

**SCIENTIFIC
LITERACY
CORE GROUP**

**MODULE – 3
Class-VIII**

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1. MANURES VERSUS FERTILIZERS

Area : Crop Production & Management

Class – 8

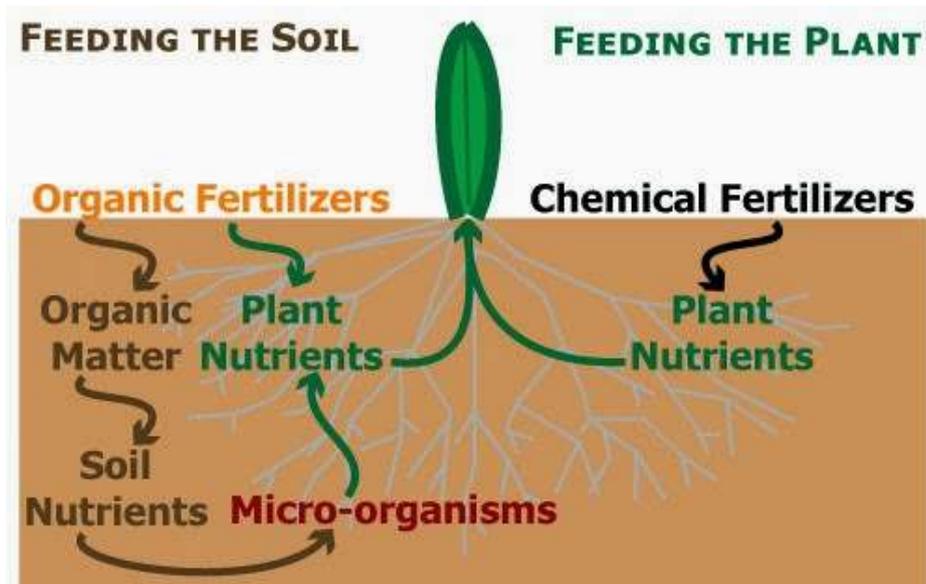
Chapter- 1

Chapter Name- Crop Production And Management

Concept : Manures versus Fertilizers

Learning Outcome:

Students will be able to interpret data shown in the picture scientifically



Q. 1. What do you understand by the phrases Feeding the soil and feeding the plant?

Q. 2. How are chemical fertilizers beneficial over organic ones?

Q. 3. Why is it advised to increase the microorganisms in the soil?

Q. 4. Which of the biochemically weathered constitutes soil?

- A. Upper
- B. Middle portion
- C. Lower portion
- D. Portion adjacent to bedrock

Q. 5. Manures are particularly beneficial as soil amendments because

- A. They contain higher concentrations of plant nutrients than most fertilizers
- B. Nitrogen contained in manure is less environmentally harmful than nitrogen contained in fertilizer
- C. They supply organic matter as well as plant nutrients
- D. Both B & C

Item description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	close constructed	Explain phenomenon scientifically	Content	Global	High
2	close constructed	Evaluate and design Scientific enquiry	epistemic	Global	Medium
3	Closed constructed	Evaluate and design Scientific enquiry	epistemic	Global	Medium
4	complex multiple choice	Evaluate and design Scientific enquiry	epistemic	Global	High
5	Simple multiple choice	Interpret data and evidence scientifically	Content	Global	Medium

Answer Key:

Answer 1: The better the soil, the better it is for our plants but the aim is to grow great plants and improving the soil quality. The quality of the soil will affect the plants grown, how well they thrive and the harvest yielded. All growers should put effort into improving their soil. Organic matter puts essential nutrients back in the soil, which in turn promotes healthy plant growth and an increase in the bacteria and microorganisms that help to transform those nutrients into forms that are available to plants.

Scoring: Full Credit – 1, Partial Credit – 1, No Credit- 0

Answer 2. Chemical fertilizers are rich equally in three essential nutrients (N,P,K)that are needed for crops and always ready for immediate supply of nutrients to plants if situation demands

Scoring: Full Credit – 1, Partial Credit – 1, No Credit- 0

Answer 3. These organisms are primary decomposers of organic matter, but they do other things, such as provide nitrogen through fixation to help growing plants, detoxify harmful chemicals (toxins), suppress disease organisms, and produce products that might stimulate plant growth.

Scoring: Full Credit – 1, Partial Credit – 1, No Credit- 0

Answer 4. Option A

Scoring: Full Credit – 1, No Credit- 0

Answer 5. Option D

Scoring: Full Credit – 1, No Credit- 0

2. CROP PRODUCTION: CONTROLLING PESTS

Area: Environment

Class – 8

Chapter- 1

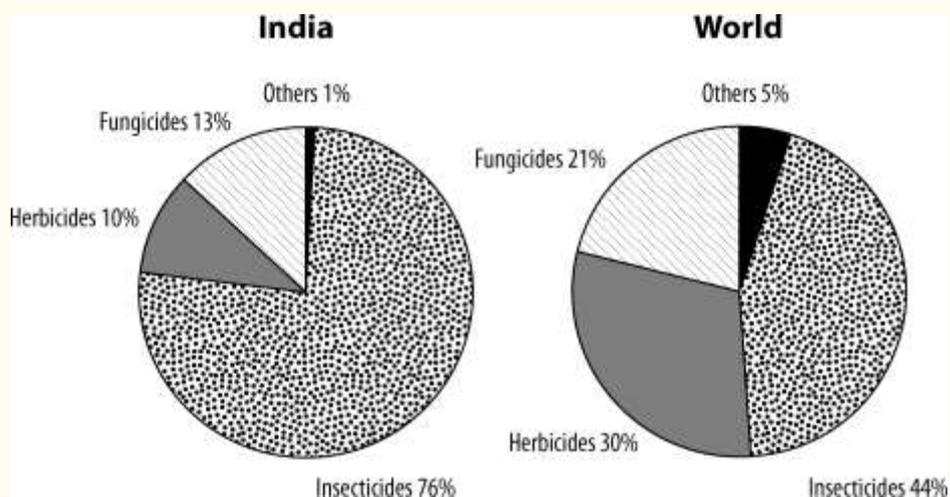
Chapter Name: Crop Production And Management

Concept: Pesticides

Learning Outcomes: Students will be able to

1. interpret data and evidence scientifically;
2. apply knowledge in day to day life

The term pesticide covers a wide range of compounds including insecticides, fungicides, herbicides, Nematicides, plant growth regulators and others. Among these, Organochlorine (OC) insecticides, used successfully in controlling a number of diseases, such as malaria and typhus, were banned or restricted after the 1960s in most of the technologically advanced countries. Organochlorines have extremely strong bonds between their chlorine and carbon components and are attracted to fats. They are also highly insoluble in water, meaning they don't dissolve. In many situations, when a pesticide is used, it also kills non-pest organisms. This can disrupt the balance of ecosystem. The benefits of pesticides include increased food production, increased profits for farmers and the prevention of diseases. Although pests consume or harm a large portion of agricultural crops, without the use of pesticides, it is likely that they would consume a higher percentage. Although there are benefits to the use of pesticides, there have also been many problems associated with their use. When pesticides are used, they do not always stay in the location where they are applied. They are mobile in the environment and often move through water, air and soil.



Answer the questions on the basis of your reading;

1) Organochlorine insecticides were used to control disease such as?

- a) Typhus b) chicken pox c) swine flu d) none of these

- 2) Why do you think that Organochlorine was banned?
- 3) How is the balance of ecosystem disrupted?
- 4) Can the mobility of pesticides be harmful? Give reason for your answer.
- 5) Which is the pesticide which was used maximum in India according to the graph?

Item Description

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

Answer Key:

A1-Typhus–option a

A2-Organochlorine would have been banned because it has really very strong bonds with carbon and chlorine components and are attracted to fats. It is highly insoluble in water which means that they don't dissolve and so can easily flow with water which can be harmful.

A3-Pesticides sometimes, can also kill non-pest organisms which leads to the disruption of the ecosystem.

A4-Yes, the mobility of pesticides can be harmful because the pesticides can move through air, water and soil. This can pollute these surroundings. The problem with mobility of pesticides is that they can come in contact with other organisms and can cause harm.

A5-insecticide-76%

3. USEFUL MICROORGANISMS

Area: Health

Class – 8

Chapter- 2

Chapter Name: Microorganisms: Friends And Foe

Concept: Role of Microorganisms

Learning Outcomes:

Students will be able to explain the role of microorganisms in day to day life.

Any entity that possesses characteristics of life such as the ability to reproduce, respond to environmental stimuli, constitutes a living organism. Furthermore, living organisms need sustenance to survive, hence they need to eat. Also, movement and mobility is a crucial aspect of an organism if it needs to acquire food.

Most organisms are visible to us. But some living organisms are extremely small, so a microscope is required to view them. These organisms are known as microbes or microorganisms and are single-celled or unicellular. They exist in nature in almost every habitat. They are ubiquitous.

“Microorganisms are minute organisms that are invisible to the naked eye.” Microorganisms are so small that they can only be seen under a microscope. These include a huge range of organisms such as bacteria, viruses, fungi, algae, protozoa, etc. These microbes can be beneficial as well as harmful in many ways. They can cause various diseases like Malaria, Dengue, Cold, Influenza etc. Some uses of microorganisms are:

A vaccine is an inactivated form of bacteria or virus that is injected into the body to simulate an actual infection. Because the injected microorganisms are 'dead,' they don't cause a person to become sick. Instead, vaccines stimulate an immune response by the body that will fight off that type of illness. First vaccine was discovered by Edward Jenner.

The medicines which kill or stop the growth of microorganisms in our body are called antibiotics. These are very useful to us as they prevent us from the effects of microorganisms. Antibiotics are made from bacteria and fungi. The penicillin is the first antibiotic which is discovered by Alexander Fleming in 1929.

Q.1 We should not allow mosquitoes to breed in our surroundings because they

- a) multiply very fast and cause pollution
- b) are vectors for many diseases
- c) bite and cause skin diseases
- d) are not important insects

Q.2 You are aware of Polio Eradication Programme in your city. Children are vaccinated because

- a) vaccination kills the polio causing microorganisms
- b) prevents the entry of polio causing organism
- c) it creates immunity in the body
- d) all the above

Q.3 Who discovered 'vaccine' for the first time?

Q.4 Name two diseases which can be prevented by using vaccines.

Q.5 What is an antibiotic? Give two examples.

Q.6 Name any two groups of micro-organisms from which antibiotics could be extracted.

Item Description

Q NO.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	Medium
2	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	Medium
3	Close constructed	Interpreting evidence	Content	Global	Low
4	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	High
5	Close constructed	Interpreting evidence	Content	Global	Medium
6	Close constructed	Interpreting evidence	Content	Global	Medium

Answer Key

- 1) B
- 2) C
- 3) Edward Jenner
- 4) Polio, Small pox
- 5) The medicines which kill or stop the growth of microorganisms in our body are called antibiotics. Streptomycin, Penicillin
- 6) Fungi and Bacteria

Scoring key

- 1 correct response – 1 point.
Any other response/ no response - 0 point.
- 2) correct response – 1 point.
Any other response/ no response - 0 point.
- 3) correct response – 1 point.
Any other response/ no response - 0 point.
- 4) correct response – 1 point.
Any 1 response – 1/2 point. (partial credit)
Any other response/ no response - 0 point.
- 5) correct response – 2 point.
For any 2 correct responses- Partial credit- 1 point
Any other response/ no response - 0 point.
- 6) correct response – 1 point.
Any 1 response Bacteria or fungi - ½ point(partial credit)
Any other response/ no response - 0 point.

4. TREATING AN INFECTION

Area : Health

Class – 8

Chapter- 2

Chapter Name: Microorganisms: Friends And Foe

Concept: Antibiotics

Learning Outcomes: Students will be able to

1. apply learning of scientific concepts in day to-day life,
2. discuss and appreciate stories of scientific discoveries;
3. relate processes and phenomenon with causes such as relating immunity with antibiotics.

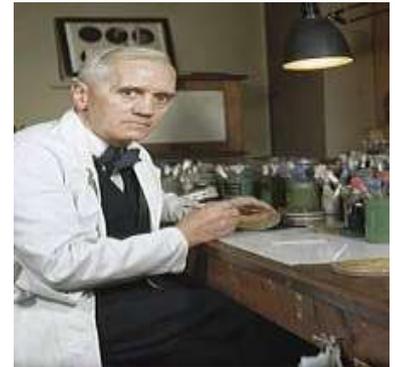
Antibiotics are powerful medicines that fight certain infections and can save lives when used properly. They either stop bacteria from reproducing or destroy them.

Before bacteria can multiply and cause symptoms, the immune system can typically kill them. White blood cells (WBCs) attack harmful bacteria and, even if symptoms do occur, the immune system can usually cope and fight off the infection.

