use different chemicals/liquids to check their acidity, basicity or neutral nature.



OBSERVATION TABLE

Use of Hibiscus flower extract to test various chemicals, liquids to determine for their acidity, basicity and neutral nature

House hold chemicals/ material	Acidic	Basic	Neutral
Lemon juice	Colour changes to pink		
Baking powder solution		Colour changes to violet	
Detergent solution		Colour changes to dark	
Tea prepared from the branded tea leaves/ Green tea with other ingredients			Significant change in colour of solution
Vinegar	Colour changes from colourless to pink		
Milk	Colour of the milk changes to light pink		
Sugar solution			Significant change in colour of solution
Common salt solution			Significant change in colour of solution

Table:1

We can also use turmeric, a common spice used in cooking, as an indicator for acidity and basicity. Turmeric is yellow in acid and neutral substances, but turns bright red with bases.

OBSERVATION TABLE

Use of turmeric to test various chemicals, liquids to determine for their acidity, basicity and neutral nature

House hold chemicals/ material	Acidic	Basic	Neutral	Can't Decide
Lemon juice				
Baking powder solution				
Detergent solution				
Tea prepared from the branded tea leaves/ Green tea with other ingredients				
Vinegar				
Milk				
Curd				
Sugar solution				
Common salt solution				

Table:2

Based upon the above observations, now try to answer the following questions:

Q1: Use the turmeric to test various chemicals/liquids available in your house. Observe for any changes taking place in the colour of them and based upon your inference try to fill the Table:2

Q.2: Can we use (other than turmeric or china rose extract) natural indicators to identify the acidity or basicity of the chemicals. If yes then give names of natural indicators.

Q.3. Try to make a list of at least 20 chemicals which are acidic, basic or neutral in nature. Does the intensity of colour change also signify their nature? Give reason/s to support your answer.

Q4: Which one of the following statements is false?

- A. Use of natural indicator can be very cost effective
- B. Natural indicators are environment friendly
- C. Commercially they can be mass produce with ease
- D. Use of natural indicators is hazardous to our health

Q5: What is the significance of knowing the nature of chemical/liquid i.e. whether it is acidic, basic or neutral?

Q6: Based upon the information given in Table:1 arrange the different chemicals/liquids in the increasing order of acidity starting from the basic liquid/s in nature.

- A. Sugar solution < Milk < Vinegar < Lemon Juice < Detergent Solution
- B. Detergent solution < sugar solution < Milk < Vinegar
- C. Salt solution < vinegar < lemon juice < baking powder
- D. None of the above

Item Description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	Open ended	Evaluate and design scientific enquiry.	content	Global	Medium
2	Open ended	Interpret data and evidence scientifically	Content	Global	Low
3.	Open ended	Interpret data and evidence scientifically	epistemic	Global	High
4	Simple Multiple Choice	Explaining phenomenon scientifically.	Content	Global	Low
5	Open ended	Evaluate and evidence scientifically	epistemic	Global	High
6	Simple Multiple Choice	Interpret data and evidence scientifically	content	Global	Low

Answer Key:

1. Students will use turmeric to test the nature of the different chemicals and fill the table:2
2. Yes. Red cabbage, Grape juice, Litmus is also examples of natural indicators
3. Students will collect different chemicals/liquids from their surroundings (school, their home, market) and will test them for their nature. The intensity of the colour signifies the strength of acidic or basic nature e.g. light pink colour change shows mild acidic as compared to intense pink colour or red colour which shows strong acidic nature.
4. D
5. It has wide applicability not only in industry but in our kitchen also. A slight change in acidic/basic or neutral nature can result in disaster in our industry manufacturing especially in case of manufacture of medicines.
6. B

7. CHEMICAL & PHYSICAL CHANGES IN ENVIRONMENT

AREA: Environment

CLASS:7

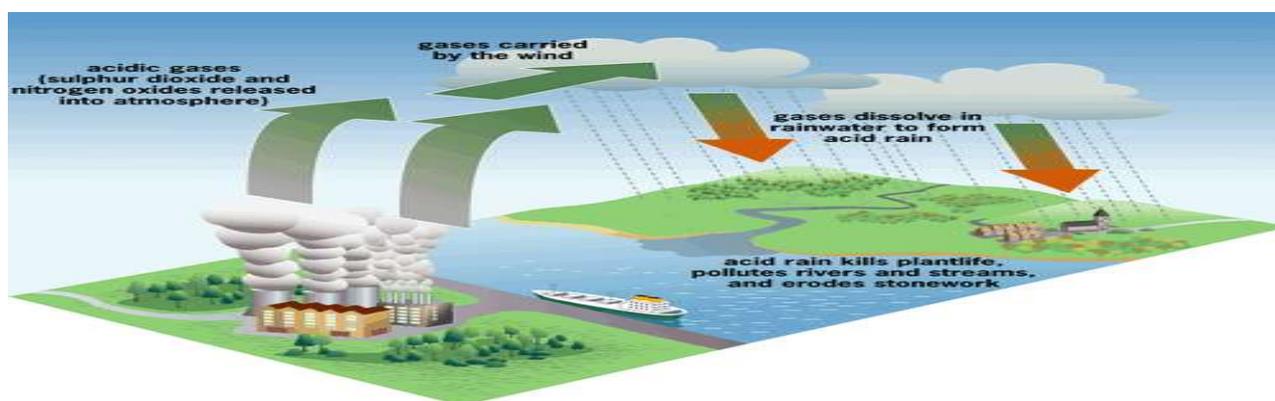
CHAPTER NO-6

CHAPTER NAME : PHYSICAL & CHEMICAL CHANGES

CONCEPT: Chemical Changes

LEARNING OUTCOMES:

Students will be able to discuss and appreciate role of Chemistry in day to day life.



Chemical and physical changes are an essential part of life. Unfortunately, some of the physical and chemical changes that occur daily, due to the intervention of man, are harmful for the environment.

Chemical and physical changes occur all around us all the time. These changes are essential parts of our daily lives, for example, digesting food, combustion, osmosis, and phase changes. However, a few of the chemical and physical changes that occur daily are harmful for the environment. For example, plastic decomposition, global warming, effects of acid rain, and oil spills.

Plastic waste is a widely recognized source of pollution. Most plastics produced are non-biodegradable; hence their disposal causes environmental damage in land and water. Nonbiodegradable plastics take hundreds of years to decompose; thus, when plastic products are disposed off in landfills, rivers, and oceans, it contaminates the soil, water, marine life and the air. Plastic pollution is a serious threat that can be prevented by recycling, using biodegradable plastic, reducing consumerism and promoting better waste-collection.

Global warming is the unusually rapid rise in the average global temperature on earth. The main cause of global warming is the drastic increase in the emission of carbon dioxide by the burning of fossil fuels. The climate change affects not only the atmosphere and land creatures but also the ocean. About a quarter of the carbon dioxide emissions are absorbed by the earth's oceans. Much of it becomes fixed and is stored in sea plants and grass. However, the carbon dioxide that is not fixed dissolves into the sea water altering the chemistry of the water.

Acidic gases are produced when fossil fuels such as coal and oil are burned in power stations, factories and homes. These acidic gases such as sulphur dioxide and nitrogen dioxide react with water molecules in the atmosphere causing rain and snow to become more acidic. This acid rain then causes harm to forests, lakes, oceans and marble/limestone buildings.

Oil spills occur when liquid petroleum is released into the environment by human interference, causing damage to marine ecosystems. Oil spills and their effects have become a widely discussed issue since it causes numerous problems for the environment. Oil spills float on water and prevent sunlight from passing through it, this makes it difficult for plants and sea animals to survive. Oil spills also kill birds as it can penetrate into the plumage and fur of birds. Oil spills are quite difficult to clean up because the wind and ocean currents break the spills and cause it to expand into large areas. Oil spills could be prevented by ship safety and regulations, as well as a reduction in the consumption of oil.

Ques/Ans

1. What happens to plastic waste?
 - A. It is a biodegradable material so it eventually disintegrates
 - B. It never fully goes away, it just breaks into little pieces
 - C. There is no such thing as plastic waste, all plastic is recycled
 - D. It is dumped in the ocean for fish to eat
2. Why is plastic dangerous for marine life?
 - A. They mistake it for food and cannot digest it.
 - B. They can get tangled in it which hinders their ability to swim.
 - C. Both A and B
 - D. It's not dangerous because they use plastic waste for habitats.
3. Acid Rain is caused by emissions of
 - A. Sulphur dioxide
 - B. Nitrogen oxide
 - C. Both (A) and (B)
 - D. Carbon dioxide

4. Sulphur dioxide is produced by
- Lightning strikes
 - Volcanic eruptions
 - Gasoline engine
 - All of the above
5. The adverse effect(s) of acid rain is(are)
- Causing paint to peel
 - Corrosion of steel structures
 - Killing insects
 - All of the above
6. Which of the following is not true about oil spills?
- Oil Spills cause damage to marine eco system.
 - Oil spills do not kill birds.
 - Oil spills can be prevented by reduction in oil consumption.
 - Oil spills are caused by human involvement.
7. Give reason
- Acid rain is a problem.
 - Oil spills are detrimental to nature

Item Description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	Simple multiple choice	Explain phenomenon scientifically	Content	Global	Medium
2	Complex multiple choice	Evaluate and design scientific inquiry	Content	Global	Low
3	Complex multiple choice	Evaluate and design scientific inquiry	Content	Global	Medium
4	Simple multiple choice	Evaluate and design scientific inquiry	Content	Global	Medium
5	Complex multiple choice	Interpret data and Evidence scientifically	Content	Global	Medium
6.	Simple multiple choice	Interpret data and evidence scientifically	Content	Global	Medium

Answer Key:

1. Full credit if response is B
No credit for any other response

2. Full Credit if response is C
Half credit if response is A or B
No credit if response is D

3. Full Credit if response is C
Half credit if response is A or B
No credit if response is D

4. Full credit if response is B
No credit for any other response

5. Full credit if response is D
Half credit if response is A or B or C

6. Full credit if response is B
No credit for any other response

8. PHYSICAL AND CHEMICAL CHANGES IN DAILY LIFE

AREA: Environment

CLASS:7

CHAPTER NO-6

CHAPTER NAME :PHYSICAL & CHEMICAL CHANGES

CONCEPT: Chemical Changes

LEARNING OUTCOMES:

Students will be able to discuss and appreciates role of Chemistry in day to day life.



Chemistry happens in the world around you, not just in a lab. Matter interacts to form new products through a process called a chemical reaction or chemical change. Every time you cook or clean, it's chemistry in action. Your body lives and grows thanks to chemical reactions. There are reactions when you take medications, light a match, and draw a breath. These examples of chemical reactions from everyday life are a small sampling of the hundreds of thousands of reactions you experience as you go about your day .

Chemical changes result in the production of new chemical substances. At a molecular level, chemical changes involve making or breaking bonds to create the new chemical substance. Examples of chemical reactions include: rusting where iron oxide is produced, or burning gasoline where water vapour and carbon dioxide are produced. (Tro, 2011) A physical change does not involve changing a substance's chemical identity. Physical changes do not produce new substance, even though the starting and ending substances may look different from each other. Examples include: phase changes, such as the melting of snow or creating mixtures, for example, mixing water and sugar. It is possible to tell chemical and physical changes apart by a couple of clues. There are a few signs that indicate that a chemical reaction took place, such as, colour change, formation of precipitate, formation of a gas, odour change, temperature change, sound, and light. Generally chemical reactions/changes are irreversible and physical changes are reversible. Yet some chemical reactions are reversible. For example, heating ammonium chloride forms ammonia and hydrogen chloride gas. However, when the gases are trapped and cooled, a

white solid of ammonium chloride is reformed. Likewise, some physical changes are irreversible. For example, breaking or damaging some materials is irreversible, such as cutting down a tree.

Ques/Ans

1. Which of the following is a chemical change?
 - A. Grinding of stone
 - B. Melting of ice in a glass
 - C. Tarnishing of silver
 - D. Mixing cookie dough

2. Which statement is true about physical changes and chemical changes?
 - A. Physical changes can change both physical and chemical properties.
 - B. Physical and chemical changes cannot happen at the same.
 - C. Chemical changes are not observable.
 - D. Chemical changes always produce new substances

3. Chewing food to break it down into smaller particles represents a _____ change, but the changing of starch into sugars by enzymes in the digestive system represents a _____ change.
 - A. Chemical, Physical
 - B. Physical, Physical
 - C. Physical, Chemical
 - D. Chemical. Chemical

4. Scientists study the characteristics of substances to better understand the natural world. Which of the following is not a chemical or physical characteristic of a substance?
 - A. Colour
 - B. Cost
 - C. Density
 - D. Odour

5. Which of the following will be observed if an apple slice is left exposed to air?
 - A. It undergoes oxidation and becomes brown in colour.
 - B. Appearance of brown colour is due to reaction between air and enzyme.
 - C. Both A and B.
 - D. None

6. In a firework show, the fireworks explode giving off heat and light. What type of change it is?

7. A student mixed 5 ml of silver nitrate and 5 ml of potassium bromide solution and observed yellow precipitates. What type of change it is?