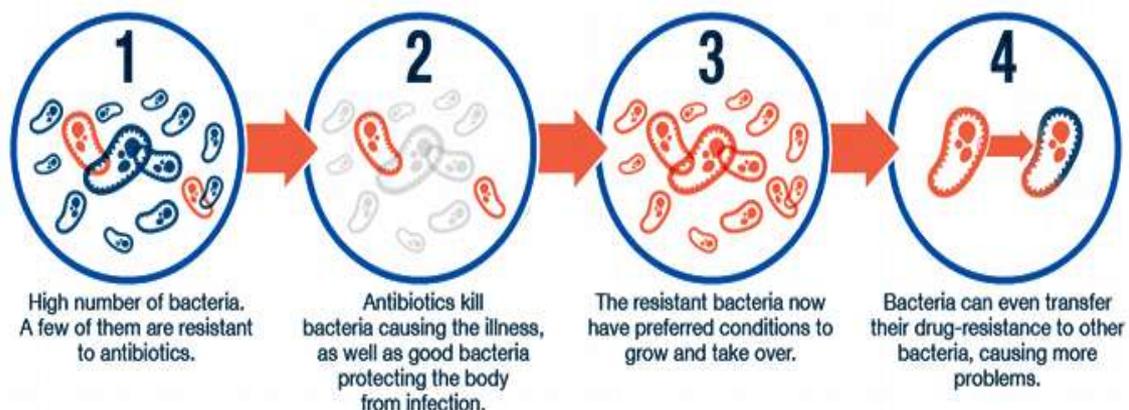
Sometimes, however, the number of harmful bacteria is excessive, and the immune system cannot fight them all. Antibiotics are useful in this scenario.

Antibiotics are strong medicines that treat bacterial infections. Antibiotics won't treat viral infections because they can't kill viruses. You'll get better when the viral infection has run its course.

Common illnesses caused by bacteria are urinary tract infections, strep throat, and some pneumonia. Antibiotics can treat bacterial infections by killing the bacteria that causes them. Some medical professionals have concerns that people are overusing antibiotics. They also believe that this overuse contributes toward the growing number of bacterial infections that are becoming resistant to antibacterial medications.



How does antibiotic resistance occur?



- 1)
 - a) Identify the personality.
 - b) What was his contribution in the field of biology?
 - c) Define the term given in answer (b).
 - d) What can be the sources of (b)?
 - e) Give 4 examples.
 - f) Give reason- It (b) should not be taken without the consult of a qualified doctor.
 - g) Is it safe to take antibiotics? Say yes/no. Justify your answer.

Item Description:

Q NO.	Q Type	Competency	Knowledge	Context	Difficulty Level
1 a	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	LOW
B	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	Medium
C	Close constructed	Interpreting evidence	Content	Global	Medium
D	Close constructed	Evaluating and designing scientific enquiry	Epistemic	Global	High
E	Close constructed	Explaining phenomena scientifically	Content	Global	Medium
F	Open ended	Evaluating and designing scientific enquiry	Epistemic	Global	High
G	Open ended	Explaining phenomena scientifically	Epistemic	Global	High

Answer Key:

- 1a) Alexander Fleming
- b) first antibiotic, penicillin
- c) Drugs which kill or stop the growth of other organisms.
- d) Bacteria and Fungi
- e) Penicillin, Streptomycin, Tetracycline, Chloromycetin.
- f) can kill good bacteria, antibiotic resistance.
- g) No, can lead to antibiotic resistance, antibiotic no longer show its effects.

Scoring key:

- 1 a) correct response – 1 point.
Any other response/ no response - 0 point.
- b) correct response – 1 point.
Any other response/ no response - 0 point.
- c) correct response – 1 point.
Any other response/ no response - 0 point.
- d) correct response – 1 point.
Any I response Bacteria or fungi- ½ point(partial credit)
Any other response/ no response - 0 point.
- e) correct response – 2 point.
For any 2 correct responses- Partial credit- 1 point
Any other response/ no response - 0 point.
- f) correct response – 1 point.
Any I response - ½ point(partial credit)
Any other response/ no response - 0 point.
- g) correct response – 1 point.
Any other response/ no response - 0 point.

5. VIRUS

Area: Health

Class – 8

Chapter- 2

Chapter Name: Microorganisms: Friends And Foe

Concept: Harmful Microorganisms

Learning Outcomes: Students will be able to

1. acquire knowledge about virus;
2. apply learning of scientific concepts in day to day life.

Viruses are found in all the ecosystems on Earth. They are microscopic organisms .They consist of nucleic acid covered with protein sheet. They reproduce only inside the cells of the host organisms which may be a bacterium, plant or animal.

1. Why viruses are considered as living as well as non living ?

.....
.....

Common ailments like cold ,influenza ,cough are caused by viruses. Serious diseases like polio, chicken pox are also caused by viruses. Covid 19, an infectious diseases caused by newly discovered virus, Corona virus. It causes mild to moderate respiratory ailment. Situation is more alarming for small children and old people and for those with medical problems like asthma, diabetes, cardiac and cancer. WHO has declared it pandemic.

2. What are the symptoms of corona virus infection.?

.....

3. What precautions should be taken to prevent corona virus infection?

.....
.....

Corona virus spreads through droplets of saliva or discharge from the nose when an infected person cough or sneeze.

4. Why is it necessary to wear a mask or to cover your mouth while talking to others ?

.....
.....

5. Read the following statements and mark aptly:

- a) N-95 mask gives better protection Agree/Disagree

- than cloth mask.
- b) Antibiotics drug works against bacteria Agree/Disagree
Not against viruses..
- c) You should self isolate Agree/Disagree
yourself if you have travelled
somewhere.

Item Description:

Q NO.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	Open constructed	Apply scientific Knowledge	Content	Global	LOW
2	Open constructed	Interpreting data scientifically	Content	Global	Medium
3	Open constructed	Interpreting evidence	Content	Global	Medium
4	Open constructed	Evaluating and designing scientific enquiry	Content	Global	High

Answer key:

Living : when present inside living cell

Nonliving : when present outside living cell

2 running nose, sore throat, dry cough, fever, difficulty in breathing

3 use mask, sanitizing, wash your hands for 20 sec with soap, social distancing, cover your mouth while coughing or sneezing

4 it is infectious and spreads through droplets of saliva

6. FOOD SPOILAGE

Area: Health

Class – 8

Chapter- 2

Chapter Name: Microorganisms: Friends And Foe

Concept : Preservation of food

Learning Outcomes : Students will be able to

1. acquire knowledge about bacteria;
2. interpret the content to understand the consequences of bacterial infection on food;
3. apply knowledge to day to day life.

KEEP FOOD SAFE TO PREVENT FOOD BORNE ILLNESS

Clean

Wash your hands with warm soapy water for at least 20 seconds before and after handling food, using the toilet, or after handling pets. Dry hands with a paper towel.



Meat, poultry, fish, dairy foods, fresh fruits and vegetables are favorite places for harmful bacteria to grow. These foods must be kept cold enough to keep bacteria away from growing and to keep foods safe.

160°-212°F	Hot enough to kill most harmful bacteria.
140°-160°F	Hot enough to kill most harmful bacteria from growing.
40°-140°F	Temperature Danger Zone- Most harmful bacteria grow best at these temperatures.
32°-40°F	Refrigerator temperature- Many harmful bacteria still grow, but at a slower rate.
-20°-0°F	Freezer temperature - Many harmful bacteria live, but they do not grow.

When in doubt, throw food out.



Cook

Use a food thermometer to measure the internal temperature of cooked foods. The colour of a food is not a reliable indicator of safety or thorough cooking.



Always wash, scrub, and rinse fruits and vegetables under running water just before eating them.



Chill

Never thaw or marinate food on the counter top at room temperature. Thaw foods in the refrigerator, in cold water, or in the microwave. Do not thaw frozen dinners before heating. Divide large amount of food into shallow containers for quicker cooling in the refrigerator.

Clean canned food lids before opening them

Store leftover food and unused canned goods in clean, sealed containers in the refrigerator. Leftovers should be eaten within 2 days.



Leftovers	165°F
Turkey, chicken and duck	165°F
Ground beef, pork, veal and lamb	160°F
Egg dishes (cook until yolk and white are firm)	160°F
Fish	145°F
Beef, pork, veal and lamb steaks, roasts, and chops (allow 3 minutes rest time)	145°F

source:- BIOLOGY TODAY

Q.1 How would you change the ways food is handled at home or restaurant and market?

A.1.....

Q.2 What are the symptoms of food borne illness?

A.2.....

Q.3 When in doubt, throw the food out. when and why?

A.3.....

Q.4 During pasteurization of milk, milk is boiled at 70°C for 15 to 30 seconds and then suddenly chilled and then stored.
 why immediate chilling and packaging of milk is necessary?

A.4.....

Q.5 How can you store cooked food for a longer period?

A.5.....

STATEMENT	STRONGLY AGREE	AGREE	STRONGLY DISAGREE	DISAGREE
At freezing temperature bacteria is killed				
There is certain temperature where harmful bacteria grows				
Most of the food items are safe between 160°F to 212°F				

Item description:

Q no.	Question type	Competency	Knowledge	Context	Difficulty level
1	Open ended	Evidence	Epistemic	Global	Medium
2	Close constructed	Scientific knowledge	Content	Global	Low
3	Open ended	Scientific knowledge	Epistemic	Global	Medium
4	Close constructed	Explain scientifically	Procedural	Global	Medium
5	Open ended				

Answer Key

A.1) Wash your hands before and after handling food. Always wash, scrub and rinse fruits and vegetables under running water before using.

A.2) Stomach ache, nausea, cramps, vomiting

A.3) When we are not sure whether the food is stale or not and when the food is 2-3 days old.

A.4) To destroy the bacteria immediate heating and cooling of milk is done.

7. PROPERTIES OF SELECTED FIBERS AND THEIR SIGNIFICANCE IN OUR DAILY LIFE

Area : : Frontiers Of Science And Technology

Class – 8

Chapter- 5

Chapter Name: Synthetic Fiber And Plastics

Concept : Properties of fibers

Learning Outcome: Student will be able to

1. classify materials based on properties/characteristics,
2. apply learning of scientific concepts in daily life.



S. No.	Property	Significance
1	Good conductor of heat	Fabrics are cool for summer wear
2	Low in elastic recovery	Fabrics wrinkle badly unless finished for recovery.
3	Absorbent	Absorb moisture, suitable for summer wear. Good for towels, diapers and handkerchiefs
4	Not attacked by moths.	Simplifies problems of storage
5	Can withstand high temperature.	Fabrics can be boiled to sterilize. Special precautions in ironing are not needed
6	Not greatly harmed by alkali.	Fabrics can be bleached, washed with strong soaps; not greatly damaged by perspiration.
7	Harmed by acids	Fruit stains must be removed immediately
8	Attacked by mildew	Avoid putting away soiled damp garments
9	Inflammable	Loosely constructed garments should not be worn near an open flame.
10	Economical	Can be mass produced for commercial purpose

Table: 1

Properties	Cotton	Wool	Acrylic	Polyester	Nylon
Tensile strength (g/denier)	3-5	1.0-1.7	4.0-5.0	4.4-6.6	4.7-5.6
Elongation percentage	4-8	25-45	20-50	15-30	25-30
Elastic recovery	0.74 at 2%	0.99 at 2%	0.80 at 2%	90-100 at 4%	100 at 8%
Strength, psi	40000-50000	59000-74000	44000-66000	78000-116000	68000-81000
Water absorbency	Highest	High	Low	Low	Low
Effect of age	Little	Little	Little	Little	Slight
Effect of sun	Weakened	Weakened	Resistant	Little	Weakened
Effect of dilute Acids at room temperature	Resistant	Resistant	Resistant	Resistant	Weakened
Effect of alkalis at room temperature	Susceptible	Susceptible	Resistant	Resistant	Weakened
Effect of organic solvents	Resistant	Resistant	Resistant	Resistant	Resistant
Dyeability	Good	Poor	Poor	Poor	Poor
Effect of heat	Decomposes on 149 ^o C	Decomposes on 130 ^o C	Sticking Point 235 ^o C	Sticking Point 240 ^o C	Melts at 263 ^o C
Cost of finished product	Costly	Costly	Economical	Economical	Economical

Table: 2

Natural and Synthetic fibres play a major role in our daily life. Nylon fibre is made from coal, water and air. Acrylic fabrics are made from a synthetic polymer called acrylonitrile. This type of fibre is produced by reacting certain petroleum or coal-based chemicals with a variety of monomers, which means that acrylic fabric is a fossil fuel-based fibre.

There is vast variety of synthetic fibres. They have several applications in our homes and industries. We can't think our life without these fibres. There are many properties which determine the usage of a particular fibre (natural/man-made). Some of these properties are flammability, Dye ability, Moisture Retention, Tensile Strength, Crease Resistance, Stiffness, Resistance to acids/bases, Luster and Action of Sunlight on the fibre. These properties of different fibres help us to use them appropriately for our advantage in an effective manner.

Some cosmetics or textiles especially synthetic are claimed to cause allergic reactions. If a person is allergic to such clothes than he/she should wear natural fibre made cloth (from cotton) as these are hypoallergenic in nature.

Using the data and information provided in above two tables answer the following questions:

Question 1: Why cotton clothes are preferred than synthetic or woollen clothes in summer days? Use the data given in above tables to support your views. (use Table 1 and 2)

.....

Question 2: Which fiber has highest melting point as per the data provided in the table 2?

.....

Question 3: What is the disadvantage of wearing cloth made from synthetic fiber in the kitchen?
 What type of cloth you should wear while cooking? (use Table: 2)

.....

Question 4: Which fiber/s is/are more susceptible to microbe's attack/ mildew in damp environment?
 Why particular fiber/s is more susceptible for microbe's attack/fungal infection than other fibres?

.....

Question 5: Match the information given in Column A with Column B using appropriate option.