Item description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	Simple multiple choice	Explain phenomenon scientifically	Content	Local-National	Low
2	Simple multiple choice	Evaluate and design scientific inquiry	Content	Local-National	Medium
3	Complex multiple choice	Evaluate and design scientific inquiry	Content	Local-National	Medium
4	Complex multiple choice	Evaluate and design scientific inquiry	Procedural	Local-National	Medium
5	Complex multiple choice	Interpret data and evidence scientifically	Procedural	Global	Medium

Answer Key:

9. Full credit if response is C
No credit for any other response

10. Full credit if response is D
No credit for any other response

11. Full credit if response is C
No credit for any other response

12. Full credit if response is B
No credit for any other response

13. Full credit if response is C
Partial credit if response is A or B
No credit for any other response

14. Chemical Change

15. Chemical Change

9. WEATHER REPORT

AREA: Environment

CLASS: 7

CHAPTER NO: 7

CHAPTER NAME : WEATHER, CLIMATE AND ADAPTATION

CONCEPT: Weather

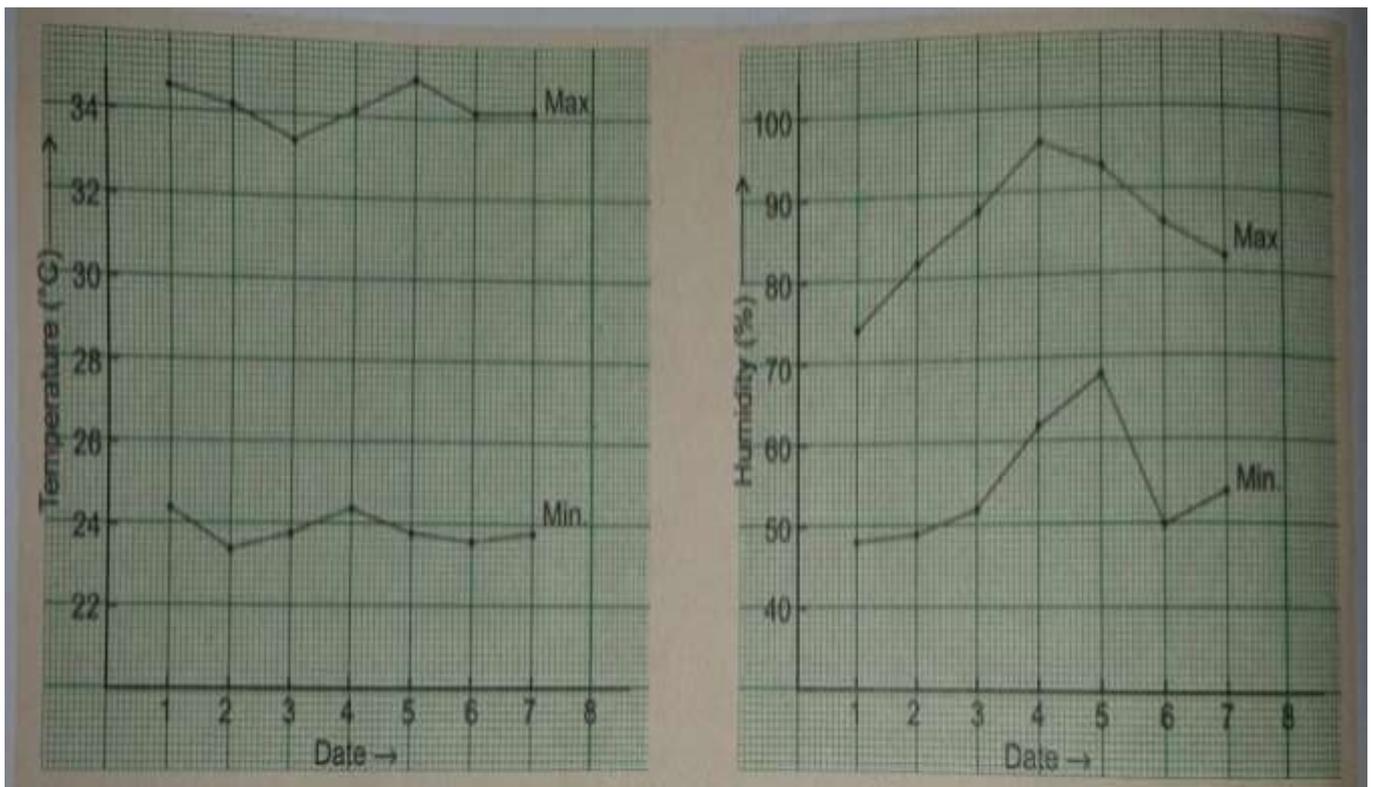
LEARNING OUTCOMES:

Students will be able to interpret the graphs and predict weather of a place.

A weather report in the newspaper gives us information about temperature, humidity and rainfall during the past 24 hours. It also predicts the weather for the day. So the weather is the day to day condition of atmosphere at a place with respect to the temperature, humidity, rainfall, wind speed, etc. It is a complex phenomenon that can vary over very short periods of time.

Given below is the graphical representation of weather for the first week of July 2019 (at Chandigarh), showing maximum and minimum temperature and humidity.

Read the graphs carefully and answer the following questions:



Q1 The primary factor that is responsible for all changes in weather.

- a) Wind speed.
- b) Temperature
- c) Sun
- d) Humidity.

Q2 Compare the weather of 2nd July and 5th July.

Q3 Write 'Agree' or 'Disagree' for the following statements:

S.No.	Statement	Agree/Disagree.
1	There was moderate rainfall on 4 th July.	
2	Nights were cold but days were very hot.	

Q4. Name the instruments used to measure temperature and humidity.

Q5. On which date the rainfall is least? Give reason to justify your answer.

Item description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	Simple MCQ	Explain phenomenon scientifically	content	Global	Low
2	Close constructed	Interpret data scientifically	procedural	Local	Low
3	Close constructed	Evaluate and design scientific enquiry	content	Local	Medium
4	Close constructed	Explain phenomenon scientifically	content	Global	Medium
5	Close constructed	Interpret data scientific	procedural	Local	medium

Answer Key:

Ans 1 Full Credit for c) Sun

No Credit for any other response.

Ans 2 On 5th July the weather is hot and humid as compare to 2nd July.

Full Credit for complete answer ; Partial credit if either Hot or Humid is given.

No credit for any other response.

Ans 3 a) agree b) disagree

Full Credit if both are correct ; Partial Credit if any one is wrong.

No credit for any other response.

Ans 4 a) Maximum-Minimum thermometer is used for measuring temperature .

b) Hygrometer is used to measure humidity.

Full Credit :if both are given ; Partial Credit: if any one is given.

No credit for any other response.

Ans 5 Rainfall is least on 1st July, as humidity is minimum on this date.

Full Credit for complete answer. ; Partial Credit if only date or reason is mentioned.

No credit for any other response.

10. WEATHER CLIMATE & ADAPTATION IN ANIMALS

AREA: Environment

CLASS: 7

CHAPTER NO: 7

CHAPTER NAME: WEATHER, CLIMATE AND ADAPTATION

CONCEPT: Climate & adaptation

LEARNING OUTCOMES:

Students will be able to understand how animals are adapted with their habitat so that they can survive well particularly animals living in tropical rainforest.

The tropical rainforests of the world host some of earth's rarest and unique flora and fauna, generally found nowhere else on our planet. Tropical rainforests are rainforests in the tropical regions of the world. These rainforests receive a high volume of annual rainfall, and nearly every month receives at least 60 mm rainfall. These rainforests have rich biodiversity and nearly 40% to 75% of all species on Earth inhabit these forests. Fauna of these rainforests includes the jaguar, tapir, okapi, boa constrictor, African gray parrot, keel-billed toucan, crowned eagle, three-toed sloth, spider monkey, large flying fox, king colobus, and more.



The forest floor is the rainforest's bottom-most layer which receives only 2% of the sunlight. Thus, plants growing here are adapted to the low light conditions, and the forest floor is relatively clear of vegetation. Thus, relatively larger animals of the tropical rainforest like the okapi, the tapir, the Sumatran rhinoceros, etc., inhabit the forest floors of rainforests. A large number of reptiles, insects, and amphibians also occur in this layer. Decaying plant and animal matter collect in the forest floor where they are decomposed by microbes like bacteria and fungi.

Q. No. 1 Mark the correct options

The tropical rainforest is

- A hot, moist biome where it rains all year long
- It lies along the equator and has dense canopies of vegetation.
- They are home to half of the Earth's plant and animal species
- Animals found here are black bear, wolf, rabbit, black tailed deer.

Q. No. 2. Tropical rainforests are located in a band around the equator mostly in the area between Tropic of _____ and Tropic of _____

Q No. 3. Although decomposition occurs rapidly in the hot, moist soil but why is the soil not rich in nutrients?

The ground floor and lower canopies of the rain forest bustle with wildlife. The aptly named spider monkeys have adapted to live at the top of the tree canopy where they have little competition for food. The spider monkey's prehensile tail gives it the ability to swing gracefully from tree to tree. Sloths also live in the trees, preferring to spend the day hanging upside down from branches. Their propensity for slow movement attests to the lack of predators they face.

Q No. 4. Why do some animals live on trees in tropical rainforests?

Q No. 5. How do sloths outsmart their predators?

Item Description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
	Simple multiple choice	Interpret data and evidence scientifically	Epistemic	Global	Medium
2.	Close constructed	Scientific evidence	Epistemic	Global	Low
3.	Open ended	Explains phenomenon scientifically	Epistemic	Global	High
4.	Open ended	Explains phenomenon scientifically	Content	Global	Medium
5.	Open ended	Scientific evidence	Content	Global	High

Answer key:

Ans 1. Option a, b and c

Ans 2. Cancer, Capricorn

Ans 3.

- i).Torrential rains wash out most of the nutrients out of the soil
- ii). Most of the carbon and essential nutrients are locked up in the living vegetation. As organic material decays it is recycled so quickly that few nutrients never reach the soil.

Ans 4.

- i)Competition for food is less.
- ii) To reach for Sunlight
- iii) The canopy offers sources of food, shelter and hiding places.

Ans5.

- i) Sloths are so slow that they often go unnoticed by their predators by blending in the surroundings.
- ii) By relying on camouflage, such as algae that grows on their fur.

11.DESTRUCTIONS CAUSED BY CYCLONE

Area: Hazards

Class: 7

Chapter: 8

Chapter Name: WINDS, STORMS AND

Concept: Destructions caused by Cyclone

Learning outcomes: The student will be able to:

1. Explain the destructions caused by cyclone.
2. Relate the hazard caused by other natural disasters.
3. Apply his learning's to hypothetical situations in day today life.

Cyclones can be very destructive. These are the first indications of an approaching cyclone. The water waves produced by the wind are so powerful that a person cannot overcome them. A cyclone is known by different names in different parts of the world. It is called a 'hurricane' in the American continent. In Philippines and Japan it is called a 'typhoon'.

The low pressure in the eye lifts water surface in the centre. The rising water may be as high as 3–12 meters.



Rising water caused by a cyclone.

Source:NCERT

text book

It appears like a water-wall moving towards the shore. As a result, the seawater enters the low-lying coastal areas, causing severe loss of life and property. It also reduces the fertility of the soil.

Continuous heavy rainfall may further worsen the flood situation. High-speed winds accompanying a cyclone can damage houses, telephones and other communication systems, trees, etc., causing tremendous loss of life and property.

Q.1 What is the first indication of an approaching Cyclones?

.....

Q.2 In the American continent a cyclone is called..... whereas it is called ‘typhoon’ in.....

Q.3 The height of rising water during a cyclone may be meters.

Q.4 Make a list of major destructions caused by Cyclones.

Item Description:

Q.no .	Question type	Competency	Knowledge	Context	Difficulty level
Q 1	Closed constructed	Interpret data	Content	Global	Medium
Q 2	Closed constructed	Interpret data	Content	Global	Low
Q 3	Closed constructed	Interpret data	Content	Global	Low
Q4	Open ended	Evaluate and design scientific query	Content	Global	High

Answer key:

Answer 1. Strong winds push water towards the shore even if the storm is hundreds of kilometers away.

Answer 2. ‘hurricane’, Philippines and Japan

Answer 3. 3–12 meters

Answer 4. The seawater enters the low-lying coastal areas, causing severe loss of life and property. It also reduces the fertility of the soil. Continuous heavy rainfall may further worsen the flood situation. High-speed winds accompanying a cyclone can damage houses, telephones and other communication systems, trees, etc., causing tremendous loss of life and property.

12. IDENTIFYING THE SOIL SAMPLE

AREA: Environment

CLASS:7

CHAPTER NO-9

CHAPTER NAME: Soil

CONCEPT: Soil profile

LEARNING OUTCOMES: Students will be able to

1. To identify any soil sample given to the child
2. Explain the soil profile and its composition
3. Conduct the simple investigation to find the % of soil type in a given sample.

Soil is made of a mixture of sand, silt, clay particles and rotted plant material. Different soil type have different percentages of each in the sample. Sandy soils have biggest particles and weigh more. It cannot hold the nutrients. Silt soil particles are smaller than sand and weigh less. Holds water and hard to drain, can hold limited nutrients. Clayey soil particles are the smallest of all .It can hold water well and become heavy when water logged .It can easily hold the nutrients.

To understand the different the different soil type let's do the following experiment.

EXP : To identify the soil type in the given sample and find the percentage of each type in 3 different sample.

LEARNING OBJECTIVE: To help the learner understand what proportion of these are for the soil with which you work.

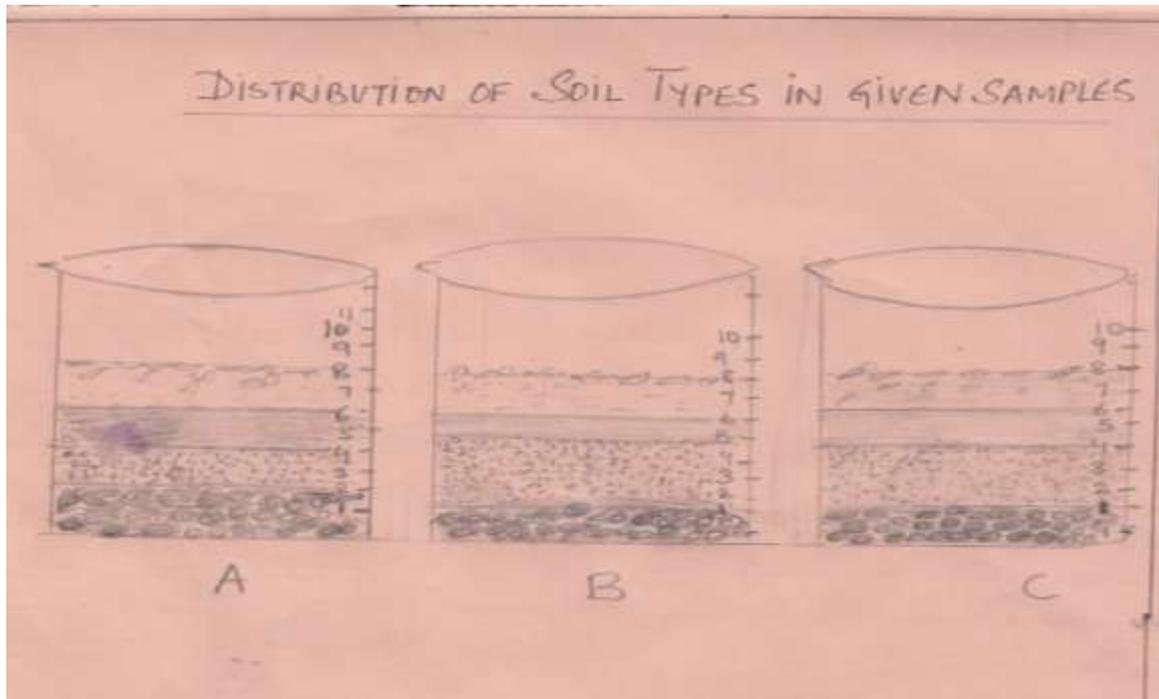
AIDS REQUIRED: 3 Beakers , 3 different soil samples, stirrer , scale for measurement

PROCEDURE:

1. Take the 3 beakers label it as A, B and C .Now fill each beaker as marked with sample soil A , B and C(3 spoons each)
2. Now fill each beaker $\frac{3}{4}$ with water and see the bubbles coming out of it.
3. Now stir the mixture well in each beaker and keep it stand still for few hours .
4. Observe the settlements.
5. Once the beakers are settled using scale measure the height of the total soil and water and then height of each soil layer.
6. Find the percentage of each part of soil and fill in the pie chart.

OBSERVATION

Below are shown the beakers after the layers get settled .



(FORMULA TO CALCULATE THE % OF SOIL LAYER=

MEASURE OF SOIL TYPE/TOTAL HEIGHT OF SOIL LAYERS INCLUDING WATER * 100)

QUESTIONS :

Q1. What did you observe in the beakers shown above after the soil gets settled. Can you label the layers as shown after the soil gets settled . In all the beakers are the layers settled in the same manner.

LAYER 1: _____

LAYER 2: _____

LAYER 3: _____

LAYER 4: _____

Q2. What could be the possible reason of bubbles coming out of each beaker?

Q3. From the figure shown above can you fill up the details as required below

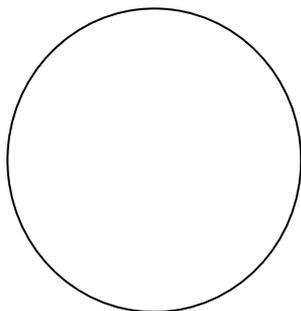
BEAKER NO.	HEIGHT OF SANDY SOIL (in cm)	HEIGHT OF CLAYEY SOIL (in cm)	HEIGHT OF HUMUS (in cm)	HEIGHT OF SILTY SOIL (in cm)
A				
B				
C				

Q4. Find out the percentage of each soil type and fill in the table shown below

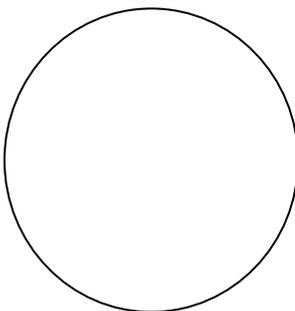
BEAKER SAMPLE NO.	PERCENTAGE OF SANDY SOIL (in cm)	PERCENTAGE OF CLAYEY SOIL (in cm)	PERCENTAGE OF HUMUS (in cm)	PERCENTAGE OF SILTY SOIL (in cm)
A				
B				
C				

Q5. Lets prepare 3 different pie chart by looking at the percentage of each soil type

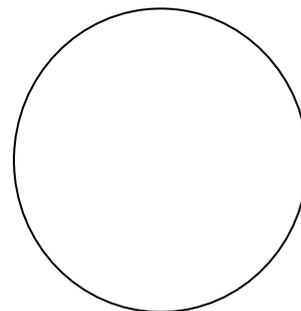
SAMPLE A



SAMPLE B



SAMPLE C



Item Description

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

Answer Key:

1. a) Observation is that different soil types gets settled according to its constituent material in the beaker

b) Different layers are

- LAYER 1: Sandy soil
- LAYER 2: Silty soil
- LAYER 3: Clayey soil
- LAYER 4: Humus

2. Bubbles start coming out of the mixture as soon as the water is poured on the soil due to the presence of air in the soil .Once the soil is stirred bubbles stops coming out.

3.

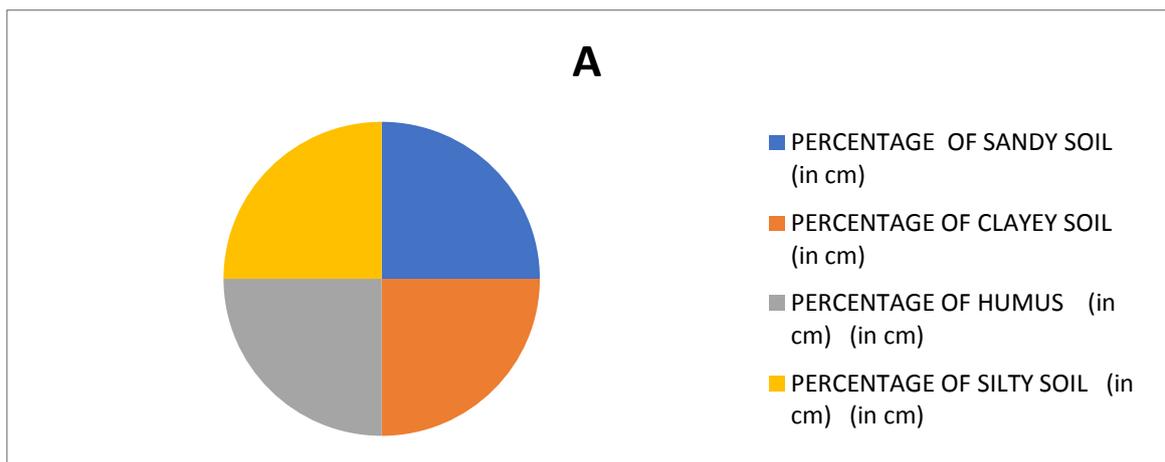
SAMPLE NO.	HEIGHT OF SANDY SOIL (in cm)	HEIGHT OF CLAYEY SOIL (in cm)	HEIGHT OF HUMUS (in cm)	HEIGHT OF SILTY SOIL (in cm)	TOTAL HEIGHT OF LAYERS (including soil & water)
A	2CM	2CM	2CM	2CM	8CM
B	1CM	1CM	2CM	4 CM	8 CM
C	1CM	3CM	2CM	2CM	8CM

4.

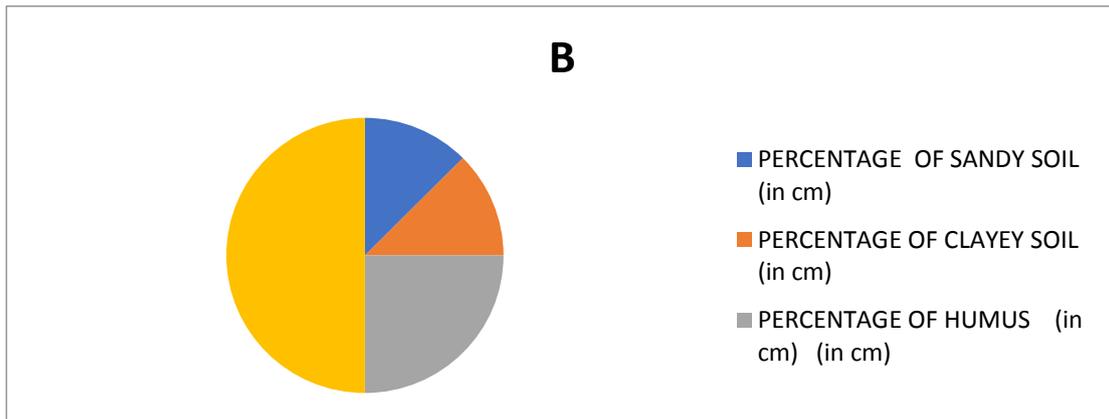
BEAKER SAMPLE NO.	PERCENTAGE OF SANDY SOIL (in cm)	PERCENTAGE OF CLAYEY SOIL (in cm)	PERCENTAGE OF HUMUS (in cm)	PERCENTAGE OF SILTY SOIL (in cm)
A	$2/8*100=25\%$	$2/8*100=25\%$	$2/8*100=25\%$	$2/8*100=25\%$
B	$1/8*100=12.5\%$	$1/8*100=12.5\%$	$2/8*100=25\%$	$4/8*100=50\%$
C	$1/8*100=12.5\%$	$3/8*100=37.5\%$	$2/8*100=25\%$	$2/8*100=25\%$

5. Pie chart

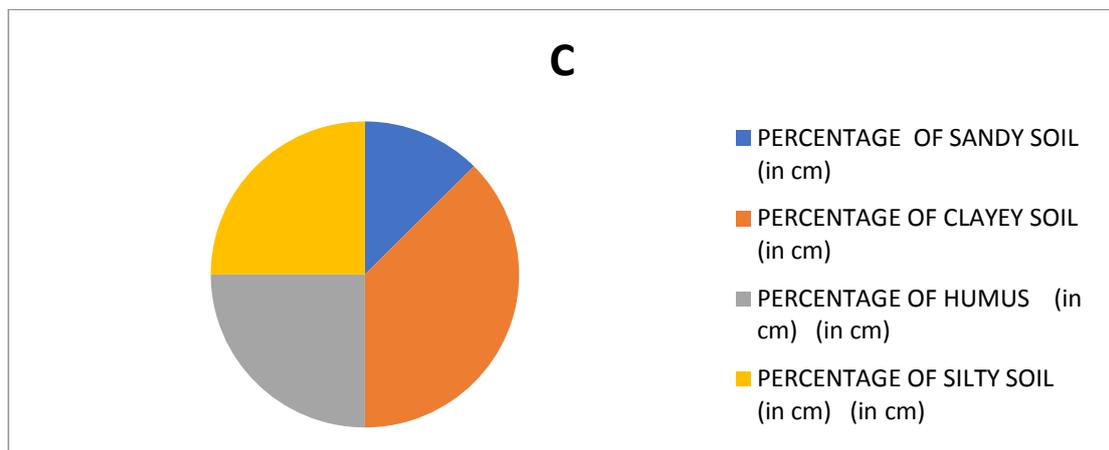
SAMPLE A



SAMPLE B



SAMPLE C



6. After the interpretation of data and making a pie chart can you find out which soil sample out of three is more suitable for pottery and which one is more suitable for growing coconuts :

SUITABLE FOR POTTERY : **sample C**
SUITABLE FOR GROWING COCONUT : **sample C**

Scoring Key:

- FULL CREDIT(2)if answers for both questions given ; PARTIAL CREDIT (1) If answers for any one question given ; NO CREDIT(0) if any other answer
- FULL CREDIT (2)if correct answer given ; NO CREDIT(0) any other answer
- FULL CREDIT (2) If all answers of 3 samples correct ; PARTIAL CREDIT (1)If answers of 2 samples correct ; NO CREDIT(0) any other answer
- FULL CREDIT (2) If all answers of 3 samples correct ; PARTIAL CREDIT (1)If answers of 2 samples correct ; NO CREDIT(0) any other answer
- FULL CREDIT (2)if all three correct pi charts ; PARTIAL CREDIT (1) if any 2 correct pi charts ; NO CREDIT(0) if wrong pi charts
- FULL CREDIT (2) a. if answer is Sample C b. No sample ; PARTIAL CREDIT(1) If any one answer ; NO CREDIT(0) any other answer

13. RESPIRATION IN ORGANISMS -1

AREA: Living System

CLASS:7

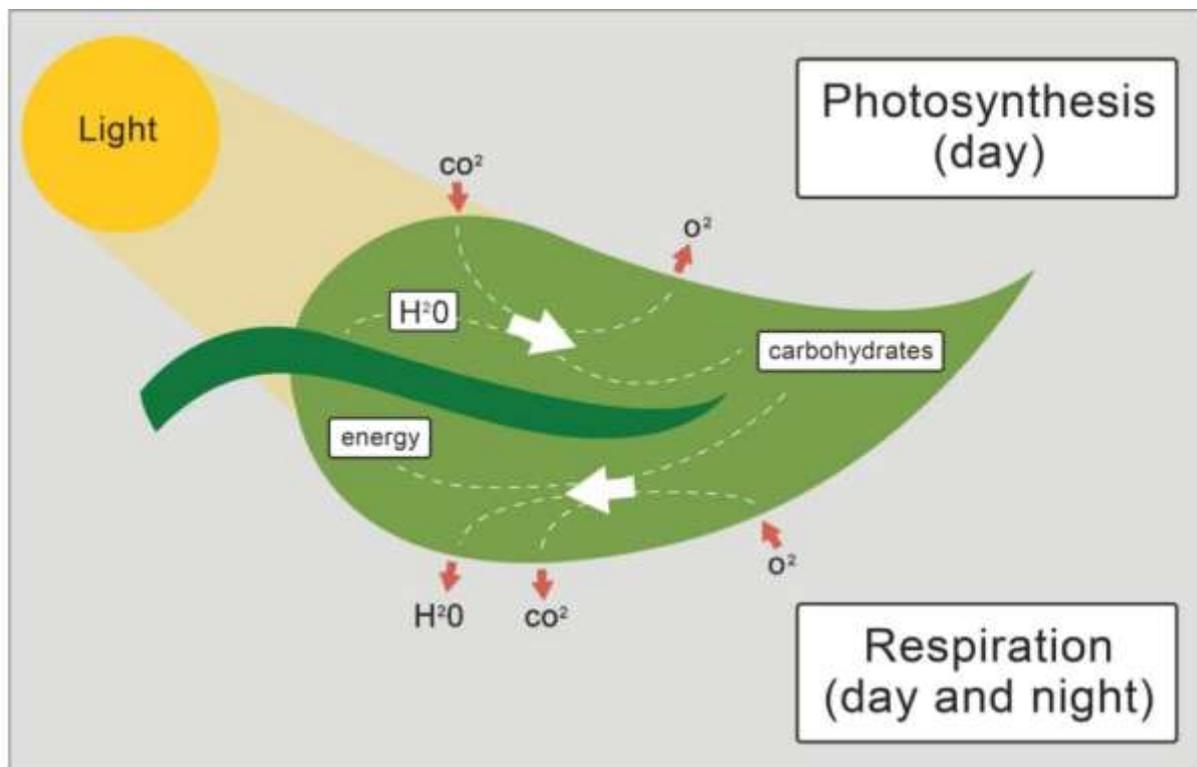
CHAPTER NO-10

CHAPTER NAME :RESPIRATION IN ORGANISMS

CONCEPT: Breathing in plants

LEARNING OUTCOMES: Students will be able to

1. Explain process and phenomenon with equation of respiration.
2. Draw labeled diagram/flow chart of plant respiratory system.