Column A	Column B
Cotton cloth are though expensive but suitable for allergic persons or prone to such allergic reactions	Cotton fiber
Rain coat can't be made from cotton or wool	Polyester and Nylon
Cost effective fiber	Cotton and wool have high water absorbency and retention time.
fibers are crease resistance	Synthetic
Easily dye ability to any color with simple techniques	Natural fibers are hypoallergenic than synthetic fibers

Item Description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty Level
1	Open ended	Interpret data and evidence scientifically.	Content	Global	Low
2	Close ended	Interpret data and evidence scientifically.	Content	Global	Low
3	Close Ended	Interpret data and evidence scientifically	content	Global	Low
4	Close Ended	Explaining phenomenon scientifically.	content	Global	Medium
5	Closed ended	Interpret data and evidence scientifically.	content	Global	Low

Answers key:

1. Cotton clothes have highest water absorbency and they are good conductors of heat which help us to keep our body temperature comfortably low in summer days.
2. Nylon is having highest melting point as per the information provided in the table 2.
3. We should not wear synthetic fibre made clothes as they stick to our body on heating. So in case of fire, these cloth will do lot of damage to the skin. It is advisable to wear cotton clothes as these clothes don't stick to our skin on heating.
4. cotton fibre is sourced from plant and woolen from animal (sheep etc.) so they are vulnerable to mildew or microbe's attack in damp environment. Synthetic fibres are generally immune to such attacks.
- 5.

Column A	Column B
Cotton cloth are though expensive but suitable for allergic persons or prone to such allergic reactions	Natural fibres are hypoallergenic than synthetic fibres
Rain coat can't be made from cotton or wool	Cotton and wool have high water absorbency and retention time.
Cost effective fibre	Polyester and Nylon
fibres are crease resistance	Synthetic
Easily dyeability to any colour with simple techniques	Cotton fibre

8. METALS AND NON METALS - I

Area : : Frontiers Of Science And Technology

Class – 8

Chapter- 4

Chapter Name: Materials: Metals And Non-metals

Concept : Chemical Properties of Metals and Non Metals

Learning Outcomes: Students will be able to understand chemical properties and uses of metals and non metals.



On burning, metals react with oxygen to produce metal oxides which are basic in nature. Non-metals react with oxygen to produce non-metallic oxides which are acidic in nature. Some metals react with water to produce metal hydroxides and hydrogen gas. Generally, nonmetals do not react with water. Metals react with acids and produce metal salts and hydrogen gas. Generally, non-metals do not react with acids. Some metals react with bases to produce hydrogen gas. More reactive metals displace less reactive metals from their compounds in aqueous solutions. Metals and non-metals are used widely in our daily life. Metals are used in making machinery, automobiles, jewellery, aeroplanes, trains, satellites, industrial gadgets, cooking utensils, water boilers, etc. Non-metals are also essential for our life for e.g oxygen being inhaled by all living beings during breathing. Non-metals are used in fertilisers to enhance the growth of plants, in water purification process, as an antiseptic in crackers and so on.

Q1. The most abundant metal in earth's crust is

- a) Cu b) Al c) Fe d) Zn

Q2. Purity of Gold is 15 carat, what is the percentage of gold in the ornaments ?

Q3. White Phosphorous has to be kept in water. Why ?

Q4. One day Sheetal went to jeweller's shop with her mother. Her mother gave an old Gold jewellery to the Goldsmith to polish it. Next day when they brought back the jewellery, they found a slight loss in its weight. Suggest a reason for the loss in weight.

Q5. When elements burn in air, they react with oxygen to form oxides. Complete the following sentences:

i) If metal oxides dissolve in water they formsolution ii).....oxides dissolve in water to form acidic solutions.

Q6. Show two major copper producing countries on world map.

Item Description:

S.No.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	Simple mcq	Interpret data and evidence Scientifically	Content	Global	medium
2	Close constructed	Explain phenomenon scientifically	Content	Global	medium
3	Close constructed	Explain phenomenon scientifically	Content	Global	medium
4	Open ended	Explain phenomenon scientifically	Content	Global	Medium
5	Close constructed	Interpret data and evidence Scientifically	Content	Global	medium
6	Open ended	Interpret data and evidence Scientifically	Content	Global	high

Answer key:

1 Aluminium

2 62.5%

3 to prevent its contact with air as it is highly reactive

4 The Goldsmith must have used aqua-regia(3:1 ratio HCl &HNO₃)in which some of gold must have been dissolved

5 i) basic oxides ii) Non metal

6.Chile , Peru , China ,Australia

9. METALS AND NON METALS - II

Area : : Frontiers Of Science And Technology

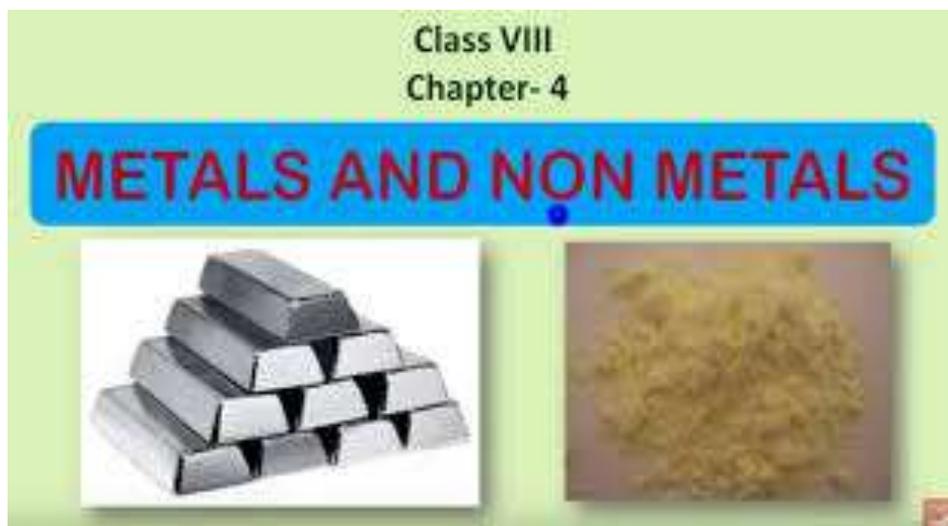
Class – 8

Chapter- 4

Chapter Name: Materials: Metals And Non-metals

Concept : Physical Properties of Metals and non-metals

Learning Outcomes : Students will be able to differentiate metals and nonmetals on the basis of their physical properties.



Elements have unique physical and chemical properties, which make them useful for specific purposes in our everyday world. All known elements can be Learning Outcomesified as metals, non-metals, or metalloids according to the substance's specific physical and chemical properties.

Physical properties: are properties that can be observed without changing the identity of a substance and chemical properties are properties that are observed while altering, or changing, the identity of the substance involved.

Metals and non-metals are separated by the zigzag or stair-step line on the periodic table. Most elements are classified as metals, which are located from the center to the left side of the zigzag line. Metals are elements that are usually silver-gray in colour, with the exception of copper and gold. All metals are solid at room temperature except mercury, which is a liquid. Metals have a lustrous or shiny appearance and reflect light when polished. They can be bent or hammered flat (malleable), can be drawn into wire(ductile), are good conductors of heat and electricity, usually show reaction with acids, and generally have high melting points (many above 800°C). Non metals are found to the right of the zigzag line on the periodic table. There are fewer non-metals than metals. Non-metals are usually dull in appearance and do not reflect light. Many are brittle, and therefore cannot be hammered into sheets. Non-metals are poor conductors of electricity and heat, show little or no reaction with acids, and generally have low melting points. At room temperature, non-metals can exist as either solids or gases, with the exception of bromine, which is a liquid. Elements found along both sides of the zigzag line are called metalloids, with the exception of aluminium. Metalloids are elements that show properties of both metals and non-metals.

Q 1. What are the name of elements which show properties of both metals and non metals? .

Q 2. Metals can exist in all three states of matter- solid, Liquid and gas.True or False

Justify.

Q 3. Why cooking utensils are made of metals but their handles are made of wood/plastic?

Q 4. Which of the following can be beaten into thin sheets?

(a) Zinc (b) Phosphorus (c) Sulphur (d) Gold

Q 5. Which of the following statement is correct ?

(a) All metals are ductile.

(b) All non-metals are ductile.

(c) Generally, metals are ductile.

(d) Some non-metals are ductile.

Item Description:

Q No.	Q Type	Competency	Knowledge	Context	Difficulty level
1	Close constructed	Explain phenomenon scientifically	Content	Global	Low
2	Open ended	Evaluate and design scientific enquiry	procedural	Global	High
3	Close constructed	Explain phenomenon scientifically	Content	Global	Medium
4	Complex MCQ	Explain phenomenon scientifically	Content	Global	Medium
5	Simple MCQ	Explain phenomenon scientifically	Content	Global	Medium

Answer Key:

1. Metalloids

2. True

3. Metals-conductors Wood-insulator

4. Score -2 for **a** and **d**

Score-0 for any other ans.

5. Score – 2 for **c** and score -0 for any other

10.COAL AND PETROLEUM

Area : Frontiers Of Science And Technology

Class – 8

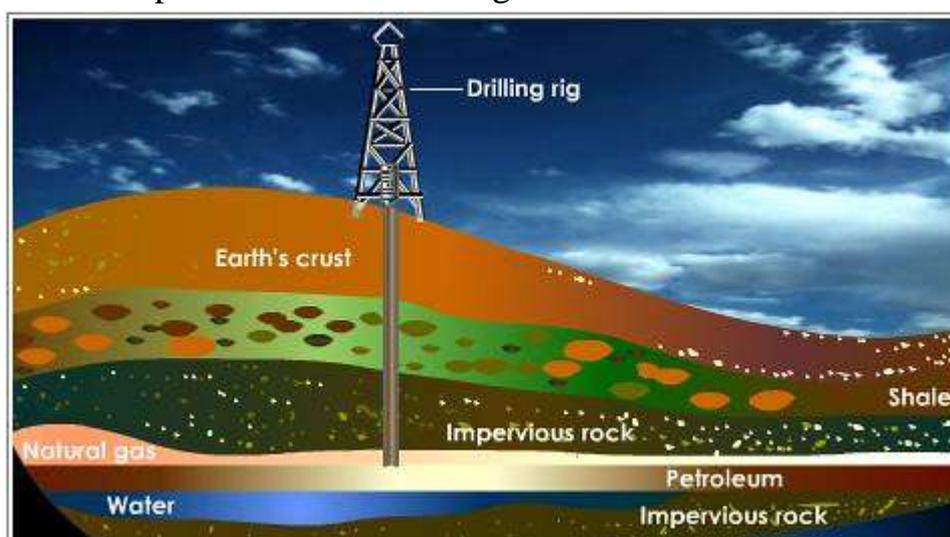
Chapter- 5

Chapter Name - : Coal and Petroleum

Topic : Coal and Petroleum

Learning Outcomes: Student will be able to

1. apply learning scientific concepts in daily life ,
2. discuss and appreciate stories of scientific discoveries;
3. differentiate between exhaustible and non exhaustible resources;
4. understand the phenomenon of making fossil fuels



Exhaustible natural resources like coal, petroleum and natural gas were formed from the dead remains of living organism (fossils). So, these are called fossil fuels. Coal and petroleum are very important natural resources and play a vital role in modern society. They are found in the earth's crust..Natural gas was formed millions of years ago along with petroleum when microscopic sea plants & animals died & got buried under the sand & mud. These plants & animals under anaerobic conditions changed to gas. when natural gas is compressed at high pressure then it is called CNG (compressed natural gas). CNG is used for power generation. It is now being used as a fuel for transport vehicles because it is less polluting. The great advantage of CNG is that it can be used directly for burning in homes and factories where it can be supplied through pipes.It is generally found trapped between impervious rocks, sometimes along with petroleum & sometimes without petroleum.In our country, natural gas has been found in Tripura, Rajasthan, Maharashtra and in the Krishna Godavari Delta.Many useful substances are obtained from petroleum which can be used for the manufacture of detergents, fibers (polyester, nylon, acrylic etc.) polyethene and many other plastics.Due to its great commercial importance, petroleum is also called Black Gold.It is believed that it took millions of years for the dead organisms to change into coal, petroleum or natural gas. Furthermore, their known reserves are limited. Another problem with fossil fuels is that they are steadily increasing air pollution, their use is linked to global warming. So, it is important that we use

fuels only when it is absolutely necessary. For energy purpose, we must look for alternative sources, such as solar energy, tidal energy, wind energy, etc. Furthermore, fossil fuels will be available to future generations for more useful products. In India, the Petroleum Conservation Research Association (PCRA) offers the following tips to conserve petrol & diesel while driving. (1) Drive at a constant & moderate speed as far as possible. Driving at a high speed or slow speed wastes a lot of fuel. (2) Switch off engine if you have to wait at traffic lights or for any other reason. (3) Check the tyre pressure regularly, low pressure or too high pressure waste fuel. (4) Make sure that you send your vehicle to garage for regular maintenance.

- Q1 Why Petroleum is called Black Gold ?
- Q2 What are fossil fuels and why are these called so ?
- Q3 We should use fossil fuels judiciously ? Justify the statement.
- Q4 Which statement is incorrect regarding CNG:
- a) It is inexhaustible resource of energy.
 - b) It is found trapped between impervious rocks along with petroleum.
 - c) CNG is used for power generation.
 - d) It can be used directly for burning in homes and factories.
- Q5 Mention few methods to conserve Petrol and diesel.
- Q6 Where can we find natural gas in India?
- Q7 Show major petroleum producing countries on world map.