Respiration In Plants

Like animals, plants also need energy. The plants get this energy by the process of respiration. Plants also use oxygen of air for respiration and release carbon dioxide.

The respiration in plants differs from the animals in three respects:

Respiration in plants	Respiration in animals
All the parts of a plant (like root, stem and leaves) perform respiration individually.	An animal performs respiration as a single unit.
During respiration in plants, there is a little transport of respiratory gases from one part of the plant to the other.	Respiratory gases are usually transported over long distance inside an animal during respiration.
The respiration in plants occurs at a slow rate.	The respiration in animals occurs at a much faster rate.

Plants get Oxygen by Diffusion:

-Plants have a branching shape, so they have quite a large surface area in comparison to their volume. Therefore, diffusion alone can supply all the cells of the plants with as much oxygen as they need for respiration.

-Diffusion occurs in the roots, stems and leaves of plants.

Respiration in Roots:

-Air occurs in soil interspaces. Root hairs of the roots are in direct contact with them.

-Oxygen of the soil air diffuses through root hair and reaches all internal cells of the root for respiration.

-Carbon dioxide produced by root cells diffuses in the opposite direction.

-In water-logged conditions, soil air becomes deficient. In the absence of oxygen, metabolic activity of the root declines and the plant may wither.

Respiration in Stems:

-The stems of herbaceous plants have stomata. The oxygen from air diffuses into the stem of a herbaceous plant through stomata and reaches all the cells for respiration.

-The carbon dioxide gas produced during respiration diffuses out into the air through the same stomata.

-In woody stems, the bark has lenticels for gaseous exchange.

Respiration in Leaves:

-The leaves of a plant have tiny pores called stomata. The exchange of respiratory gases in the leaves takes place by the process of diffusion through stomata.

Q1. Name the process through which much needed oxygen is supplied to all the cells of the plants?

- A. Diffusion
- B. Endosmosis
- C. Exosmosis
- D. Photosynthesis

Q2. Respiration in Plants takes place through:

- A. Stomata
- B. Lenticels
- C. Both A and B
- D. Only A

Q3. Consider the following statements:

- A. Respiration takes place both day and night.
- B. Photosynthesis occurs during day time only.
- C. Both A and B are correct.
- D. Neither A nor B are correct.

Q4. Various methods used by plants to get rid of their waste products are:

- I. Gaseous waste through stomata and lenticels.
- II. Stored solid and liquid waste by shedding leaves, peeling of bark and falling of fruits.
- III. By secreting waste in the form of gum and resins.

Which of the following statements is/are correct?

- A. I and II are correct.
- B. II and III are correct.
- C. I and III are correct.
- D. I, II and III are correct.

Q5. Name the waste products secreted by Plants?

- A. Carbon Dioxide
- B. Oxygen
- C. Water Vapour
- D. All are correct.

Q6. Which of the following statements is/are correct?

- I. The net gaseous exchange in leaves at night is, oxygen diffuses in and carbon dioxide diffuses out.
- II. Net gaseous exchange during day time is, oxygen diffuses out and carbon dioxide diffuses in.

Select the correct answer from the codes given below:

- A. Only I is correct.
- B. Only II is correct
- C. Both I and II are correct.
- D. Neither I nor II is correct.

Q7. Which of the following statements are correct regarding respiration in plants?

- I. Respiration is the process of releasing energy from food.
- II. Respiration takes place individually in all parts of the plants like stem, roots, leaves etc.
- III. The rate of respiration is slow in plants whereas it is faster in humans and animals.

Select the correct answer from the codes given below:

- A. I and III are correct
- B. I and II are correct
- C. I, II and III are correct
- D. None of the above

Q8. Name an extension of the epidermal cells of a root which is in direct contact with the soil?

- A. Root Hairs
- B. Internodes
- C. Bundle Scars
- D. Pith

Item Description:

Q No	Q Type	Competency	Knowledge	Context	Difficulty level
1.	Simple MCQ	Explain phenomenon scientifically	Content	global	low
2	Simple MCQ	Explain phenomenon scientifically	Content	global	low
3	Simple MCQ	Explain phenomenon scientifically	Content	global	low
4	Simple MCQ	Explain phenomenon scientifically	Content	global	low
5.	Simple MCQ	Explain phenomenon scientifically	Content	global	low
6.	Simple MCQ	Interpret data and evidence scientifically	Content	global	medium
7.	Simple MCQ	Interpret data and evidence scientifically	Content	global	medium
8.	Simple MCQ	Explain phenomenon scientifically	Content	global	low

Answer Key:

Ans 1. A

Ans 2. C

Ans 3. C

Ans 4. D

Ans 5 .D

Ans 6.C

Ans 7. C

Ans 8. A

14. RESPIRATION IN ORGANISMS-2

AREA: Living System

CLASS:7

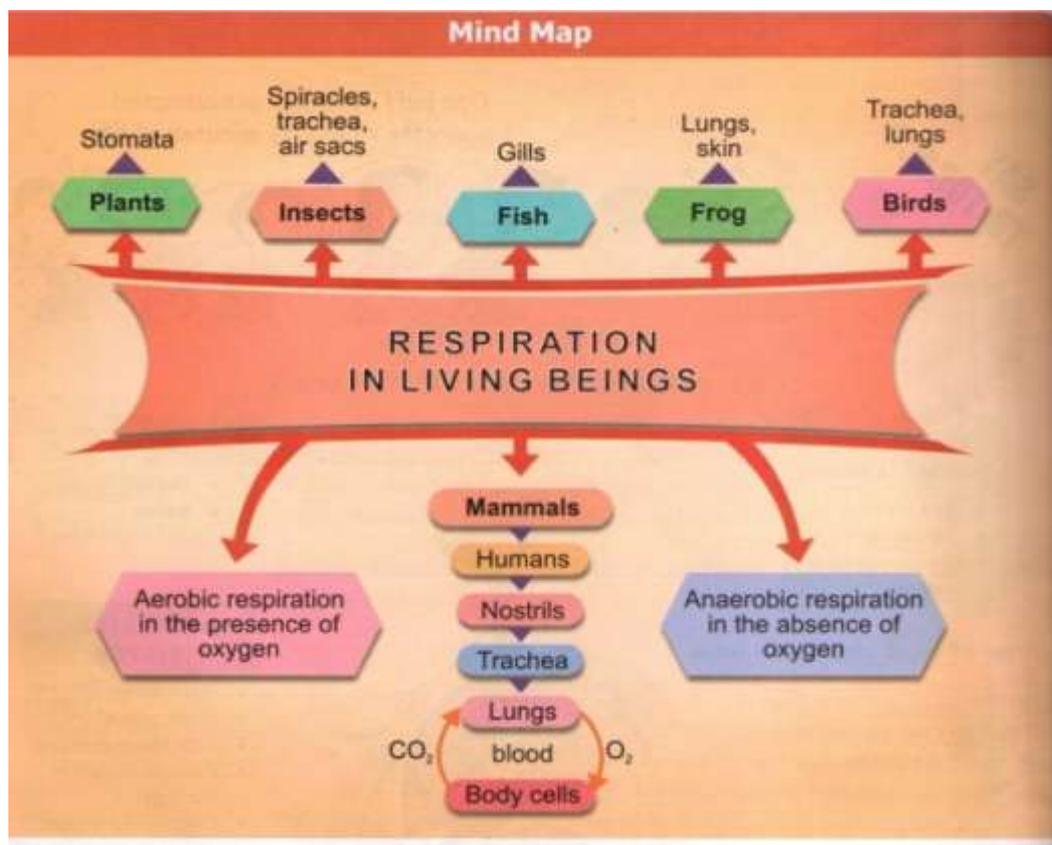
CHAPTER NO-10

CHAPTER NAME :RESPIRATION IN ORGANISMS

CONCEPT: Breathing System

LEARNING OUTCOMES: Students will be able to

1. explain process and phenomenon with equation of respiration.
2. draw labelled diagram/flow chart of human respiratory system,
3. construct model of human respiratory system from using materials from surroundings.



All living things need energy to live. Respiration is the process of using oxygen to break down food to release energy, carbon dioxide and water.

Respiratory system in Human beings:

The organ for respiration in human beings are as follows:

1. Nasal cavity
2. Pharynx

3.Trachea (windpipe)

4.Lungs (bronchi, bronchioles, alveoli)

5.Diaphragm

-Lungs are present in the chest cavity, which is surrounded by ribs on the sides. The ribs form a cage-like structure called the ribcage. A large muscular sheet called diaphragm forms the base of the ribcage. The diaphragm contract and relax all the time.

-Breathing is a continuous process in which humans breathe in and breathe out air from the body. It is an involuntary action controlled by the brain.

Breathing consists of two phases: inhalation, the process of taking in air and exhalation the process of giving out air.

-During inhalation, the diaphragm contract, it flattens and increases the space inside the chest cavity. This makes the air breathe in and so chest rises and the air outside rushes into lungs. During exhalation, the diaphragm relaxes, it decreases the space inside the chest cavity. This makes the air breathe out and so the chest moves inward and the expelled out.

Respiration in Microorganisms:

In microorganisms such as Amoeba, the exchange of gases takes place through their most body surface.

Respiration in Aquatic organisms

Aquatic animals like fish live in water and get oxygen which is dissolved in water. Fish have a special structure called gills on either side of their mouth. Oxygen from the water diffuses into the blood in the gills and it is carried to every part of the body. Similarly, carbon dioxide in the blood of a diffuses out into the water from the gills.

Aquatic animals such as lobster, prawns, crab and shellfish also respire through gills.

Respiration in Earthworm

In animals that live in the soil, such as earthworms and leeches the exchange of gases takes place through the slimy surface of the skin.

Respiration in Insects:

Respiratory system of an insect such as grasshopper and Cockroaches is known as the tracheal system. It is made up of spiracles and trachea. An insect takes air through tiny holes called spiracles which are located on the body. Spiracles open into narrow tubes called traceae, which carry the oxygen to different parts of the body. Carbon dioxide diffuses out through the trachea and exit through the spiracles.

Respiration in Birds

Birds have lungs with air sacs. Air sacs do not play a direct role in oxygen and carbon dioxide exchange, however they do keep oxygen rich air moving, in one direction, through the avian respiratory system.

Respiration in Amphibians

Amphibians like frogs, newts and salamander are both aquatic and terrestrial. Frogs have lungs, but they use their skin for the exchange of gases when in water. They use their lungs when on land.

Q1.Earthworms and frogs breathe through their skin because of which the skin of both the organisms is

(a) moist and rough.

(b) dry and rough.

- (c) dry and slimy.
- (d) moist and slimy.

Q2. Fish breathe with the help of gills which are richly supplied with blood vessels. The gills help the fish to

- (a) take in oxygen from air.
- (b) release waste substances in water
- (c) absorb nutrients present in water.
- (d) take in oxygen dissolved in water.

Q3. An organism that respire by tracheal system is

- (a) Cockroach
- (b) Earthworm
- (c) Butterfly
- (d) Mosquito

Q4. Birds have _____ for respiration.

- A. Lungs
- B. Air bladder
- C. Skin
- D. Gills

Q5. Organisms which respire in absence of air are called _

- (a) microbes
- (b) anaerobes
- (c) aerobes
- (d) none of these

Q6. Which of the following organism breathe through spiracles?

- (a) housefly
- (b) earthworms
- (c) snails
- (d) All of these

Q7. Differentiate between inhalation and exhalation?

Q8. Explain the mechanism of breathing in human beings through a flowchart.

Item Description:

Q No	Q Type	Competency	Knowledge	Context	Difficulty level
1.	Simple MCQ	Explain phenomenon scientifically	Content	Personal	low
2	Simple MCQ	Explain phenomenon scientifically	Content	global	low
3	Simple MCQ	Explain phenomenon scientifically	Content	global	low
4	Simple MCQ	Explain phenomenon scientifically	Content	global	low

5.	Simple MCQ	Explain phenomenon scientifically	Content	global	low
6.	Simple MCQ	Interpret data and evidence scientifically	Content	global	low
7.	Closed constructed	Interpret data and evidence scientifically	Content	global	medium
8.	Closed constructed	Interpret data and evidence scientifically	Content	global	medium

Answer Key:

Ans 1 D

Ans2. D

Ans3.A

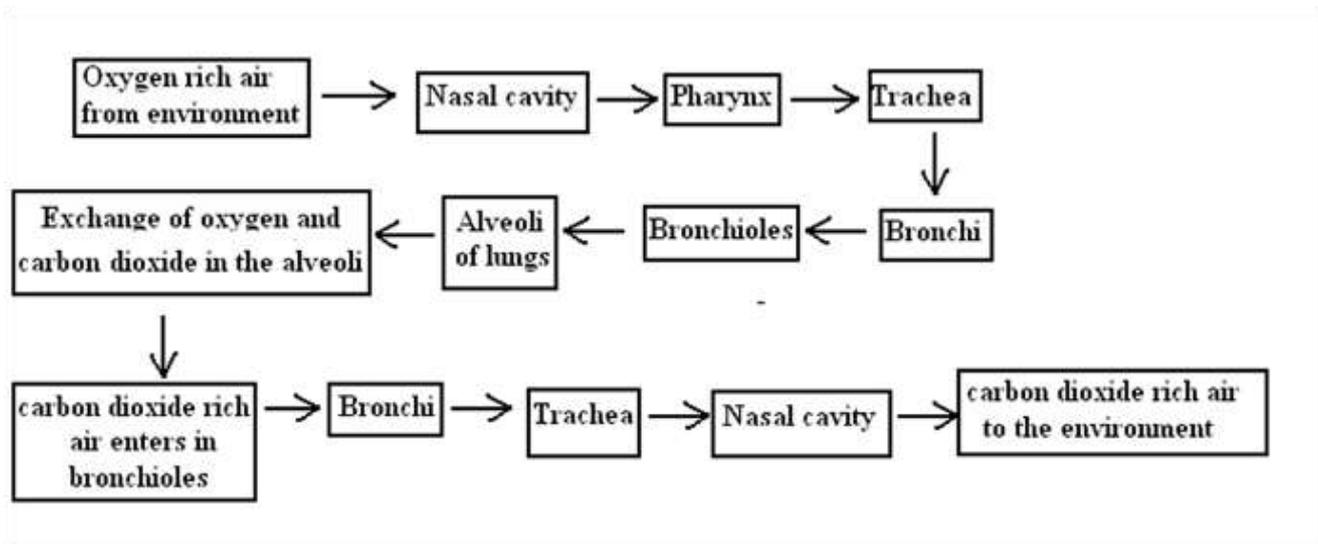
Ans4. B

Ans5 .B

Ans6.A

Ans7. Inhalation is the process of intake of air into lungs, whereas exhalation is the process of letting air out from lungs.

Ans8.



15. HEART FELT STORY

AREA: Living System

CLASS:7

CHAPTER NO-11

CHAPTER NAME : TRANSPORTATION IN PLANTS AND ANIMALS

CONCEPT: Circulation System

LEARNING OUTCOMES: Students will be able to

1. Relate process and phenomena with causes
2. Differentiate between artery and veins.

Shubham is a 10 years old boy. His muscular heart is very sad now a days. Shubham does not go out to play now a days. His father has got him a new mobile. All he does is play games on his mobile whole day. He also eat chips the whole day. Shubham's heart feels tired and sluggish. His heart is worried that if shubham continues like this, one day the heart will face severe problems. So the heart decides to approach the veins and arteries.



Q1. Shubham does not exercise and eats junk food. Why does his muscular heart feel sluggish and tired the whole day?

.....

.....

..

Artes and veins are the best friends of the heart. The arteries help the heart to transport oxygen rich blood to all parts of the body. They work hard and have thick elastic walls. Veins help to carry carbon dioxide rich blood from all parts of the body back to the heart. They have thin walls and valves that allow blood to flow only upwards towards the heart.



Q2. Both veins and arteries are best friends. However they are different from each other. Write any two points of differences between them.

Arteries	Veins

“Hello Friends!” the heart says. “How are you?”

The arteries and the veins reply, “We are Okay, You look Sad?”

“Yes”, Says the heart. “I feel tired and sluggish. I am not getting any exercise now days, Shubham keeps sitting”.

“Yes, we also feel the bad cholesterol depositing in our inner walls. If this continues you will soon fail and stop working.” says the arteries.

Q3. Why do you think deposition of bad cholesterol in the inner walls of arteries and veins will cause heart to stop working?

.....
.....
.....

“What do you think should be done?” asks the veins.

“ I think we should all go on a strike for some time, so that Shubham understands our importance and takes care of our health.” says the heart.

So, the heart, veins and arteries go on a strike the next days. Shubham suddenly feels a lot of pain in his chest and faints. He is rushed to the hospital. The doctor examines him and writes a long prescription. When Shubham wakes and reads the prescription it says, “Exercise daily, play in the ground, run, eat vegetables and fruits in a balanced diet, minimise the use of technology and above all Love your heart.”

Q4. Why does the doctor prescribe Shubham to eat vegetables and fruits?

.....
.....
.....



Shubham realises his mistake and listens to the doctors’ advice. His Heart is happy to see Shubham happy and healthy.

Q5. Read the statements carefully and answer in Agree/disagree.

S. No	Statement	Agree/Disagree
1	We all must exercise.	
2.	We should minimise the use of technology.	
3.	It is important to keep our heart happy, as it impacts transportation of nutrients and respiration.	

Item Description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	Close constructed	Explain the process scientifically	content	Personal	Level 3 (application)
2	Close constructed	Explain the process scientifically	content	Personal	Level 2 (understanding)
3.	Close constructed	Explain the process scientifically	content	Personal	Level 3 (application)
4.	Close constructed	Explain the process scientifically	Content	Personal	Level 3 (application)
5.	Skill based	Attitude and skills	Attitude	Personal	Affective domain

Answer key:

A1- Heart is a muscle. Muscles require exercise and good nutritious food for its health and maintenance.

A2-

ies	s
thick elastic wall	thinner walls
port oxygen rich blood	port carbon dioxide rich blood

A3- when the walls of the arteries and veins thicken the heart has to work extra to transport blood.

A4- vegetables and fruits add vitamins and minerals to our food. These are important nutrients that keep us healthy.

A5.

S. No	Statement	Agree/Disagree
1	We all must exercise.	agree
2.	We should minimise the use of technology.	agree
3.	It is important to keep our heart happy, as it impacts transportation of nutrients and respiration.	agree

16. Transport in plants

AREA: Living System

CLASS:7

CHAPTER NO-11

CHAPTER NAME :TRANSPORTATION IN PLANTS AND ANIMALS

CONCEPT: Transport Of Substances In Plants

LEARNING OUTCOMES: Students will be able to

1. Conduct simple investigations to seek answers to queries
2. Differentiate between xylem and phloem
3. Explain processes and phenomena.

All multi cellular organisms have inbuilt systems to perform basic functions of life. There is division of labour and different organs are involved in different functions. In plants too this division can be seen. The leaves and the other green parts are involved in photosynthesis. The food so produced by this process is then transported to all parts of the plant body through a transport system. Similarly water and other nutrients that form the raw materials for food production are absorbed through the roots. Then these materials are transported to other plant body parts for performing various life processes.

Q1. Name the system that is responsible for transportation of materials in human body.

.....

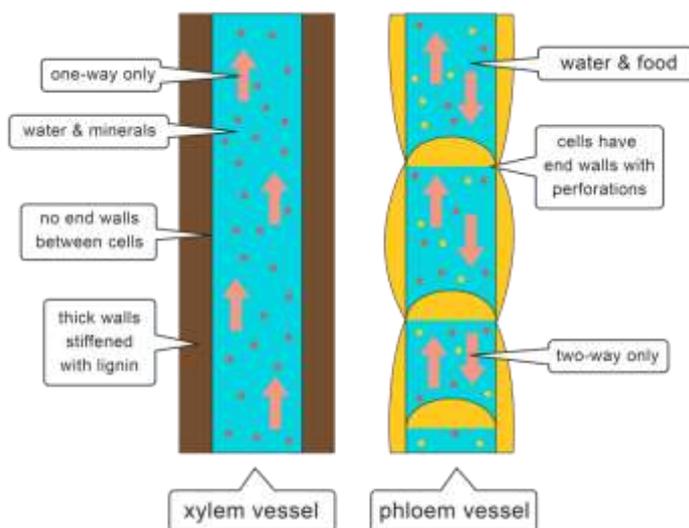


Figure 1

Transportation in plants takes place through the Xylem and phloem vessels. The characteristics of xylem and phloem vessels can be seen in figure 1.

Q2. Observe the figure 1 and complete the following table:

	Xylem	Phloem
Materials transported		
Direction of flow of Materials		
Presence of end walls		

Q3. In the figure 1 you can observe that both xylem and phloem vessels have thick walls. What could be the significance of these walls?

.....

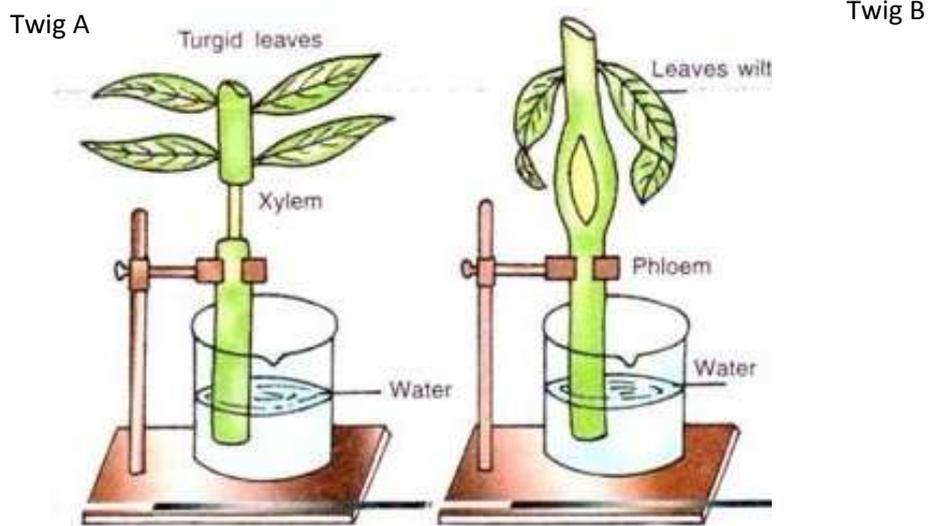


Figure 2

A student set up an experiment to the path of study transportation of water by taking two twigs (seen in figure 2). Twig A with phloem removed and xylem intact was taken. Twig B with xylem removed and phloem intact was taken. The twigs were then fixed to a stand and were allowed to remain for about 2 days with their lower end immersed in the water.

Q4. You can observe the impact of the experiment in the figure 2. What do you observe?

.....

Q5. What are your inferences from the above experiment?

.....

.....

Item Description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	Closed constructed	Explain the process scientifically	content	Personal	Medium
2	Closed constructed	Explain the process scientifically	content	Personal	Medium
3.	Closed constructed	Explain the process scientifically	content	Personal	High
4.	Closed constructed	Evaluate and design scientific enquiry	procedural	Personal	Medium
5.	Closed constructed	Interpret data and evidence scientifically	procedural	Personal	Medium

Answer Key:

(1) Circulatory system

(2)

	Xylem	Phloem
Materials transported	Water and minerals	Food and water
Direction of flow of Materials	One way	Two ways
Presence of end walls	No end walls	End walls with perforations

(3) For providing strength to the plants in absence of skeletal system.

(4) Twig A is upright and Twig B has drooped.

(5) Xylem transports water.

Scoring:

(1) Full credit for naming the process.

(2) Full credit for completing the table. Partial credit for any two observations

(3) Full credit for explaining the reason.

(4) Partial credit for one observation and full credit for both observations.

(5) Full credit for correct inference.

17. SEXUAL REPRODUCTION IN PLANTS

AREA: Living System

CLASS:7

CHAPTER NO-12

CHAPTER NAME : REPRODUCTION IN PLANTS

CONCEPT: Pollination & Fertilization

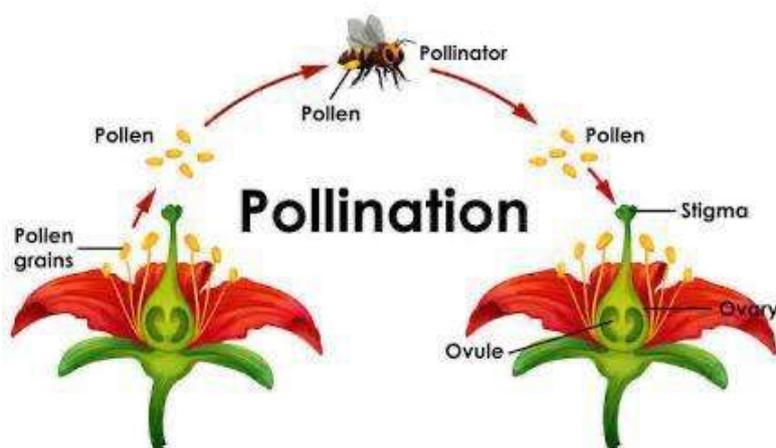
LEARNING OUTCOMES:

Students will be able to the child is able to explain process and phenomenon.

INTRODUCTION:

Plants like other living things reproduce to ensure the continued existence of the species. They propagate by means of seeds, spores or plantlets, often in large numbers. Seeds and spores are formed by sexual reproduction involving male and female gametes. Plantlets are formed by asexual or vegetative reproduction, in which a plant produces new plants on its own.

A) POLLINATION



Flowers are reproductive organs of plant. They usually contain both male and female reproductive parts. Plant produce pollen which contains a nucleus inside that is the male gamete but this pollen is not capable of moving from one place to another. This means plants must have a mechanism to transfer pollen from anther to stigma.

This process is known as Pollination and there are two main mechanisms by which it occurs: transferred by Insects (or other animals like birds) or transferred by Wind. The structure of insect and wind pollinated flowers are slightly different as each is adapted for their specific function.