Answer Key:

1. Due to its great commercial importance, petroleum is also called Black Gold.
 - a. Coal, petroleum and natural gas. As these were formed from the dead remains of living organism so, these are called fossil fuels.
 - b. It is believed that it took millions of years for the dead organisms to change into coal, petroleum or natural gas. Furthermore, their known reserves are limited. Another problem with fossil fuels is that they are steadily increasing air pollution, their use is linked to global warming. So, it is important that we use fuels only when it is absolutely necessary.
2. a)
- 6 Natural gas has been found in Tripura, Rajasthan, Maharashtra and in the Krishna Godavari Delta.
7. Saudi Arabia , Canada ,Iran and Iraq.

Item description:

S.No.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	Close constructed	Explain phenomenon scientifically	Content	Global	medium
2	Close constructed	Explain phenomenon scientifically	procedural	Global	medium
3	Open Ended	Interpret data and evidence Scientifically	Procedural	Global	medium
4	Simple Mcq	Explain phenomenon scientifically	Content	Global	Medium
5	Open ended	Interpret data and evidence Scientifically	content	Global	medium
6	Close constructed	Interpret data and evidence Scientifically	content	National	High
7	Open ended	Interpret data and evidence Scientifically	procedural	Global	High

11.COAL AND ITS PRODUCTS

Area : Frontiers Of Science And Technology

Class – 8

Chapter- 5

Chapter Name: : Coal and Petroleum

Topic : Coal and Petroleum

Learning Outcomes-Students will be able to

1. Classify different types of coal;
2. Differentiate between coke, coal and coal gas
3. Apply knowledge to day to day life i.e. pollution



Coals are classified into three main ranks, or types: lignite, bituminous coal, and anthracite. These classifications are based on the amount of carbon, oxygen, and hydrogen present in the coal. Coal is defined as a readily combustible rock containing more than 50% by weight of carbon. Coals other constituents include hydrogen, oxygen, nitrogen, ash, and sulphur.

Lignite - It has the lowest heating value and lowest carbon content. Although lignite is more solid than peat it crumbles when shipped long distances. Lignite is used to generate electricity. Other uses include generating synthetic natural gas and producing fertilizer products.

Bituminous -It is intermediate in rank and sometimes called soft coal. It appears smooth when you first see it, but look closer and you'll find it has many layers. It is the most abundant kind of coal. It has a high heating value, but it also has a high sulphur content.

Anthracite -It is the highest rank of coal which means that it has the highest heating value and highest carbon content. It is very hard, deep black, and looks almost metallic because it is brilliantly glossy. Anthracite burns longer, with more heat and with less dust and soot than other types of coal. The primary market for anthracite is for heating homes.

Coal is one of the most useful fossil fuels. It has many applications such as producing heat for households, firing industrial generators, manufacturing cast iron, etc. It can also be produced in the industry to obtain products like coke, tar and coal gas. These by-products are beneficial to us too.

Coke: Coke is a high-carbon product obtained by the destructive distillation of coal. The amount of carbon content in coke is so high that it is said to be an almost-pure form of carbon. Coke is greyish-black in colour and is a hard, porous solid.

Coal tar: It is obtained as a by product in the process of making coke. Though its colour is the same as coke, tar is a highly viscous liquid. It also has an extremely unpleasant smell.

Coal gas: This is also obtained as a by product while producing coke, and again, just like tar, its smell is not very pleasant. It is a highly flammable gas as the main component of it is methane.

Question/Ans

1. When coal burns in air then
 - A. Carbon dioxide is formed
 - B. Sulphur dioxide is formed
 - C. Carbon monoxide is formed
 - D. Hydrogen is formed

2. Carbonisation is
 - A. Slow conversion of dead vegetation into coal
 - B. Deposition of soil
 - C. Falling of tree
 - D. None

3. Coal is produced in industry to get
 - A. Coke
 - B. Coal tar
 - C. Coal gas
 - D. All above

4. Which is an almost pure form of carbon?
 - A. Coke
 - B. Coal tar
 - C. Coal gas
 - D. None of these

5. The characteristic of coke is
 - A. Tough
 - B. Black in colour
 - C. Porous
 - D. All of above

6. Which type of coal has the highest carbon contents?
 - A. Lignite
 - B. Bituminous
 - C. Anthracite

D. None

7. Can coal be prepared in the laboratory from dead and decaying matter? Explain

Item description :

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

Answer key

1. Full credit if response is A
No credit for any other response
2. Full credit if response is A
No credit for any other response
3. Full credit if response is D
No credit for any other response
4. Full credit if response is A
No credit for any other response
5. Full credit if response is D
No credit for any other response
6. Full credit if response is C
No credit for any other response

12.COMBUSTION

Area : Frontiers Of Science And Technology

Class – 8

Chapter- 6

Chapter Name: Combustion and Flame

Topic: Combustion and Flame

Learning Outcomes- Students will be able to-

1. explain the concept of combustion.
3. apply knowledge to day to day life

Combustion is a chemical reaction commonly referred to as "burning." In the most general sense, combustion involves a reaction between any combustible material and an oxidizer to form an oxidized product. It usually occurs when a hydrocarbon reacts with oxygen to produce carbon dioxide and water and energy is released

Combustion is an exothermic reaction. Sometimes the reaction proceeds so slowly that the change in temperature is not noticeable. Combustion doesn't always result in fire, but when it does, a flame is a characteristic indicator of the reaction.

Q1. In which of the following situations match stick will get ignited when rubbed against the side of match box and justify.

- a) Friction heats the head of match stick to a temperature where chemical reacts and more heat is generated
- b) If the chemicals on head of match stick or rough side of match box or both are moist friction doesn't raise the temperature

Q2. Encircle Yes or No in the following giving suitable justification to your answer

- a) Aerobic respiration is a slow combustion process Yes/ No
- b) Anaerobic respiration is a slow combustion process Yes /No

When fires occur on earth the combustion gases rise as they are hot and light. As the flame goes up, more air is sucked into the base of the fire, feeding more oxygen to the fire and making it burn more strongly.

In space fires don't go up and the fire has a harder time obtaining a supply of oxygen. In the microgravity of the orbiting space shuttle, oxygen molecules can only get to a fire by either being pushed into it by something like a fan--which would take the place of the suction of air into the fire on the earth--or by diffusing

The diffusion process is slower than the suction created by flames on earth. The result is that the combusting gases also have to diffuse outward to obtain new oxygen, so the fire becomes bigger. But as its area grows in size, more heat is lost through radiation. If enough heat is lost the burning

material will be cooled below its ignition temperature, and the fire will go out. This usually doesn't happen on the earth because air is drawn in fast enough to supply the fuel.

Q3. Which of the following options for variation in candle flame on earth and space you Agree and Disagree

a) Earth	Shape of flame is like tear drop and yellow in colour	Convection process occurs	Flame is hot
b) Space	Shape of flame is spherical and blue in colour	Convection process doesn't occur	Flame is cool
c) Earth	Shape of flame is like a tear drop and blue in colour	Convection process doesn't occur	Flame is hot
d) Space	Shape of flame is spherical and yellow in colour	Convection process doesn't occur	Flame is hot

Answer key /Scoring

Ans1. a) As heat generated is enough to reach the ignition temperature so match stick gets ignited

For correct option and correct justification score 1

Ans 2 a) Yes b) No

Reason for(a) is that aerobic respiration occurs in presence of oxygen i.e the food/glucose gets oxidized

(b) Reason for b is that anaerobic respiration occurs in absence of oxygen

If both parts of answer along with reasoning are correct then score is 1

Ans 3. a)agree b) agree c) disagree d) disagree score 1 if all correct

Item Description:

S.No	Question Type	Competency	Knowledge	Content	Level
1	Closed constructed	Explaining scientific phenomenon	Global	Content	Medium
2	Closed constructed	Explaining scientific phenomenon	Global	Content	Medium
3	Closed constructed	Explaining scientific phenomenon	Global	Content	Medium

13.DEFORESTATION

Area: Environment

Class – 8

Chapter- 7

Chapter Name: Conservation Of Plants And Animals

Concept: Consequences of Deforestation

Learning Outcomes: Student will be able to

1. evaluate content;
2. apply knowledge to day to day life by making efforts to protect environment and suggest ways to cope with environment hazards

Deforestation is the permanent removal of trees to make room for something besides forest This can include clearing of land for agriculture or grazing, using timber for fuel , construction or manufacturing. Forests cover 31% of the land area on our planet. They help people thrive and survive by purifying water and air or by providing jobs to many people. Many animals also rely on forests. Forests play a crucial role in mitigating climate change because they act as Carbon Sinks-soaking up cabondioxide that would otherwise be free in atmosphere and contribute to ongoing changes in climate patterns.

1. Deforestation is.....

2. How forests act as Carbon Sinks?

.....

3. What’s the effect of deforestation on climate patterns of the earth?

.....

4. Suggest measures that can be adopted to stop deforestation?

.....

5. Answer in yes or no.

a)Forests help in balancing water cycle.

b)Green house gases are released by forests in atmosphere.

Item Description:

1.	Interpret content	Closed constructed	Content based	Low	
2.	Apply knowledge	Open ended	Global	Medium	
3.	Evaluate	Open ended	Global	Medium	
4.	Evaluate and design	Open ended	Global	High	
5.	Apply knowledge	Open ended	Global	Medium	

Answer key

- 1 cutting down of trees for land usage for our own benefit
2. by absorbing carbon dioxide from atmosphere
3. increase in temperature by increase in green house effect
4. implementation of strict laws, awareness, more jobs in forestry
5. a) yes
b) No

14. FOREST FIRES

Area : Environment

Class – 8

Chapter- 7

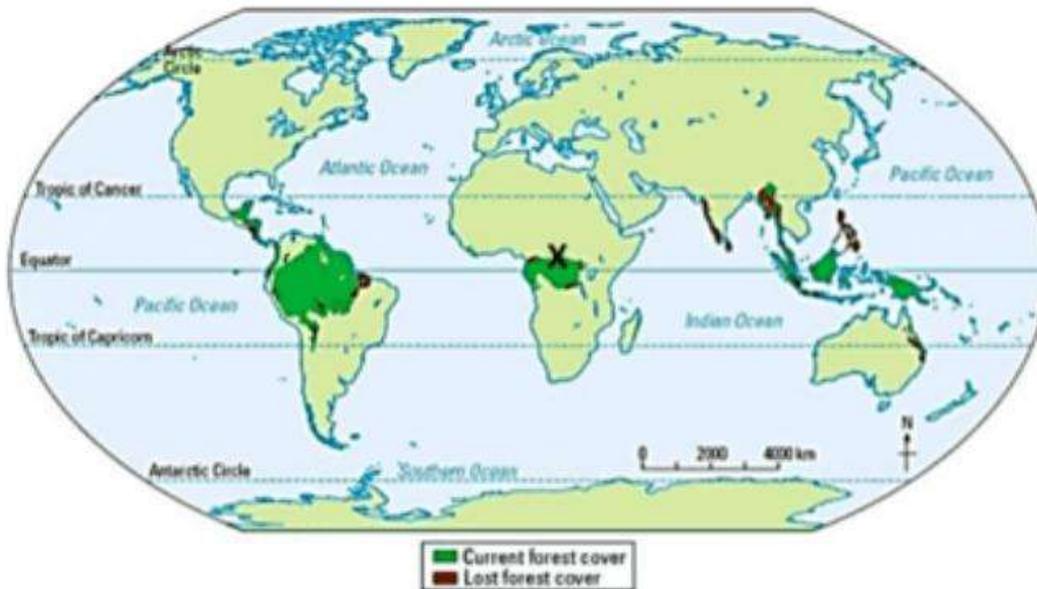
Chapter Name: Conservation Of Plants And Animals

Concept: Consequences of Deforestation

Learning Outcomes: Students will be able to

1. make efforts to protect environment,
2. suggest ways to cope with environmental hazards like forest fires;
3. interpret content to understand the consequences of deforestation;
4. classify different types of rain forests.

1. Identify the tropical rain forest labeled as 'X' in the given figure.
 - a) Congo rainforest
 - b) Amazon rainforest
 - c) South east Asia's rainforest



2. Recently a devastating forest fire incident took place in Australia which has killed several wildlife and affected the people of that area as many respiratory disorders have been faced by them like suffocation. Amazon rain forests are known as the lungs of the world as it provides sufficient oxygen to the world. Which forests are called lungs of the world? In which country are they located?

.....
....

3. Scientists have always warned of rising temperature due to increase of release of green house gases which has led to climate change. What do you think is the main reason for forest fires? Explain.

.....
 ...
 4. Are all forest fires dangerous? Comment.

.....
 ...
 5. What do you think can be done to prevent forest fires?

Item description:

Q. No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1.	close constructed	Interpret data and evidence scientifically	Content	Global	Medium
2.	open ended	Explain phenomenon scientifically	Content	global	Medium
3.	close constructed	Explain phenomenon scientifically	Content	personal	Low
4.	open ended	Explain phenomenon scientifically	epistemic	global	high
5.	open ended	Explain phenomenon scientifically	epistemic	global	high

Answer key:

1. congo rain forests
2. amazon rainforests .In Brazil
3. release of green house gases rise in temperature,change in climatic patterns
4. No.mild surface fires does not lead to devastation due to burning of dry leaves
5. Limiting release of green house gases ,use of technology,robots,artificial intelligence

15. PALM OIL AND RAINFORESTS

Area : Natural Resource

Class – 8

Chapter- 7

Chapter Name: Conservation Of Plants And Animals

Concept : Plants and Animals

Learning Outcomes :

Students will be able to protect environment by using resources judiciously.