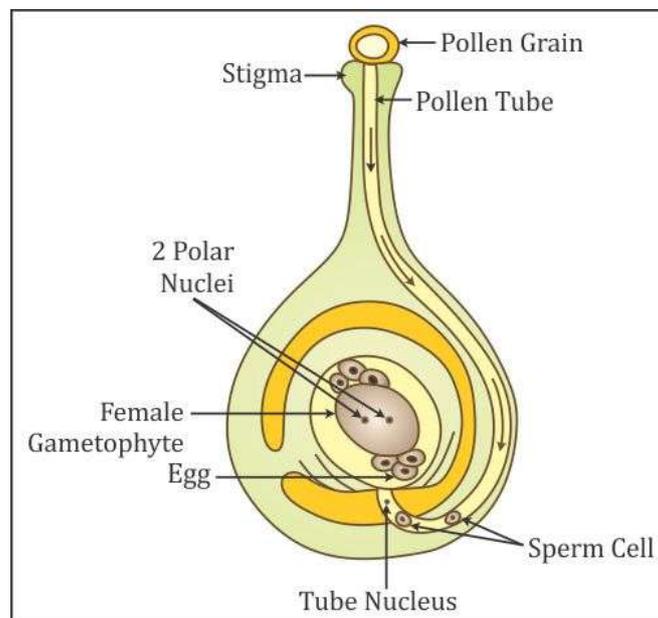
Difference between insect and wind pollinated flowers



Feature	Insect-pollinated	Wind-pollinated
Petals	Large and brightly-coloured – to attract insects	Small, often dull green or brown – no need to attract insects
Scent and nectar	Usually scented and with nectar – to attract insects	No scent or nectar – no need to attract insects
Number of pollen grains	Moderate - insects transfer pollen grains efficiently	Large amounts – most pollen grains are not transferred to another flower
Pollen grains	Sticky or spiky - sticks to insects well	Smooth and light – easily carried by the wind without clumping together
Anthers	Inside flower, stiff and firmly attached - to brush against insects	Outside flower, loose on long filaments – to release pollen grains easily
Stigma	Inside flower, sticky - pollen grains stick to it when an insect brushes past	Outside flower, feathery – form a network to catch drifting pollen grains

B) FERTILIZATION

Fertilization is the union of male and female gametes in the ovules. Fertilization occurs within 24 hours of pollination. Within 3-5 days of fertilization, the flower parts drop and the pistil swells and elongates. The fertilized egg developed through various stages over the next twenty days until it becomes a mature embryo (seed).

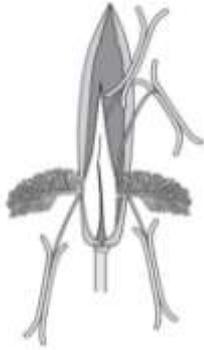


ANSWER THE FOLLOWING QUESTIONS:

Ques. 1: Suggest why insects rarely visit wind pollinated flowers?

Ques. 2: What is relationship between bees and flowers.

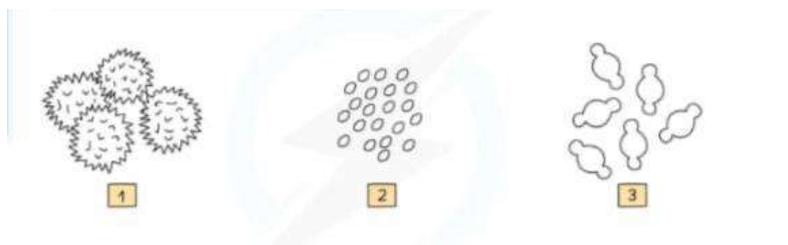
Ques. 3:



Give two points that you can tell from diagram that this flower is wind pollinated.

Ques. 4: As we know flowers are very colourful and give off sweet scent to attract pollinators. But there is a flower called Voodoo Lily that gives off a really bad smell like rotting meat or cow dung. The colour of petals is also dark like meat. This shows that different flowers have adapted to different pollinators. What types of pollinators do you think will pollinate this flower?

Ques. 5:



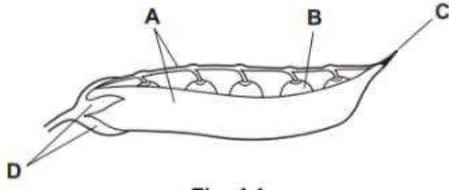
The diagram shows pollen grains of different species of plants. Which pollen grains are involved in insect-pollination?

- A. 1 and 2.
- B. 1 only.
- C. 2 and 3.
- D. 3 only

Ques. 6: Which floral part would you expect to change the most if the usual pollinator of the flower disappeared and a new one began to adapt to do the job?

- A) Sepal.
- B) Stamen
- C) Pistil
- D) Petal

Ques.7: Look at the picture of a pea pod, the fruit of pea plant-



1. Name the parts of pea flower from which structure A and B have developed.

- A:
 - B:
2. Parts C And D are also remaining parts of the pea flower. Suggest which part C was and D was in the original flower.
- C:
 - D:

Ques. 8: A flower of brinjal plant after the process of sexual reproduction produces 250 viable seeds.

Answer the following questions giving reasons:

- a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?
- b) What would have been the minimum number of ovules present in the ovary?
- c) How many male gametes were involved in this process ?

Ques.9: Some people have an allergy to pollen produced by flowering plants. This is known as hay fever. Suggest why hay fever tends to be caused by wind pollinated plants rather insect pollinated plants.

Ques. 10: Before pollination and fertilization, major structures in the flower include the ovule and the ovary. What do these become respectively, after pollination and fertilization ?

- A) embryo and seed
- B) seed and fruit
- C) stigma and style
- D) zygote and endosperm.

Item Description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
2	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
3	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
4	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
5	Multiple Choice	Explaining phenomenon scientifically.	Content	Global	Medium
6	Multiple Choice	Explaining phenomenon scientifically.	Content	Global	Medium
7	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
8	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium
9	Open Ended	Explaining phenomenon scientifically.	Content	Global	Medium
10	Close ended	Explaining phenomenon scientifically.	Content	Global	Medium

Answer Key:

Ans. 1: Wind pollinated flowers are usually small and inconspicuous and do not possess any scent or produce nectar. Their stigma may be large and feathery to catch the pollen grains. Insects may visit them to collect pollen but usually are ineffective.

Ans. 2: Flower provides Bees with nectar and pollen that worker Bees collect to feed their entire colonies. Bees provide flowers with the means to reproduce by spreading pollen from flower to flower in a process called pollination.

Ans. 3: Any 2 from the above chart.

Ans. 4: Flies are attracted to rotting meat and so the most likely pollinators of this flower are flies.

Ans. 5: B

Ans. 6: D

Ans. 7: 1. A: Ovary

B: Ovule

2. C: Style/Stigma

D: Sepals

Ans. 8: A) 250, 1 pollen grain participate in fertilization of 1 ovule

B) 250, 1 Ovule after fertilization forms 1 Seed.

C) 500, each pollen grain carries 2 male gametes (250x2)

Ans. 9: Wind pollinated plants produce light pollen grains that are released into the air. Allergy problems are caused by these tiny airborne pollen particles. They are easily inhaled unlike insect pollinated plants whose pollen grains are heavier.

Ans. 10: B

18. WORLD OF LIGHT & IMAGES AROUND US

AREA: Frontiers Of Science And Technology

CLASS:7

CHAPTER NO-15

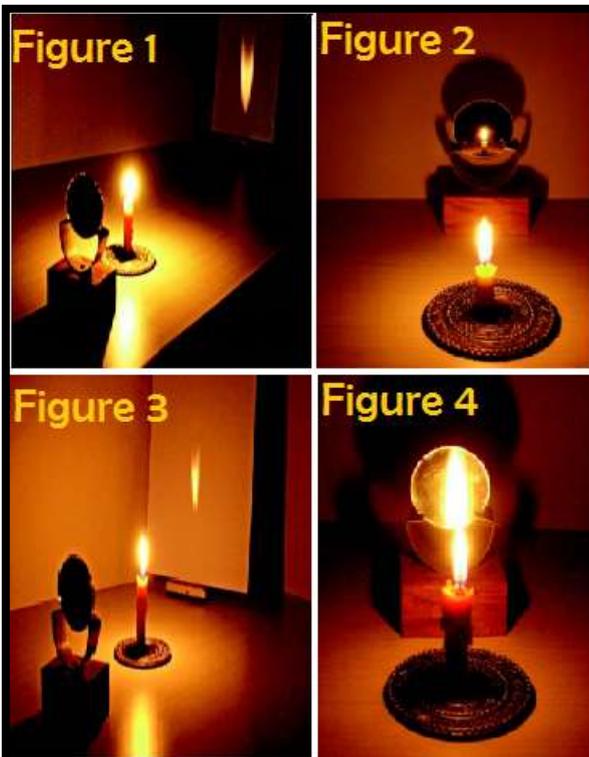
CHAPTER NAME :LIGHT

CONCEPT: SPHERICAL MIRRORS

LEARNING OUTCOMES: Students will be able to

1. Analyze and interpret given figure showing formation of images
2. Communicate the findings and conclusions effectively
3. Relate process and phenomenon with cause and effect of image formation
4. Apply the interrelationship between placement of object and formation of images
5. Apply scientific principle in everyday life

Light is always an attraction for a common man as well as for scientists. VII performed an experiment in a dark room with spherical mirrors, candle, stand and screen, they succeeded to form four also. Students of class images as shown in figure 1, figure 2, figure 3 and figure 4. They found that inverted images can also be formed, students were very intelligent having the knowledge about the concept behind these optical phenomenon of image formation. This phenomenon is a part of our every day life, like focus of light made by torch, a dentist examining a patient with a mirror, image from the outer side of a spoon, image from the inner side of a spoon, image



Q 1 Choose correct option regarding phenomenon taking place for image formation in given figures

(a) Reflection of light (b) Transfer of light (c) Expansion of light (d) Lightening

Q 2 Nature of image formed in figure 1, 2, 3 and 4 are respectively

(a) Real, virtual, real, virtual

(b) Virtual, real, real, real

(c) Real, real, virtual, real

(d) Virtual, virtual, real, virtual

Q 3 Which two pairs of figures are similar with respect to type of image formed

- (a) 1,3 and 2,4 (b) 1,4 and 2,3 (c) 1,2 and 3,4 (d) There are no such pairs

Q 4 A dentist examining a patient with a mirror, which figure exactly explains the phenomenon takes place in the mirror used by dentist

- (a) Figure 1 (b) Figure 2 (c) Figure 3 (d) Figure 4

Q 5 Type of mirrors used in figures 1, 2, 3 and 4 are respectively

- (a) Concave, concave, convex, concave (b) Concave, convex, concave, concave
(c) Concave, convex , convex,concave (d) Convex , convex, concave, concave

Q 6 “Mirrors are very useful in making many optical devices, equipments and consumer products” What is your opinion about this statement, rate it on 1-5 response scale and justify your response in three sentences only.

1 Strongly agree

2 Agree

3 Neutral

4 Disagree

5 Strongly disagree

Item Description:

Q no .	Question type	Competency	Knowledge	Context	Difficulty Level
Q 1	Simple MCQ	Explan phenomenon scientifically	Procedural	Personal	Low
Q 2	Complex MCQ	Explan phenomenon scientifically	Procedural	Personal	Medium
Q 3	Complex MCQ	Explain phenomenon scientifically	Procedural	Personal	Medium
Q 4	Simple MCQ	Explan phenomenon scientifically	Procedural	Personal	Medium
Q 5	Complex MCQ	Explain phenomenon scientifically	Procedural	Personal	Medium
Q 6	Likert Scaling (OpenEnded)	Interpret data And evidence scientifically	Epistemic	Global	Medium

Answer Key

1. a
2. a
3. a
4. d
5. b
6. Open Ended, Survey Based

Scoring Key

- Q1. 1 mark for correct answer and 0 mark for incorrect answer.
- Q2. 1 mark for correct answer and 0 mark for incorrect answer.
- Q3. 1 mark for correct answer and 0 mark for incorrect answer.
- Q4. 1 mark for correct answer and 0 mark for incorrect answer.
- Q5. 1 mark for correct answer and 0 mark for incorrect answer.
- Q6. No score , opinion based question

Source- NCERT Text Book Class 7

19. FORMS OF WATER

AREA: Environment

CLASS:7

CHAPTER NO-16

CHAPTER NAME: Water a precious resource

CONCEPT: Physical changes

LEARNING OUTCOMES:

Students will be able to explain existence of water in different states in nature.

Water can be found in the forms i.e, solid, liquid and gas. The solid form, snow and ice is present as ice caps at the poles of earth, snow-covered mountains and glaciers. Liquid water is present in oceans, lakes, rivers and even underground. The gaseous form is the water vapour present in the air. The continuous cycling of water among to three forms keeps the total amount of water on the earth content.

Questions:

- 1) In how many forms water can be found?
- 2) Which state of water is water vapour?
- 3) Molten lava pores a volcano. After a few hours the liquid lava hardens into a shiny gray rock. Which phase change has taken place?
- 4) An unopened bottle of water is taken out of the refrigerator and placed on a table, after a while, bottle is covered with droplets of water. What phase change has occurred?
- 5) What phases are shown in the three images below?



- a. Image 1 is gas, image 2 is liquid and image 3 is solid.
 - b. Image 1 is liquid, image2 is solid and image 3 is gas.
 - c. Image 1 is liquid, image 2 is gas and image 3 is solid.
- 6) What is the phase of water when its temperature is 150 degree Celsius?

Item description:

Q.No	Q.type	Competency	Knowledge	Context	Difficulty level
1.	Close constructed	Interpret data and evidence scientifically	Procedural	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	Low

Answer Key

1) Score 2 if the response is 3

Score 1 if the response is 2

Score 0 if the response is 1

2) Score 2 if the response is Gas

Score 0 for any other response

3) Score 2 if the response is Freezing

Score 1 if the response is Solid

Score 0 for any other response

4) Score 2 if the response is Condensation

Score 1 if the response is Liquid

Score 0 for any other response

5) Score 2 if the response is 2

Score 1 if the response is 3

Score 0 if the response is 1

6) Score 2 if the response is Gas

Score 1 if the response is Water Vapour

Score 0 for any other response

20. SIGNIFICANCE OF WATER

AREA: Natural Resources

CLASS:7

CHAPTER NO-10

CHAPTER NAME : WATER A PRECIOUS STORY

CONCEPT: Availability of water

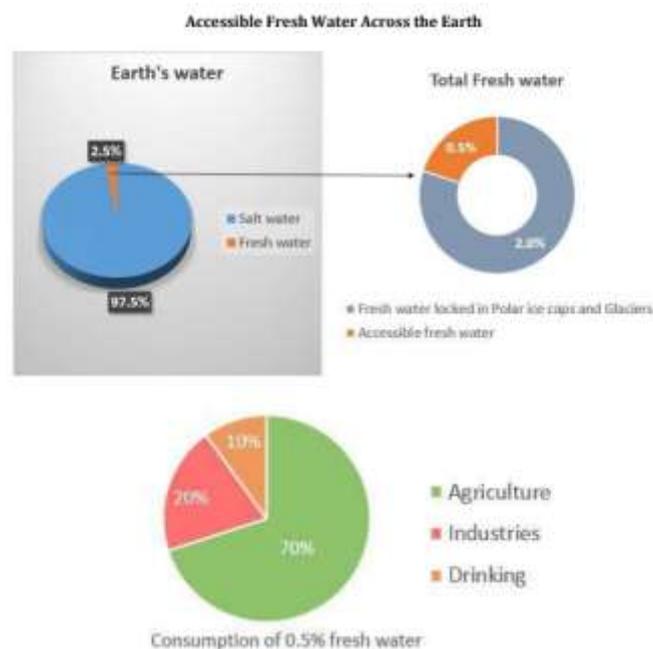
LEARNING OUTCOMES:

Students will be able to make efforts to protect environment, e.g. following good practices for water conservation.