Palm oil is edible vegetable oil. It is obtained from palm tree fruit. The oil is trans-fat free, having low cost so it is widely used. The largest exporters of palm oil are Malaysia AND Indonesia .In these countries rainforests are being cleared for plantation of palm oil. This illegal act of deforestation is fatal for rainforest ecosystem which is very fragile. These rainforests are home for a number of animals like orangutans, elephants, and tigers.

Q 1 Indonesia and Malaysia are largest producers of palm oil. What kind of climatic conditions are required for palm tree?

Q 2 Keeping in mind the fact that palm oil is a vegetable oil, do you expect the use of palm oil in shampoo and cleaning agent? Support your answer with reason.

Q 3 Which of the following can be a problem related to palm oil plantation and deforestation. Mark yes or no (Along with reason)

STATEMENT	Y/N	REASON
It can lead to indigenous right abuse		
It can lead to modern day slavery and child labour		
It can lead to climate change		
It can lead to wildlife smuggling		

Q 4 In 2016, ONLY 45000 orangutans were left in Borneo. If this continued this specie will extinct in 25 years. Can you suggest one reason for decreasing population of orangutans?

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	Complex multiple choice	Interpret data and evidence scientifically	procedural	global	medium
4	Open ended	Explain phenomenon scientifically	epistemic	global	low

Answer key:

Answer 1 tropical climate

Answer 2 yes. It is a vegetable oil so can be used in manufacturing of soaps and shampoos.

Answer 3 yes, yes, yes, yes.

All the reasons can be associated with deforestation and excessive plantation.

Answer 4 the reason for declining population is habitat destruction that lead to extinction due to lack of food and human interference.

16.CELL: STRUCTURE AND FUNCTIONS

Area : Living system

Class – 8

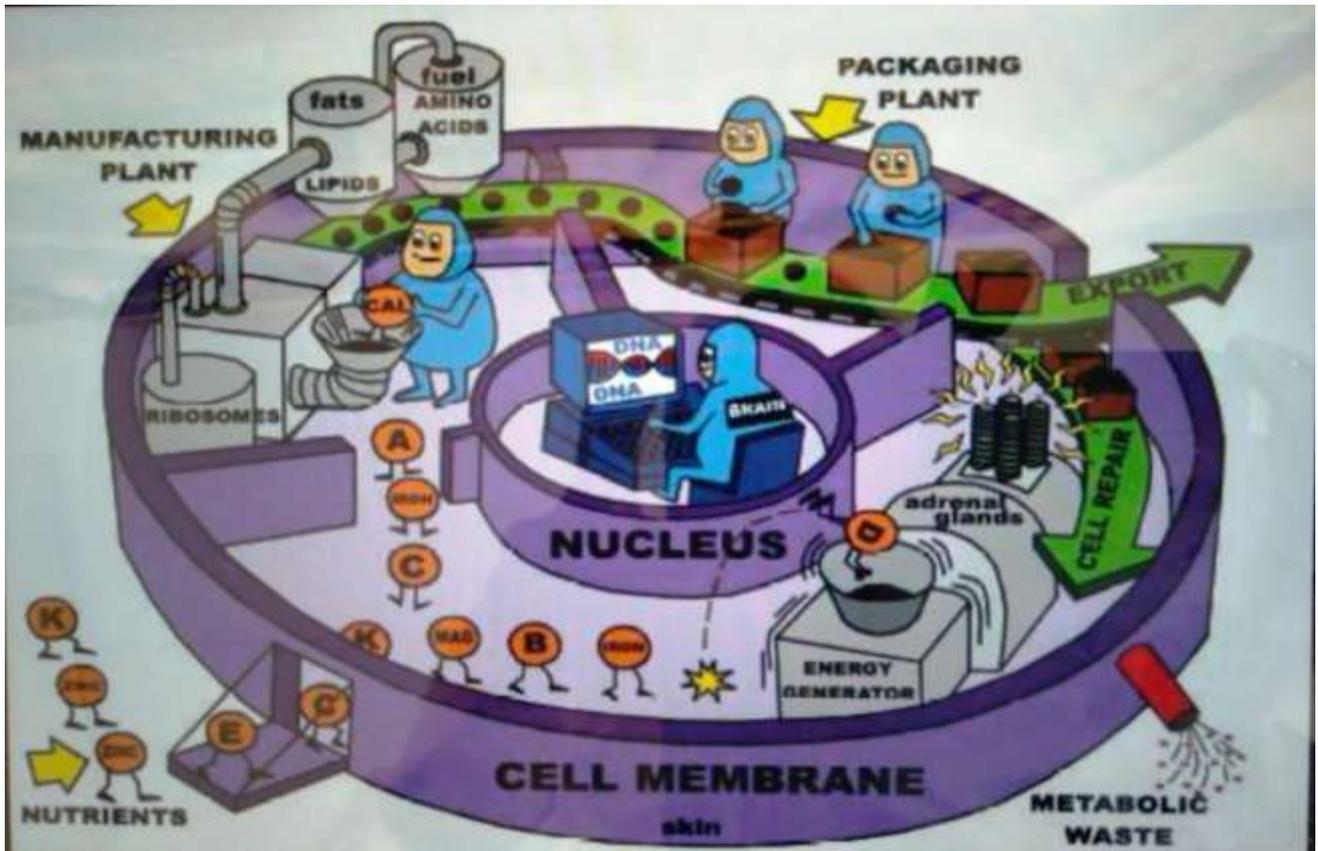
Chapter- 8

Chapter Name: Cell : Structure and Function

Concept : Structure of Cell and its functions

Learning Outcomes : Students will be able to

1. list various parts of the cell;
2. explain the functions of various parts of the cell.



Question 1

“Cells are basic structural units of living organisms.” It is called so because-

- (1) Cells exhibit a variety of shapes and sizes.
- (2) Number of cells present, varies from organism to organism.
- (3) The smallest living part of an organism is cell.
- (4) Cells were first observed in cork by Robert Hooke in 1665.

Question 2

What is the scientific name used for cytoplasm and nucleus together?

.....

Question 3

Look at the picture and recognize the organelles from their functions-

- (1) Brain of the cell
- (2) Dustbin of the cell
- (3) Energy generator of the cell
- (4) Post office of the cell.
- (5) Manufacturing plant of the cell.

Question 4

In the picture given above, the cell is allowing the ions to walk in happily. What is the function of ions that are walking into the cell?

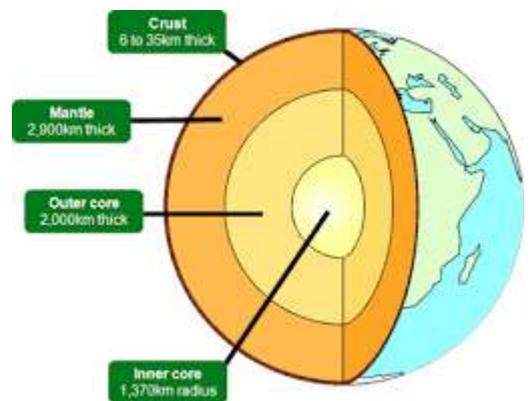
.....

Question 5

Observe the picture of the earth and write the parts of the earth that are equivalent to cell membrane, nucleus and cytoplasm.

.....

.....



Item description:

Q. No.	Question type	competency	knowledge	context	Difficulty level
1	Closed constructed	explaining phenomenon scientifically	Content	global	medium
2	Closed constructed	evaluating and designing scientific enquiry	Content	global	medium
3	Closed constructed	Evaluating and designing scientific enquiry	Content	global	medium
4	Closed constructed	Explaining phenomenon scientifically	Content	global	medium

Answer Key

Answer 1 Option 3

Answer 2 protoplasm

Answer 3 (1) nucleus

(2) lysosomes

(3) mitochondria

(4) Golgi Apparatus

(5) Ribosomes

Answer 4 they act as catalysts

17.MODES OF REPRODUCTION

AREA: Frontiers Of Science and Technology

Class – 8

Chapter- 9

Chapter Name: Reproduction In Animals

Concept: Sexual & Asexual Reproduction

Learning Outcomes: Students will be able to

1. explain different modes of reproduction and difference between sexual and asexual reproduction ;
2. draw labelled diagrams

Harry and John were listening to the conversation between Berry (the jelly fish) and Dan (the dog).

Dan: We are superior than you Berry because we reproduce sexually.

Berry: We are superior than you Dan because we reproduce asexually.

John: Harry what is sexual and asexual reproduction.

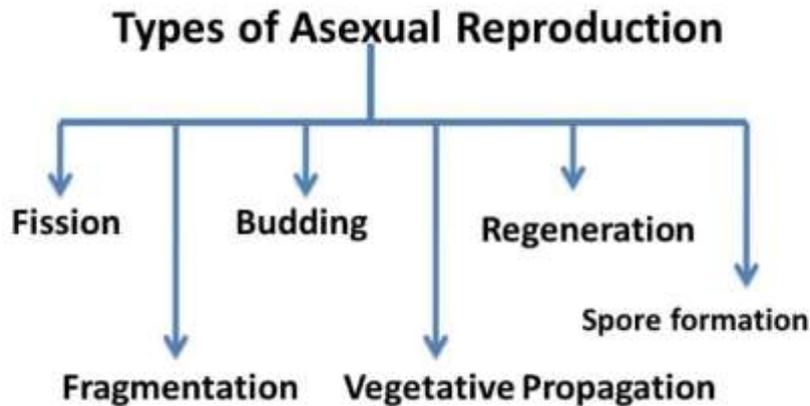
Harry:

These are different modes of reproduction.

John: Berry and Dan why are you debating whereas in both sexual and asexual reproduction new individual is produced and both increases the number of species on the earth.

Dan: We two individuals share our male and female gametes to reproduce our offsprings.

Berry: I myself as a single parent can reproduce the new individual. One thing more asexual reproduction is of different types like.



Dan: Well I have a better chance of survival.

Berry: My offspring will be identical and guaranteed to look exactly like me. encourage genetic variation.

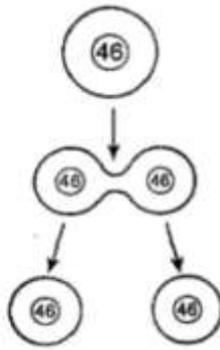
Dan: I

Berry: I'm able to reproduce faster

John and Harry: Nice talking to both of you. Your debate helped us to understand the special characters of sexual and asexual reproduction.

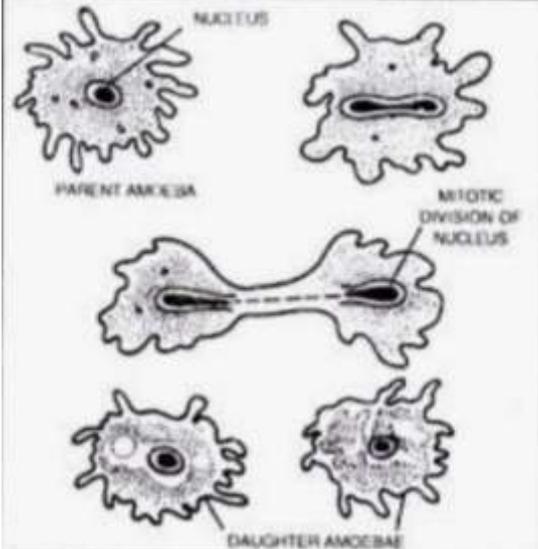
Q 1. Which type of reproduction is depicted by this picture sexual or asexual?

(1 Mark)

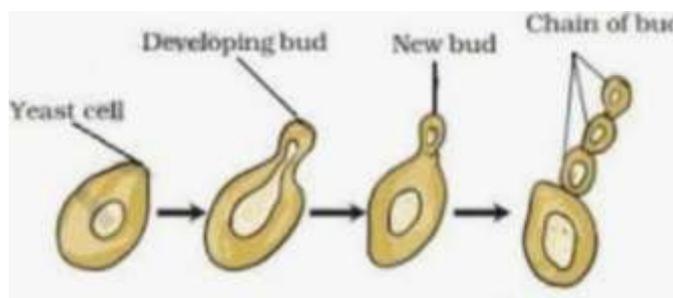


Q 2. Choose the appropriate pictures and definitions to fill the blanks given below: (2 Marks)

Sno.	TYPES	DEFINITION	PICTURE
1.	Asexual Reproduction	Type of reproduction in which only one parent is involved	
2.	Sexual Reproduction		<p>The illustration shows a green male figure on the left and a yellow female figure on the right. Pink arrows point from each towards a central green circle containing the letter 'S' and a yellow circle containing the letter 'X'. A pink arrow points down from these two circles to a purple baby figure, representing the formation of a zygote and subsequent development.</p>
3.	Budding	Type of asexual reproduction in which a new organism develops from an outgrowth due to cell division	

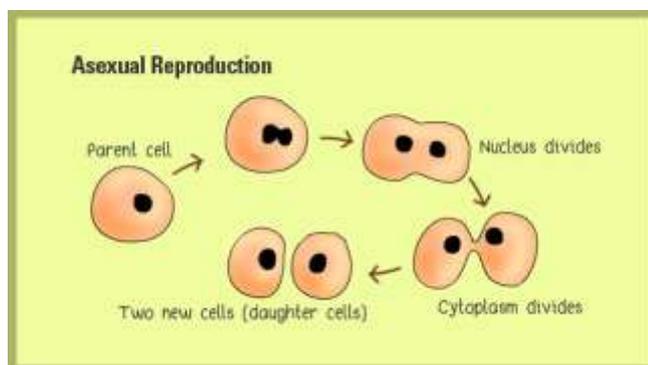
4.	Binary Fission	 <p>The diagram illustrates the process of binary fission in an amoeba. It starts with a 'PARENT AMOEBA' containing a 'NUCLEUS'. The nucleus undergoes 'MITOTIC DIVISION OF NUCLEUS', resulting in two daughter nuclei. Finally, the cell divides to form two 'DAUGHTER AMOEBAE'.</p>
----	----------------	---

Choose From :



a)

- b) It involves exchange of genetic information between 2 different individuals
- c) Sexual reproduction by a separation of the body into 2 new bodies.



d)

Q 3. In the given question, a statement of assertion (A) is followed by a statement of Reason (R). mark the correct choice as: (1 Mark)

- (a) Both assertion (A) and reason (R) are true and reason is the correct explanation of assertion (A) .