Ref: International Journal of Innovative Studies in Sociology and Humanities (IJSSH) ISSN 2456-4931 (Online) www.ijissh.org Volume: 4 Issue: 4 | April 2019 Emerging Challenges of Water Scarcity in India: The Way Ahead Dr.Rajesh Kumar

Water is Life. Water is power. Water is the new oil of the contemporary era. Water is becoming, rapidly, scarce across the globe through overuse and contamination. As this issue becomes more acute, tensions will escalate and this will affect us all. But unlike oil, water is essential for survival of humanity. In the coming years, every country, including India, will have to determine how to treat water as an economic good, a human right, and a depleting resource.

Water covers 70 percent of our planet and it is easy to think that. However, freshwater, the stuff we drink, bath, irrigate our farm fields, is incredibly rare. Only 3 per cent of the world's water is fresh water, and two-thirds of that is tucked away in frozen glaciers or otherwise unavailable for our use. As a result, a total of 2.7 billion people find water scarce for at least one month of the year.



CAUSES OF WATER SCARCITY

- **Overuse of Water-** It may be overused on people, animals, land or any other number of things. It may also be used for recreational activities without any care about the effects that it may have on the world around them.
- **Pollution of Water-** Inadequate sanitation is also a major problem for 2.4 billion people and they are exposed to diseases such as cholera, typhoid and other water-borne illnesses. 2 million people, mostly children, die each year from diarrheal diseases alone.
- **Conflict-** If there is conflict over an area of land, it may be difficult to access the water that is located there
- **Drought-** A drought is an area which is not getting enough rainfall to be able to sustain the life that is residing there.
- **Agriculture** sector consumes more water than any other source and wastes much of that through inefficiencies.

Being Wise With Water

There is no new water in the world, we are using the same water that the dinosaurs used. Use as much water as you need but please don't waste it! Here are some top tips to save water...

- Leaving the tap running when brushing your teeth could waste 18 litres of water.
- Use a watering can rather than a hosepipe.
- Wash your vegetables in a bowl rather than under a running tap.
- You can add more ways.....

Questions

Q1. Water is the new oil of the contemporary world. Is it because it is becoming expensive or is it becoming scarce?

_____.

Q2. Our Planet is covered by 70% of water, still we face shortage, this is because

_____.

Q3. Amongst the human activities that use water _____ activity consumes maximum water.

Q4. Match the following

Water scarcity problems are due to:

a. Conflict	a. Less rainfall
b. Drought	b. City drain opening into a river
c. Agriculture	c. War is there between two nations
d. Pollution	d. Inefficient system of irrigation

Q5. In your opinion which of the following activities are wise ways of using water: say yes or no.

S.no	Activity	Yes/ No
1.	Washing of cars	
2.	Watering your plants with a hosepipe	
3.	Keep the tap running while brushing your teeth	
4.	Mopping your front area of the house instead of washing.	

Item description:

Q. No	Q Type	Competency	Knowledge	Context	Difficulty level
1	Close constructed	Explains phenomenon scientifically	Content	Global	low
2	Close constructed	Interprets data and evidence scientifically	Content	Global	Medium
3	Close constructed	Interprets data and evidence scientifically	Procedural	Global	Medium
4	Open ended	Evaluate and design scientific enquiry	Epistemic	Global	Medium
5	Open ended	Evaluate and design scientific enquiry	Procedural	Personal	Medium

Answer Key

1. The fresh water available on earth is already scarce and its availability is getting reduced due to human activities.
2. This is because the out of the total available water 97.5 % is salt water and the fresh water is only 2.5%.
3. Agriculture
4. Correct Match

a. Conflict	c. War is there between two nations
b. Drought	a. Less rainfall
c. Agriculture	d. Inefficient system of irrigation
d. Pollution	b. City drain opening into a river

5. In your opinion which of the following activities are wise ways of using water: say yes or no.

S.no	Activity	Yes/ No
1.	Washing of cars	No
2.	Watering your plants with a hosepipe	No
3.	Keep the tap running while brushing your teeth	No
4.	Mopping your front area of the house instead of washing.	Yes

21. GREEN COVER IN INDIA

AREA: Natural Resources

CLASS:7

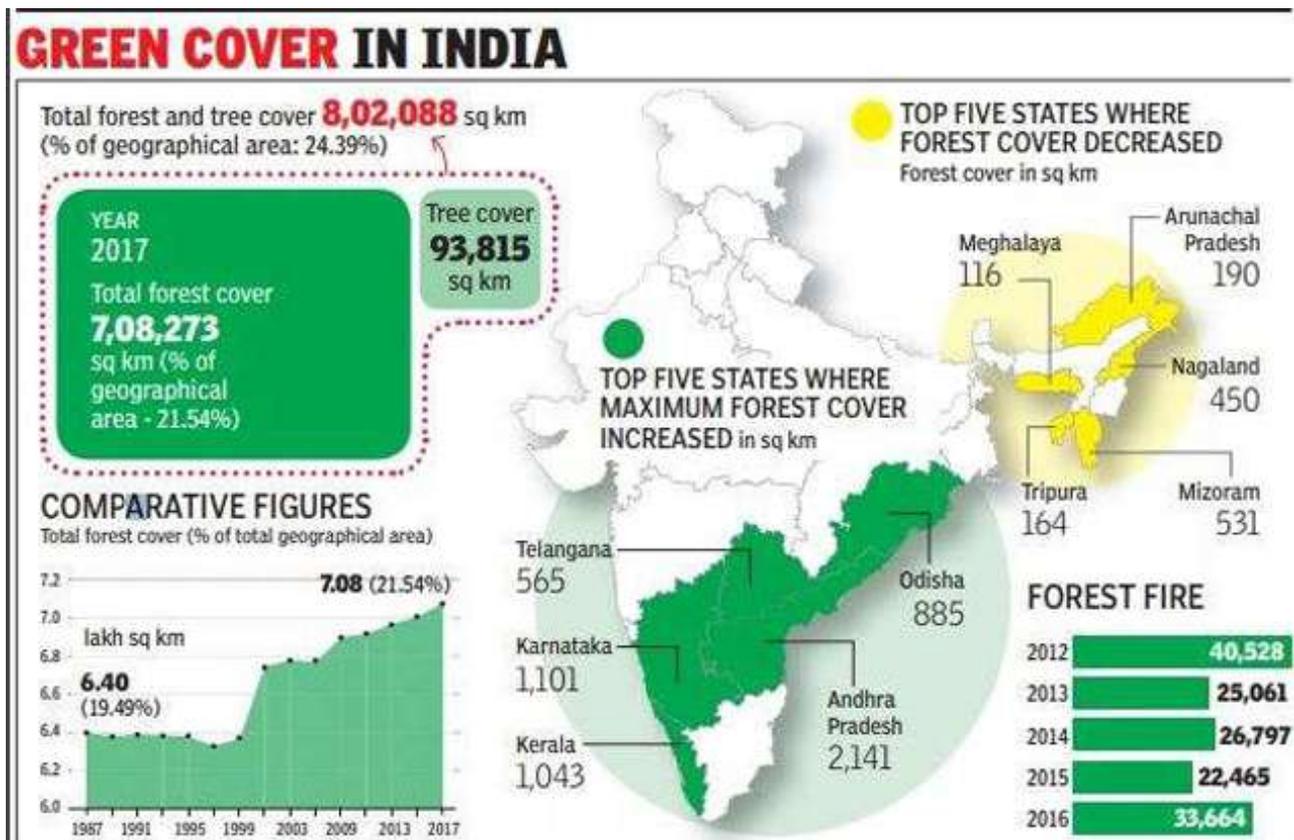
CHAPTER NO-17

CHAPTER NAME : FOREST our lifeline

CONCEPT:Forest exploration

LEARNING OUTCOMES: Students will be able to

1. Make effort to save the environment and efficient use of resources.
2. Simple investigation to find factors that can lead to decrease of forest cover globally
3. Read the data to do calculation of increase or decrease of forest cover
4. To prepare pie chart of the data given.



Source:

<https://www.insightsonindia.com/2018/07/09/insights-into-editorial-indias-forest-cover-what-data-shows/>

Global Forest Watch, (GFW)—a collaborative project of the University of Maryland, Google, USGS, and Nasa—suggests that **green cover has declined sharply in the country.**

Forest Survey of India employs satellite imagery to estimate “forest cover”, considering “all lands which have a tree canopy density of **more than 10%** when projected vertically on the horizontal ground, within a minimum areal extent of one hectare” as forests.

This definition fails to distinguish between **native forests and man-made tree plantations**, overstating the extent of forest cover.

While the Convention on Biological Diversity has a similar definition of forests, it mentions that the land in question should not be under agricultural or non-forest use

While the latest estimate of tree cover extent from GFW is of 2010, data on loss of forest cover is updated annually. The tree cover loss for Indian states shows an accelerating trend in recent years, with the heavily forested **north-eastern states, Odisha, and Kerala showing the greatest amount of tree cover loss in the period 2001-2017.**

However, the official data represents that **Kerala gained 30% forest cover** in the same period. This can be explained by the fact that Kerala is one of the **biggest producers of plantation crops in India**, with rapidly growing plantation crops likely compensating for the loss of native forest cover.

According to the GFW data, all states and union territories with the exception of Chandigarh show a **decline in the extent of tree cover** in the time period 2000-2010. In contrast, in terms of official data, 28 of 36 states and UTs have registered an increase in forest cover.

QUESTIONS

Q1. A forest cover be defined as

1. All trees which are projected vertically on the horizontal ground,
2. All land which have a tree canopy density of **more than 10%**
3. All Land area which shows distribution of trees.
4. All area except the water bodies are included as forest cover.

Q2. Which states have shown drastic decrease of forest cover in last 5 years

1. Kerala , Andhra Pradesh, Karnataka, Maharashtra
2. Meghalaya, Tripura, Arunachal Pradesh, Nagaland , Mizoram .
3. Punjab , Haryana, Himachal Pradesh, UP

Q3. Kerala had Forest cover loss in the period 2001-2017 . How could the loss of the state was compensated so fast and current data reveals that tree loss have been recovered?

Q4. From the data shown above kindly interpret the forest area cover in sq. Km from 1995 till 2017

Year	Total Forest Cover in sq. Km
1995	
1999	
2003	
2009	
2013	
2017	

Q5.a) Find out the states which have shown increase of the forest cover , till date as mentioned in the data provided above

SR.NO	STATE NAME	INCREASE OF FOREST COVER(sq. Km)

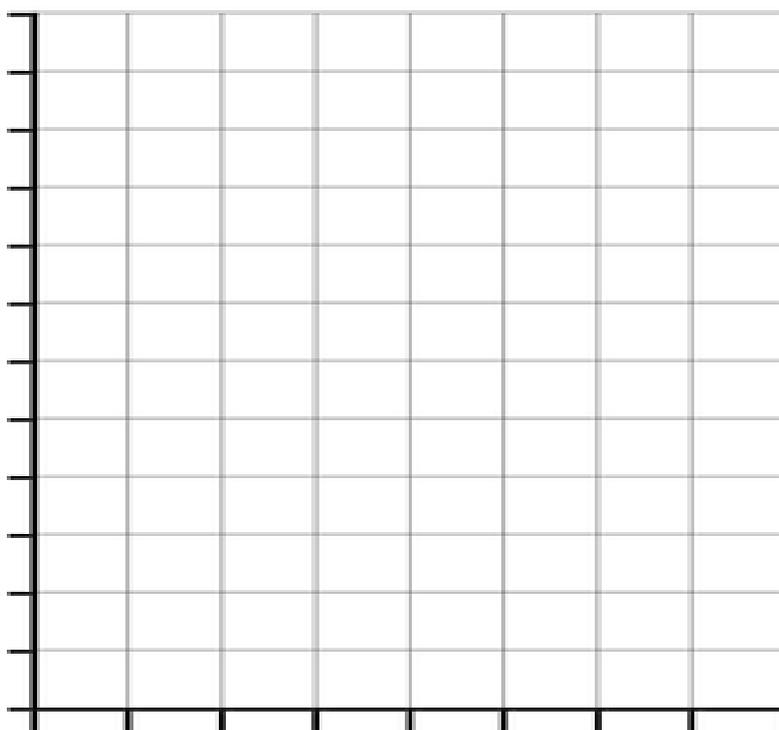
Q6. Find out the percentage increase of the forest cover of one state over the other state

SR.NO	% increase from one STATE over other STATE	INCREASE OF FOREST COVER(sq. Km)
1	Andhra Pradesh from Telengana	
2	Karnataka from Kerela	
3	Kerela from Odisha	
4	Odisha from Telangana	

Q7. Fill in the table with the appropriate information (ATTITUDE BASED)

SR.NO	Statement	Agree	Disagree	Partially Agree	Partially Disagree
1.	Forest Fires play a major role in the destruction of the forest cover of any area.				
2.	Citizens of any country doesnot contribute in the green growth of any place				
3.	As a citizen we all must pledge and take steps towards the green progress of our country				
4.	Tree Cover loss can be recovered in few months				
5.	Of all the union Territories ,Chandigarh outshines in the green cover growth.				

Q8 Prepare a Bar graph of the data provided in question no 5 below



Item Description:

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

Answer Key:

Ans1: option 1 and 2

Ans 2: option 2

Ans.3: Kerala is one of the **biggest producers of plantation crops in India**, with rapidly growing plantation crops likely compensating for the loss of native forest cover.

Ans 4.

Year	Total Forest Cover in sq. Km
1995	6.4
1999	6.4
2003	6.8
2009	6.9
2013	7.0
2017	7.08

Ans 5.

SR.NO	STATE NAME	INCREASE OF FOREST COVER(sq. Km)
1	Telangana	565
2	Odisha	885
3	Kerala	1043
4	Karnataka	1101
5	Andhra Pradesh	2141

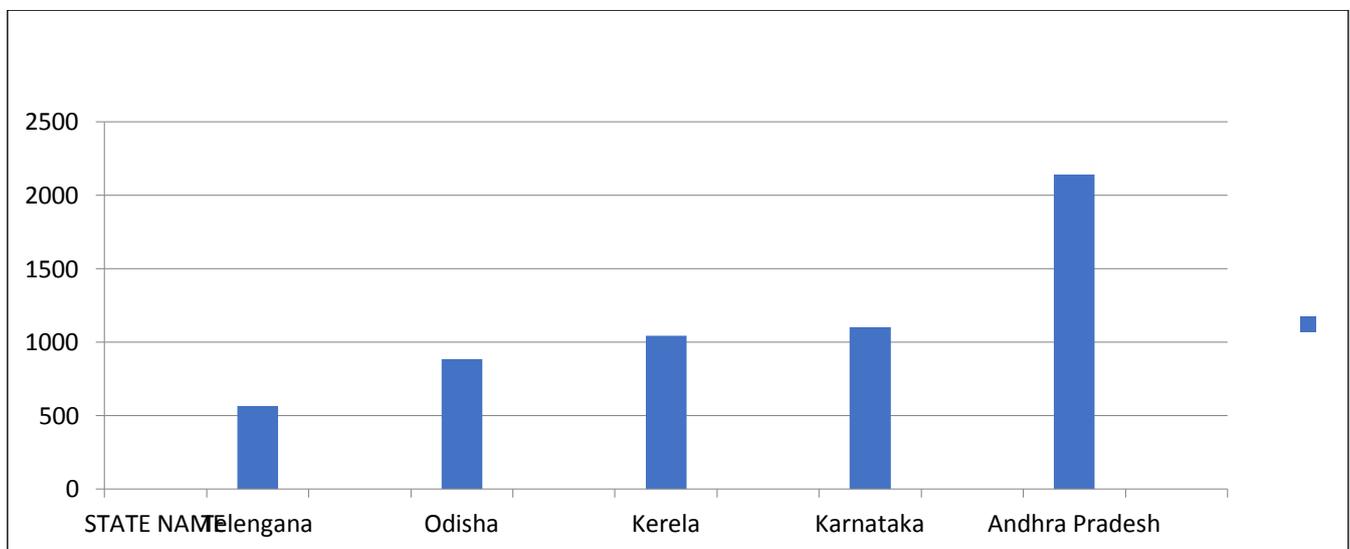
Ans 6.

SR.NO	Increase from one STATE over other STATE	INCREASE OF FOREST COVER (Km)
1	Andhra Pradesh from Telengana	$2141-1043=1098$ $1098/2141*100=51.28\%$
2	Karnataka from Kerela	$1101-1043=58$ $58/1101*100=5.26\%$
3	Kerela from Odisha	$1043-885=158$ $158/1043*100=15.14\%$
4	Odisha from Telangana	$885-565=320$ $320/885*100$

Ans. 7

1. Partially Agree
2. Disagree
3. Agree
4. Disagree
5. Agree

Ans 8. Bar chart



Scoring Key:

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

- PARTIAL CREDIT(1) If any three answers correct
NO CREDIT(0) no correct answer
6. FULL CREDIT (2) if all answers are correct
PARTIAL CREDIT(1) If any three answers correct
NO CREDIT(0) no correct answer
7. FULL CREDIT (2) if all answers are correct
PARTIAL CREDIT(1) If any three answers correct
NO CREDIT(0) no correct answer
8. FULL CREDIT (2) if Bar graph is shown
NO CREDIT(0) If Bar graph not drawn

22. WASTE WATER STORY-1

AREA: Environment

CLASS:7

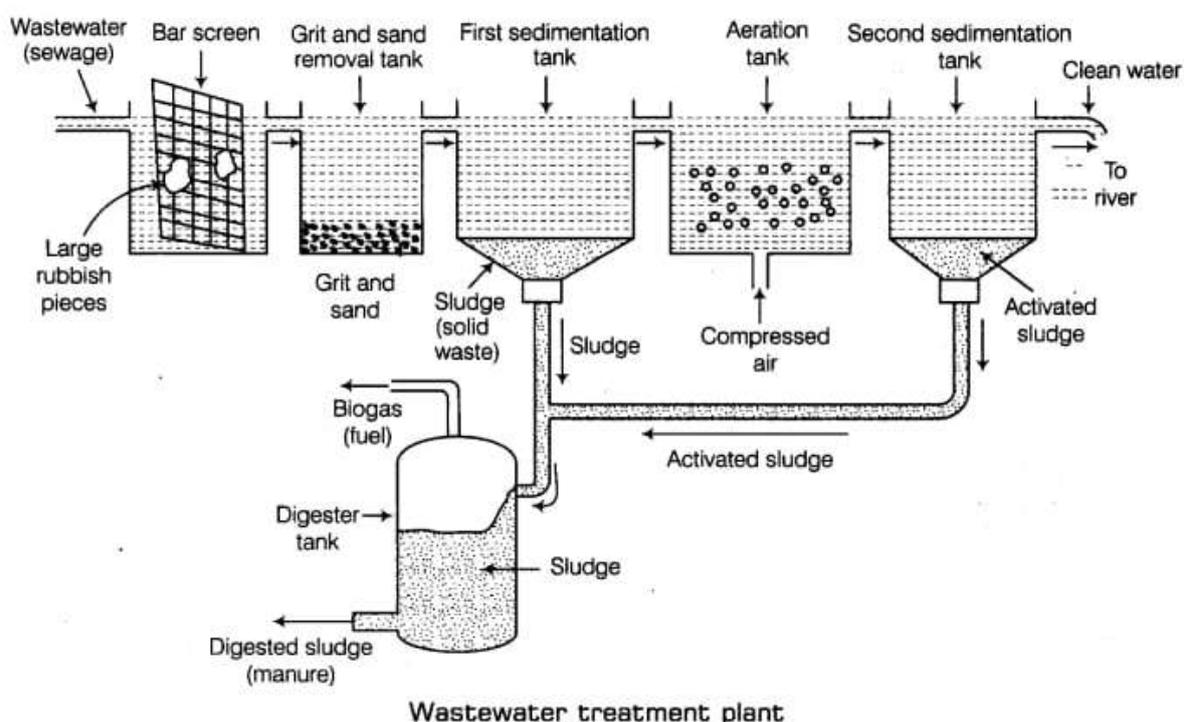
CHAPTER NO-18

CHAPTER NAME : WASTE WATER STORY

CONCEPT: waste water treatment plant

LEARNING OUTCOMES:

Students will be able to suggesting methods for treatment of polluted water for reuse.



Four common ways to treat wastewater include physical water treatment, biological water treatment, chemical treatment, and sludge treatment. Let us learn about these processes in detail.

Physical Water Treatment

In this stage, physical methods are used for cleaning the wastewater. Processes like screening, sedimentation and skimming are used to remove the solids. No chemicals are involved in this process.

One of the main techniques of physical wastewater treatment includes sedimentation, which is a process of suspending the insoluble/heavy particles from the wastewater. Once the insoluble material settles down at the bottom, you can separate the pure water.

Another effective physical water treatment technique includes aeration. This process consists of circulating air through the water to provide oxygen to it. Filtration, the third method, is used for filtering

out all the contaminants. You can use special kind of filters to pass the wastewater and separate the contaminants and insoluble particles present in it. The sand filter is the most commonly used filter. The grease found on the surface of some wastewater can also be removed easily through this method.

This uses various biological processes to break down the organic matter present in wastewater, such as soap, human waste, oils and food. Microorganisms metabolize organic matter in the wastewater in biological treatment. It can be divided into three categories:

Aerobic processes: Bacteria decomposes the organic matter and converts it into carbon dioxide that can be used by plants. Oxygen is used in this process.

Anaerobic processes: Here, fermentation is used for fermenting the waste at a specific temperature. Oxygen is not used in anaerobic process.

Composting: A type of aerobic process where wastewater is treated by mixing it with sawdust or other carbon sources.

Secondary treatment removes most of the solids present in wastewater, however, some dissolved nutrients such as nitrogen and phosphorous may remain.

Chemical Water Treatment

As the name suggests, this treatment involves the use of chemicals in water. Chlorine, an oxidizing chemical, is commonly used to kill bacteria which decomposes water by adding contaminants to it. Another oxidizing agent used for purifying the wastewater is ozone. Neutralization is a technique where an acid or base is added to bring the water to its natural pH of 7. Chemicals prevent the bacteria from reproducing in water, thus making the water pure.

Sludge Treatment

This is a solid-liquid separation process where the least possible residual moisture is required in the solid phase and the lowest possible solid particle residues are required in the separated liquid phase.

An example of this includes dewatering of sludge from industrial wastewater or sewage plant where the residual moisture in dewatered solids determines the disposal costs and the centrate quality determines the pollution load returned back to the treatment facility. You need to minimize both.

Q. No.1. In the above stimulus initially physical separation is being done by _____.

Q. No.2. In the diagram Bar screen carries out what process? Name the process.

Q. No.3. What is the composition of sludge?

Q. No.4. Which are the two oxidising agents used in purifying waste water?

Q. No.5. Which method is used as Anaerobic process in purifying water?

Q. No.6. Name the tank where Anaerobic process is being carried out in the diagram.

Item Description:

S.No	Question Type	Competency	Knowledge	Context	Difficulty Level
1	Close Constructed	Explained Phenomena Scientifically	Content	Global	Low
2	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Low
3	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
4	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
5	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
6	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium

Answer key:

Answer1: Score 2 if the answer is Bar screen.
Score 0 for any other answer.

Answer2: Score 2 if the answer is Physical process.
Score 0 for any other answer.

Answer3: Score 2 if the answer is soap, human waste, oils and food.
Score 0 for any other answer.

Answer4: Score 2 if the answer is chlorine and ozone.
Score 0 for any other answer.

Answer5: Score 2 if the answer is Fermentation.
Score 0 for any other answer.

Answer6: Score 2 if the answer is Digester tank .
Score 0 for any other answer.

23: WASTE WATER STORY -2

AREA: Environment

CLASS:7

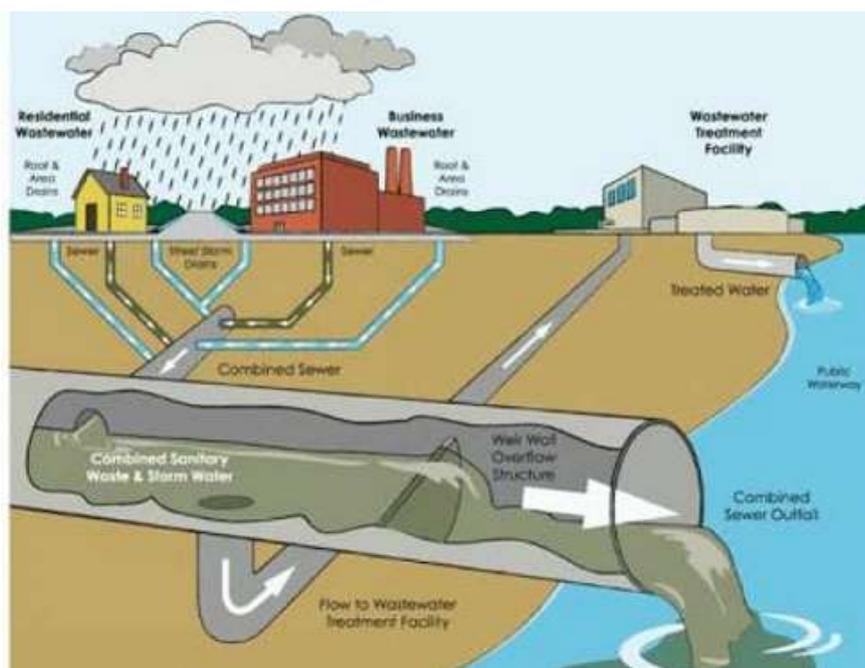
CHAPTER NO-18

CHAPTER NAME : WASTE WATER STORY

CONCEPT: Waste water treatment plant

LEARNING OUTCOMES:

Students will be able to suggesting methods for treatment of polluted water for reuse.



Study the above photograph in which the waste water from drains ,home and waste water treatment plant directly flown into the river water .As you can see in the figure there is a difference in the colour of the water which is being discharged in the river water Based upon the above stimulus give answer for the following questions:

Q1 Which component will be maximum in the water from factories?

A) the nitrogenous waste. B) chemicals. C). all of these

Q2 Which drain water will be the breeding ground for insects?

A) factory waste water B) household waste water C) both

Q3. Which type of drain water flown into river can cause waterborne disease?

A) household waste water B) factory drain water C)water from waste treated plant.

Q4. Which insoluble impurities will be present from the drain water coming from home?

A) oil B) paper napkin and leftover food C) urine.

Q5. Which type of water is responsible increasing the acid like nitrous acid and carbonic acid in river water?

A) water from home. B) rain water. C) both.

Q6. What is the advantage of waste water treatment plant ?

A) it removes nitrogenous waste B) it removes insoluble waste C) both.

Item Description:

S.No	Question Type	Competency	Knowledge	Context	Difficulty Level
1	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Low
2	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Low
3	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
4	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
5	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium
6	Close Constructed	Explained Phenomena Scientifically	Procedural	Global	Medium

Answer Key:

A1. FC. for OPTION B , NC for any other answer.

A2. FC-answerC . PC IF OPTION A or B.

A3. FC- option A , NC if any other option.

A4. FC options A and B. PC if A or B. NC if C.

A5. FC option B . NC if any other option.

A6. FC OPTION C, PC if options A and B