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion(A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

(e) Both assertion (A) and reason (R) are false.

Assertion: Sexual reproduction promotes diversity of characters in offspring

Reason: Sexual reproduction results from fusion of two gametes coming from two different and sexually distinct individuals.

Q4 Which are 3 advantages of sexual reproduction over asexual reproduction? (2 Marks)

Q5 Match the following: (2 Marks)

- | | |
|---|------------------------------------|
| 1) Reproductive cells. | a) Sexual Reproduction |
| 2) Asexual reproduction. | b) Gametes |
| 3) When bacterial cell reproduces asexually | c) Amoeba |
| 4) Encourage genetic variation. | d) Two daughter cells are produced |

Q6. We are sisters why are we different? (2 Marks)



Item Description:

Q NO.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	MCQ	Interpret data scientifically	Content	Global	Low
2	MCQ	Apply scientific Knowledge	Content	Global	Medium
3	MCQ	Apply scientific Knowledge	Content	Global	Medium
4	Closed constructed	Apply scientific Knowledge	Content	Global	Low

5	Closed constructed	Apply scientific Knowledge	Content	Global	Low
6	Open Constructed	Evaluate and design scientific enquiry.	Content	Global	Medium

Answer Key

A1) Asexual reproduction.

A2) 1-d, 2-c, 3-a, 4-b

A3) A

A4) A) Genetic diversity is the main advantage.

B) Better chance of survival.

C) Increase in the ability of an organism to adapt to the environment.

A5) 1-b. 2-c. 3-d. 4-a.

A6) Sexual reproduction results from fusion of two gametes coming from two different and sexually distinct individuals.

18. CLONING

Area: Frontiers Of Science And Technology

Class – 8

Chapter- 9

Chapter Name: Reproduction In Animals

Concept: Asexual Reproduction

Learning Outcomes: Students will be able to explain the process of cloning



Cloning is the process of generating a genetically identical copy of a cell or an organism. Cloning happens often in nature for example when a cell replicates itself asexually without any genetic alteration or recombination.

Cloning of mammal was first achieved in 1996. Scientist in Scotland successfully cloned an adult female sheep. The clone was called Dolly.



Dolly the sheep
Dolly the sheep, the first clone of an adult mammal, at the Roslin Institute, near Edinburgh.

Dolly was genetically identical to the adult female sheep that the udder cell was taken from.

Artificial cloning is of three types

- a) Gene Cloning: It produces copies of genes or segment of DNA
- b) Reproducing Cloning: It produces copies of whole animal.

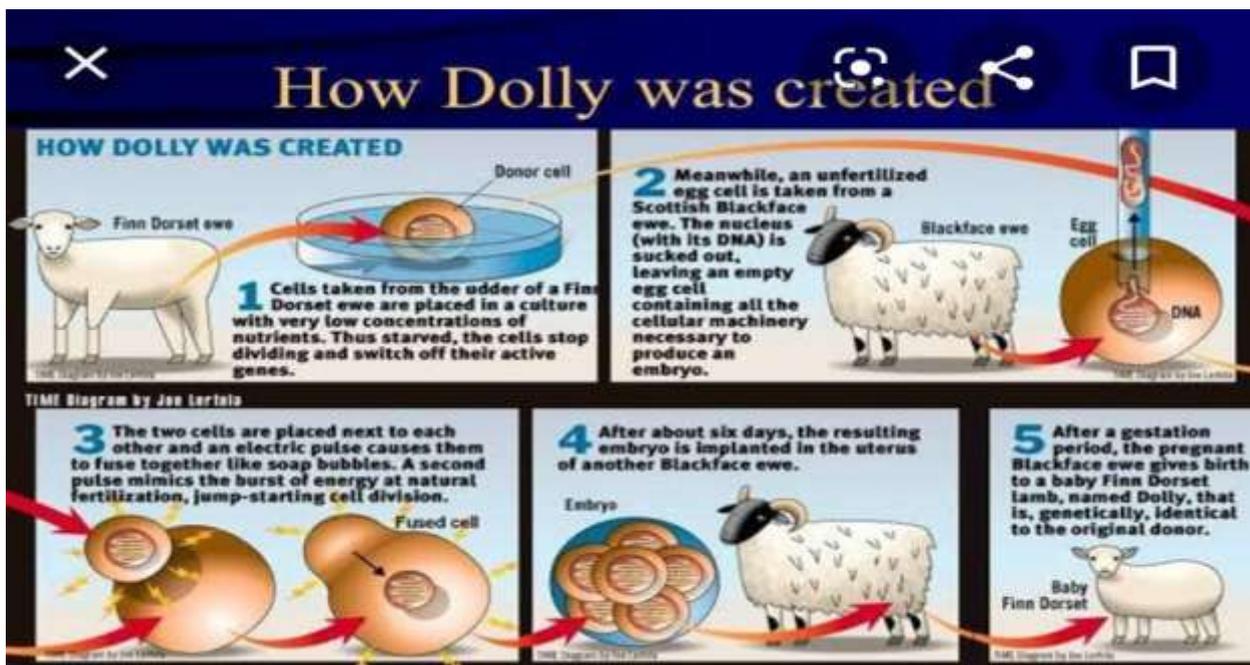
c) Therapeutic Cloning: The production of embryonic stem cells for use in replacing or repairing damage tissues or organs

Q1 How does cloning effect the DNA of animals? (1 Mark)

.....
.....

Q2 Which type of cloning is involved in : (2 Marks)

- a) Treatment of diseases.....
- b) Clone of Dolly.....



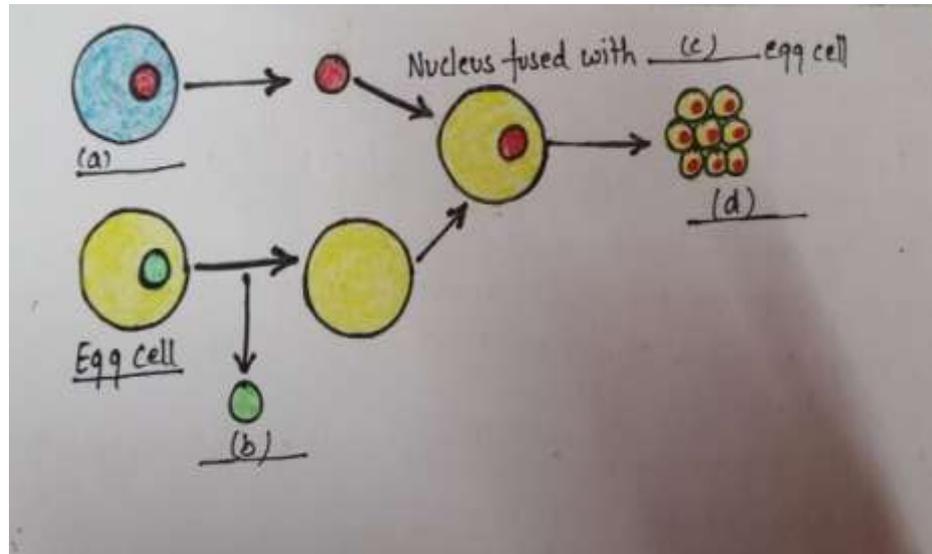
Q3 What is being removed from the cells in cloning? (1 Mark)

.....

Q4 Have animal somatic cells been used to create embryos? (1 Mark)

.....

Q5 Read the information carefully in the above picture and fill up the blanks below (2 Marks)



Q6 In the following questions, a statement of assertion (A) is followed by a statement of reasoning (R). Mark the correct choice as: (1 Mark)

- a) Both A&R are true and R is the correct explanation of A.
- b) Both A &R are true but R is not the correct explanation of A .
- c) A is true but R is false.
- d) A is false but R is true.
- e) Both A & R are false

Assertion (A) : Individuals produced by asexual reproduction are known as clones.
Reason (R): They are known as clones because they are genetically similar .

.....

Q7 Which are three essential components generally involved in successful cloning ? (2 Marks)

.....
.....

Item Description:

Q NO.	Q Type	Competency	Knowledge	Context	Difficulty Level
1	Closed constructed	Apply scientific Knowledge	Content	Global	LOW
2	Closed constructed	Apply scientific Knowledge	Content	Global	Medium
3	Closed constructed	Apply scientific Knowledge	Content	Global	Medium
4	Closed constructed	Evaluating and designing scientific enquiry	Content	Global	High
5	Closed constructed	Interpret data scientifically	Content	Global	Medium
6	Simple MCQ	Explain phenomenon scientifically	Content	Global	Low
7	Closed constructed	Apply scientific Knowledge	Content	Global	Medium

Answer Key

Ans 1 cloning does not change DNA, and clones are not genetically engineered animals.

Ans 2 a) therapeutic cloning b) reproductive cloning

Ans 3 nucleus

Ans 4 yes

Ans 5 a) somatic cell b) nucleus c) denucleated d) embryo

Ans 6 (a)

Ans 7 DNA from the animals to be cloned

A viable egg to receive that DNA

A mother to gestate the resulting embryo or surrogate mother

19.TAKING THE RIGHT DECISION

Area: Health

Class – 8

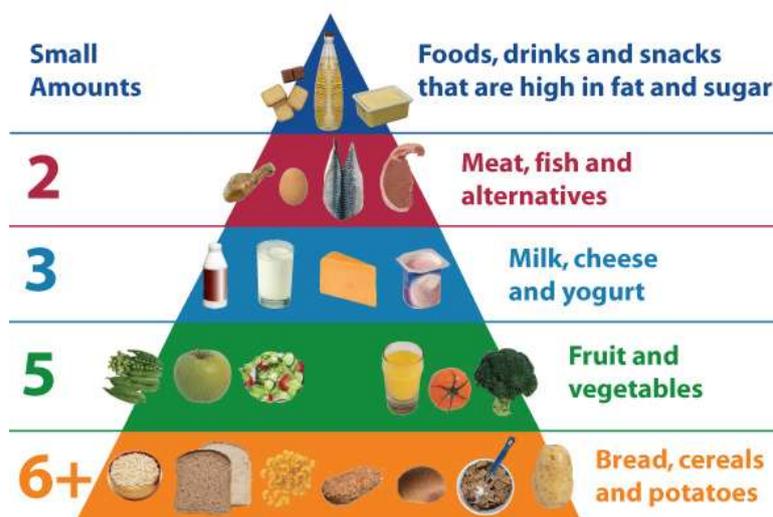
Chapter- 10

Chapter: Reaching The Age of Adolescence

Concept: Adolescence and Puberty

Learning Outcomes:

Student will be able to apply learning of scientific concepts in day to-day life by making correct food choices.



The school canteen was a favourite spot of all students. During the break they would leave their home-made food in the class and rush to have chips, cold drinks and other fried food items. When the school reopened after the new session the students observed that the school canteen had a new look. It displayed fruits, milk products, mini meals and healthy steamed food along with the junk food. If the student made the correct choice, he would earn points which would be added in his score card. This was a big change for the students

They stopped visiting canteen and seemed unhappy. The school principal addressed the students and the school counsellor explained to them about making healthy choices in their growing period and this life style change would affect their future as well.

Analyse this situation

- Q1. The school Canteen gave the choice to the students to choose what they ate. Was it a correct decision of the school authorities?
- Q2. It's said that youth can digest any thing so they can eat junk food, do you agree with it.
- Q3. Correct knowledge helps to make the right choices. Justify.

Q4. In a balanced diet which nutrient should be in maximum quantity and which should be in least quantity.

Q5. Choose which are healthy options and which are unhealthy options

Option	Healthy/ Unhealthy
Drinking milk	
Eating five types of fruits daily	
Skipping breakfast	
Eating in-between the meals/binge eating	
Eating rice, dal, vegetables and Chappati	

Item Description

Q.No	Q Type	Competency	Knowledge	Context	Difficulty level
1	Open ended	Explain phenomenon scientifically	Epistemic	Personal	Medium
2	Closed Constructed	Explain phenomenon scientifically	Epistemic	Personal	Medium
3	Open ended	Evaluate and design scientific enquiry	Epistemic	Global	Medium
4	Close constructed	Evaluate and design scientific enquiry	Content	Global	Medium
5	Open ended	Evaluate and design scientific enquiry	Epistemic	Personal	medium

Answer Key

1. Yes, as it will help the students to make right choices.
2. No eating junk food is unhealthy for any age group.
3. Yes, correct knowledge helps to make right choices so the students started visiting canteen again and took the right decisions.
4. Carbohydrates should be in maximum quantity and fats and sugar in minimum quantity.
5. Choose which are healthy options and which are unhealthy options

Option	Healthy/ Unhealthy
Drinking milk	Healthy
Eating five types of fruits daily	Healthy
Skipping breakfast	Unhealthy
Eating in-between the meals/binge eating	Unhealthy
Eating rice, dal, vegetables and Chappati	Healthy

20. GROWING UP HEALTHILY

Area: Health

Class – 8

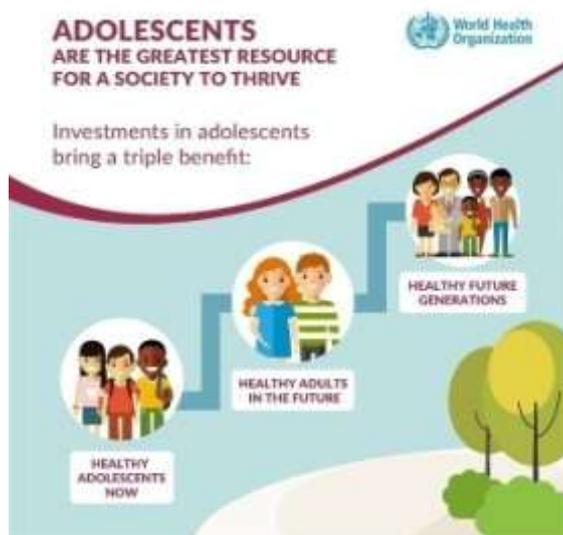
Chapter- 10

Chapter: Reaching The Age of Adolescence

Concept: Changes in Puberty

Learning Outcomes :

Students will be able to apply learning of scientific concepts challenging myths and taboos regarding adolescence.



Rita was a class VIII student. She was a fun loving person and was also a bright in our studies.

She would participate in all school activities. After the summer break when she returned to the school, her teacher observed some changes in her behaviour. She was withdrawn and stopped participating in activities. She would make excuses for not participating in games . This change worried her teacher and she asked Rita to meet her after the classes. As the teacher gently enquired from her, Rita broke down sharing her experience of changes that her body was undergoing and she was uncomfortable about it. The teacher was able to bring back the confidence in Rita by sharing the science behind her bodily changes and that it was a normal process of growing up.

Questions

- Q1. What body changes could Rita be experiencing
- Q2. Were these changes happening under the influence of hormones
- Q3. Do you think the teacher was right in getting worried about Rita
- Q4. A healthy lifestyle for a teenager would include which type of activities.
- Q5. How is the future of the nation affected if we have healthy teenagers.

Answer Key

1. a.Starting of menstruation.
b.Increase in breast size
c. Developing of body hair
d. Acne /pimples may occur
2. Yes, these changes were due to growth and reproductive hormones (which start realising during this period)
3. The teacher was right in getting worried about her and her timely support helped Rita to face these changes positively.
4. Healthy lifestyle means Exercise, balanced diet, regular sleeping hours and positive attitude.
5. Healthy teenagers mean healthy adults and healthy future generations.

Item Description

Q.No	Q Type	Competency	Knowledge	Context	Difficulty level
1	Closed Constructed	Explain phenomenon scientifically	Content	Global	Medium
2	Closed Constructed	Explain phenomenon scientifically	Procedural	Global	Medium
3	Close constructed	Evaluate and design scientific enquiry	Epistemic	Global	Medium
4	Open ended	Evaluate and design scientific enquiry	Epistemic	Global	Medium
5	Open ended	Evaluate and design scientific enquiry	Epistemic	Global	High

21.BED OF NAILS: SCIENCE OF CIRCUS

Area : Frontiers Of Science And Technology

Class – 8

Chapter- 11

Chapter Name - Force And Pressure

Concept : Force And Pressure

Learning Outcomes- Students Will be able to-

1. Relate Force Pressure and Area
2. Apply the knowledge to day to day life.

Bed Of Nails is primarily a form of entertainment in circuses, sideshows and other venues. Lying on a bed of nails is an expression of a performer's stamina, bravery and imperviousness to pain. At first, it seems baffling that a person could lie on a bed of pointed nails and not be injured...but it's a matter of distributing your weight across many nails so they don't pierce you.

Pressure is the application of force over a particular area. In mathematical terms, pressure is equal to **force divided by area**.

If you step on the point of a nail, your foot exerts a tremendous amount of pressure on the nail's tiny point. As a result, the point can go straight through your foot. But a bed of nails has lots of points that are close together -- there's a lot of surface area for the body to cover. Hundreds of nails support the weight of your body instead of just one. Typically, your body doesn't exert enough pressure on any one nail for it to break the skin.



(Picture Source : Mental Floss.com)

Q1. Why can you lie down on a bed of nails without having any nail break your skin, but if you step on a single nail, it will go right through your foot?

- a) There is more force exerted on a single nail than the entire bed of nails.
- b) The force is the same in both cases, but there is less pressure when you lie on the bed of nails.
- c) The force is the same in both cases, but there is more pressure when you lie on the bed of nails.

d) The area is the same in both cases, but there is more force when you lie on the of nails.

Q2. Match the following

Column A	Column B
a) Camel	i) Broad and Deep Foundation
b) Pressure	ii) Six or Eight Tyre
c) Truck	iii) Sharp Cutting Edge
d) High Building	iv) Broad Feet
e) Knife	v) Pascal

Q3. Shoes with stiletto heels go in and out of fashion. (Stiletto is an Italian word meaning a small and murderous dagger).



i) Stiletto heels pose many health risks to the person wearing them. The organ system likely to be the most affected is

- a) Respiratory System b) Circulatory System
- c) Skeletal System d) Nervous System

ii) Such heels can also damage floors and dance halls. Calculate the pressure exerted by a woman dancer exerting 600N force on a heel of area 1 cm^2 ($1 / 10000 \text{ m}^2$)

If the floor is damaged by pressure over 5MPa ($5 \times 10^6 \text{ Pa}$), will it be damaged?

Q4. Pick the **odd** one out :

- a) Force, Pressure, Time, Area
- b) Camel's Feet, Shoulder Straps of School Bags, Surgeon's Knife, Truck Tyres

Q5. When Force is Doubled and Area of Contact is halved, the resultant pressure becomes;

- a) halved b) two times
- c) four times d) remains the same

Q6. You are walking out on a frozen lake and you begin to hear a sound of ice cracking beneath you. Which strategy is the best for getting off ice safely?

- a) try to leap in one bound to the shore
- b) jump up and down to decrease the contact time with ice
- c) shuffle your feet without lifting them to reach the shore
- d) lie down flat on ice and crawl to the shore

Item description:

Q No.	Q type	Competency	Knowledge	Context	Difficulty
1	Simple MCQ	Interpreting evidence scientifically	Content	Global	Medium
2	Close constructed	Evaluating and designing scientific enquiry	Content	Global	Easy
3	i) Simple MCQ	Interpreting evidence scientifically	Epistemic	Global	Medium
	ii) Close Constructed	Evaluating and designing scientific enquiry	Procedural	Global	Medium
4	Close Constructed	Evaluating and designing scientific enquiry	Epistemic	Global	Medium
5	Simple MCQ	Interpreting evidence scientifically	Content	Global	Medium
6	Simple MCQ	Interpreting evidence scientifically	Content	Global	Medium

Answer Key :

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

Q2 a - iv, b - v , c - ii, d - i, e - iii

FC for all correct answers, PC for 2 incorrect answers, FC for more than 2 incorrect answers

Q3.i) (c)

ii) Pressure exerted by a woman dancer : $P = \text{force} / \text{Area}$

$$P = 600/0.0001$$

$$= 6000000 \text{ Pa} = 6 \times 10^6 \text{ Pa} = 6 \text{ MPa which is more than } 5 \text{ MPa}$$

Thus, the dance floor will be damaged.

FC for both parts correct ,PC for one part correct and NC for both parts incorrect

Q4. a) Time

b) Surgeon's Knife

FC for both options correct, PC for one option correct, NC for both options incorrect

Q5. (c) FC for correct answer and NC for incorrect answer

Q6. (d) FC for correct answer and NC for incorrect answer

22.DRINKING WITH A STRAW

Area : Frontiers Of Science And Technology

Class – 8

Chapter- 11

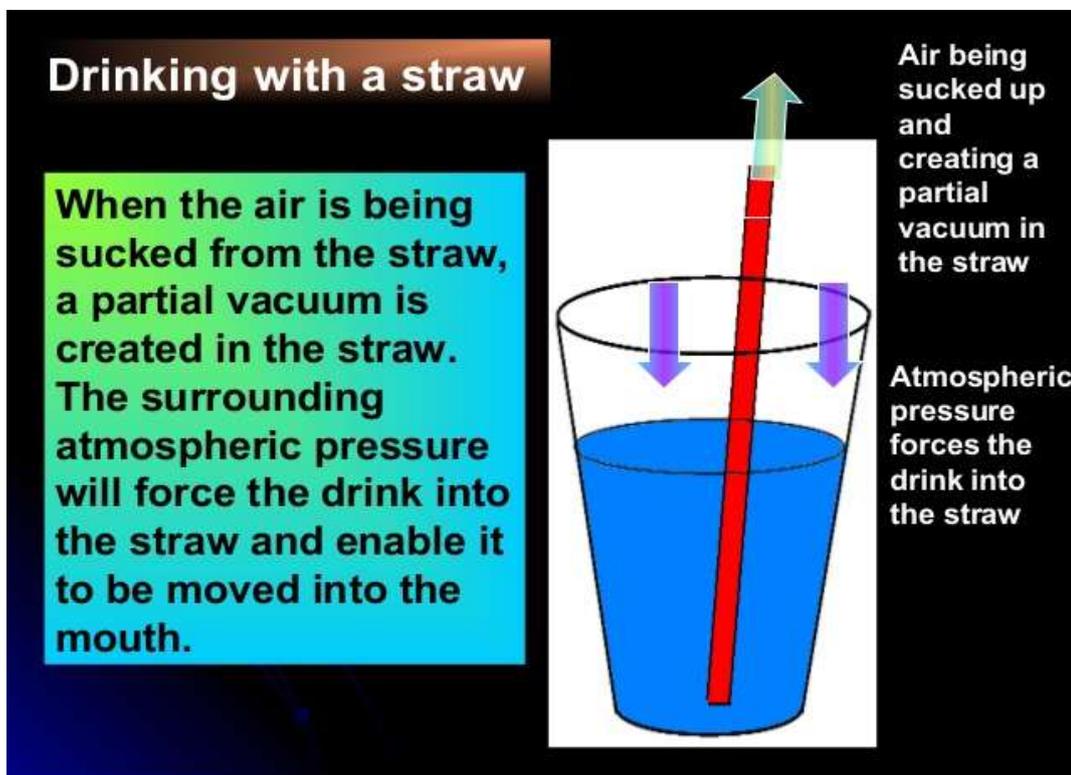
Chapter Name: Force and Pressure

Concept : Pressure exerted by liquids and gases

Learning Outcomes: Students will be able to

1. explain phenomena and relate them with causes,
2. conduct simple experiments to seek answers;
3. interpret the context and explains the phenomenon scientifically;
4. apply the knowledge to day to day life.

When you suck water up a straw, you are not really pulling it up the straw. You are just moving some of the air in your mouth out of the way, creating a slightly lower pressure. Since Earth's atmosphere is pressing down on the water in the cup, it's forced up the straw until the pressure differential is equalized.



Q1. Fill in the blank.

When we drink liquid with a straw, the air pressure acting on the surface of liquid then becomes _____ than the pressure inside the straw.

- a) Greater
- b) Smaller

- c) Equal
- d) None

Q2. Which of the following is a consequence of atmospheric pressure?

- a) Drinking a soft drink through a straw
- b) Natural breathing process
- c) Working of a liquid dropper
- d) All of these

Q3. Atmospheric pressure in the centre of a tropical cyclone is

- a) very low because of dense sinking air
- b) very low because of rising warm air
- c) very high because of sinking warm air
- d) very high because of converging winds.

Q4. Why is an astronaut on moon unable to drink lemonade with a straw?

Q5. How could you compare air movement inside your lungs and drinking with a straw?

Q6. I care for my environment and would avoid using a

- a) Bamboo straw
- b) Plastic straw
- c) Paper straw
- d) Steel straw

Item Description:

Q N	Q type	Competency	Knowledge	Context	Difficulty
1	Simple MCQ	Interpreting evidence scientifically	Content	Global	Medium
2	Simple MCQ	Interpreting evidence scientifically	Content	Global	Easy
3	Simple MCQ	Explain phenomenon scientifically	Epistemic	Global	Medium
4	Close Constructed	Evaluate and Design Scientific Enquiry	Epistemic	Global	High
5	Close Constructed	Explain phenomenon scientifically	Content	Global	Medium
6	Simple MCQ	Evaluate and Design Scientific Enquiry	Content	Global	Easy

Answer Key:

Q1. (a) FC for correct answer and NC for incorrect answer

Q2. (d) FC for correct answer and NC for incorrect answer

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

Q4. There is no atmosphere on moon. When the astronaut tries to suck lemonade with a straw, there is no air to enter the glass being emptied by reduction of liquid inside.

FC for similar answer and NC for incorrect answer

Q 5. When the carbon dioxide is breathed out, a low pressure zone is created in the lungs. Due to atmospheric pressure, air pushes in naturally.

FC for similar answer and NC for incorrect answer

Q6. (b) FC for correct answer and NC for incorrect answer

23.FRICTION AND SPORTS

Area: Frontiers for science and technology

Class – 8

Chapter- 12

Chapter Name: Friction

Concept : Friction

Learning Outcomes: Students will be able to

1. relate phenomenon with routine life
2. interpret the context
3. explains the phenomenon scientifically.

There are two types of friction, static friction and kinetic friction. Kinetic friction is the friction force when the object is moving or sliding. Air resistance is also a type of friction.



The force due to friction is generally independent of the contact area between the two surfaces. This means that even if you have two heavy objects of the same mass, where one is half as long and twice as high as the other one, they still experience the same frictional force when you drag them over the ground. This makes sense, because if the area of contact doubles, you may think that you should get twice as much friction. But when you double the length of an object, you halve the force on each square centimeter, because less weight is above it to push down. Note that this relationship breaks down when the surface area gets too small, since then the coefficient of friction increases because the object may begin to dig into the surface.

Friction is a force that is apparent in every sport, for example; a boat will have friction force when moving through water, a runner will experience a level of friction between their body and the air, a cyclist will have friction acting on their tyres...

In order to try and establish which sport has the most friction involved you could look at sports that have equipment specifically designed to reduce the effects of friction. A good example of this would be swimming, there are no rules in swimming as to the kind of swimsuit that can be worn, as there are some suit designs that decrease the effects of friction, and therefore are advantageous in competition.

If we use the premise that sports that involve air and water have the most friction, then that narrows the field down. Examples of these could be Swimming, Kayaking, Canoeing and Rowing.

Q1. What are different kinds of frictions mentioned in the above paragraph?

Q2. Give the name of sports where friction with air and water is mentioned in the paragraph.

Q3. How area of contact between two bodies affect force of friction?

Q4. Mention the sport you play and describe briefly how friction is involved in that sport? What possible way you adopt to use it effectively?

Item Description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	Close Constructed	Explain phenomenon scientifically	Content	Local	Low
2	Close Constructed	Explain phenomenon scientifically	Content	Local	Medium
3	Close Constructed	Explain phenomenon scientifically	Content	Global	Medium
4	Open Ended	Evaluate and design scientific enquiry	procedural	Personal	Medium

Answer Key:

A1. Static, kinetic **(FC)** ; Any one **(PC)**

A2. Runner, Swimming, Kayaking, Canoeing and Rowing. **(FC)**; Any Three **(PC)**

A3. Area has no role to play unless its very small **(FC)**; No role **(PC)**

A4. Open ended

Child would mention the sport he plays and expected to mention friction during running, holding, jumping, stopping etc. **(FC – for any three relevant to sport)**

24.FASCINATING WORLD OF SOUND

Area: Frontiers for science and technology

Class – 8

Chapter- 13

Chapter Name: Sound

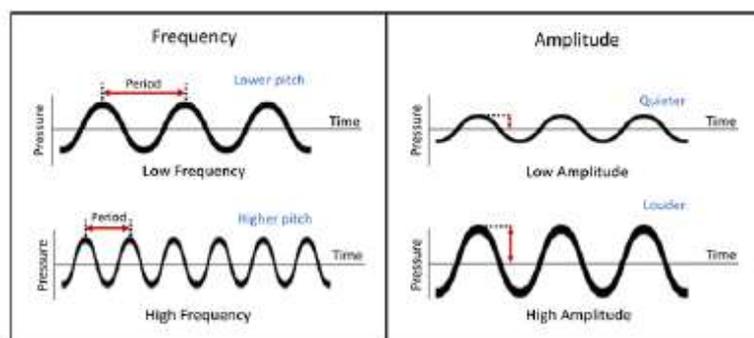
Concept : Vibrating Body Sound

Learning Outcomes: Student will be able to –

1. differentiate between various human Sound and also know the cause behind it like pitch, loudness, amplitude etc;
2. identify difference in various sounds;
3. draws conclusion regarding cause and effect ;
4. draw conclusion about audible range of human ear.



We can recognize many familiar sounds without seeing the objects producing them. These sounds must be different to enable you to recognize them. Fire alarms / sirens are loud, whispers are soft and every one of your friends has a different voice. The difference between sounds are caused by mainly due to difference in amplitude and frequency. Frequency is expressed in hertz and its symbol is Hz. A frequency of 1 Hz is one oscillation/vibration per second. Loudness is measured by amplitude, when



amplitude of vibration is large the loud sound is produced, loudness cannot be assigned a specific number but intensity of sound is measured in decibels. A whisper is about 10 decibels intensity sound and sounds with intensities above 84 decibels may damage your ears. If a sound is loud enough over 120 decibels intensity then it can be painful to

listen to, this is the threshold of pain. The frequency determines the pitch of sound. Drum produces a sound of low pitch on the other hand a whistle produce a sound of high pitch. A bird makes a high pitched sound whereas a lion makes a low pitched roar. The roar of a lion is very loud while sound of the bird is quite feeble. This science of sound (acoustics) is very interesting and is useful in understanding the types of sound and also helpful in making various musical instruments also. This science is an integral part of our life and creates fascinating world of sound around us.

Q1 Sound of siren and whistle are different as we perceive and can be easily differentiated, this difference is mainly due to

- a) Sounds of different amplitude and frequency
- b) Sounds of different amplitude only
- c) Sounds different frequency only
- d) Difference if ear structure of humans

Q2 the symbol of frequency is

- a) Hz b) Hz c) HZ d) Hertz

Q 3 What is the reason of loud sound? Explain in brief

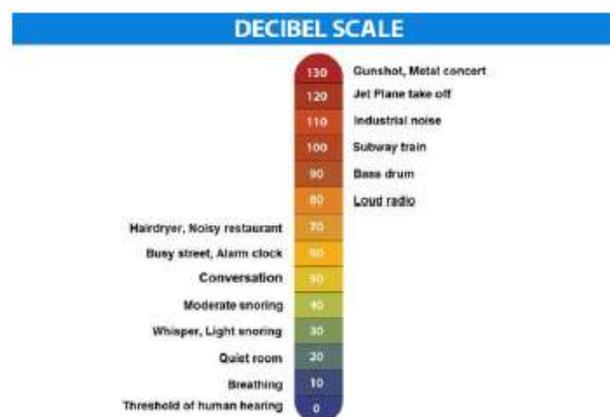
Q 4 High amplitude sounds definitely have

- a) High energy Yes/No
- b) High pitch Yes/No
- c) Large loudness Yes/No
- d) High frequency Yes/No

Q 5 Acoustics is a

- a) Science of studying the sound and its causes agree/disagree
- b) Science of studying cause hearing impairment agree/disagree
- c) Science of understanding the types of sound agree/disagree
- d) Science helpful in making various musical instruments agree/disagree

Q 6 Check following figure and choose correct / incorrect responses



- a) Gunshot sound can be painful to ears to listen correct/incorrect
- b) Threshold of human hearing is 10 decibel correct/incorrect
- c) Threshold of human hearing is < 10 decibel correct/incorrect
- d) Whispering and breathing sounds are equal in decibels correct/incorrect

Item Description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty level
1	MCQ	Explain phenomenon scientifically	Content	Global	Medium
2	MCQ	interpreting data and evidence scientifically	Content	Global	Medium
3	Close Constructed	Explain phenomenon scientifically	Content	Global	Medium
4	MCQ	interpreting data and evidence scientifically	Content	Global	Medium
5	MCQ	Explain phenomenon scientifically	Content	Global	Medium
6	MCQ	interpreting data and evidence scientifically	Content	Global	Medium

Answer Key

- 1). a
- 2). b
- 3). answer should be strictly in accordance with the passage
- 4). a) yes b) no c) yes d) no
- 5). a) agree b) disagree b) agree c) agree
- 6). a) correct b) incorrect c) correct d) correct

25. CHEMICAL EFFECTS OF CURRENT ELECTROPLATING

Area: Frontiers for science and technology

Class – 8

Chapter- 14

Chapter Name: Chemical Effects of Electric Current

Concept : Electrolysis

Learning Outcomes: Student will be able to –

1. draw labelled diagram of experimental set up ,
2. apply phenomenon of Electroplating in day to day life

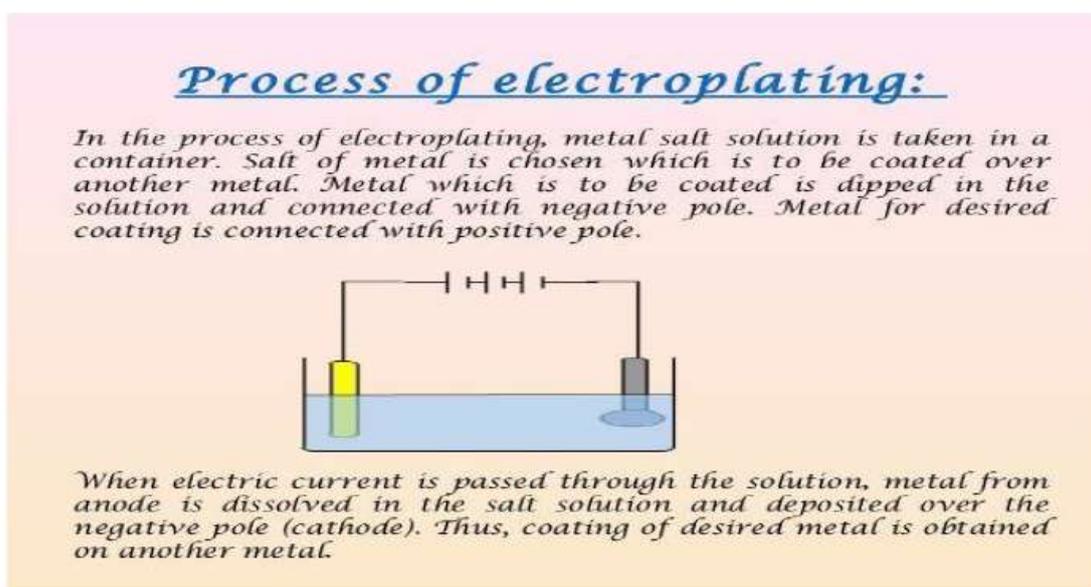


Figure 1

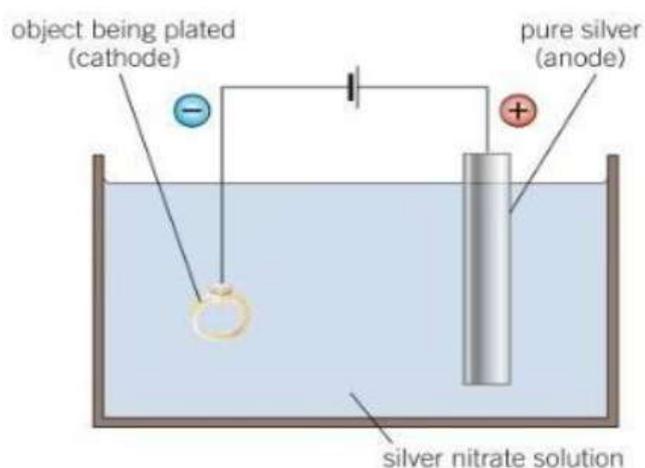


Figure 2



Figure 3

1. Referring to Figure 2 and 3, define these key words:

a) Electrolyte and electrolysis

b) Identify the process taking place in these figures respectively.

2. In the electrolysis of an aqueous solution, which of the following statements is/are true?

a) Electrons are lost by one of the species at the anode.

b) Oxidation takes place at the positive electrode.

c) Reduction takes place at the cathode.

d) Electrons flow around the circuit from the cathode to the negative end of the battery.

3. For an object being plated with silver using silver anode and silver nitrate solution, which of the following reactions is/are true?

a) The cathode half reaction is : $\text{Ag(s)} + \text{e}^- \rightarrow \text{Ag}^+(\text{aq})$

b) The anode half reaction is : $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag(s)}$

c) The anode half reaction is: $\text{Ag (s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$

d) The cathode half reaction is: $\text{Ag(s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$

e) The cathode half reaction is : $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag (s)}$

4. Tick any one option (agree / disagree) for the following statements:

a) Refining of copper is based on phenomenon of electrolysis

b) Galvanisation involves coating of copper on iron.

c) At cathode oxidation takes place in electrolytic cells.

d) During electrolysis of water , oxygen gas bubbles out at cathode.

5. The prominent effects of Electrolysis are:

a) Metals may get deposited at the electrode surface.

b) Gaseous bubbles may get formed near electrodes.

c) Change of colour of solution may occur due to dissolution of different ions.

d) Refining of metal.

Answer key:

2. Score 2 if response is a,b and c
 Score 0 for any other answer
3. Score 2 if response is c and e
 Score 0 for any other answer
5. Score 2 if response is a,b and c
 Score 1 if response is a,b or b,c
 Score 0 if response is d

26. USES OF ELECTROPLATING

Area: Frontiers of Science and technology

Class: 8

Chapter: 14

Chapter Name: Chemical effects of electric current

Concept: Uses of Electroplating

Learning outcomes: The student will be able to:

1. Explain the uses of electroplating.
2. Conduct simple investigations to seek answers to queries.
3. Apply learning of scientific concepts in day to-day life.

Electroplating is a very useful process. It is widely used in industry for coating metal objects with a thin layer of a different metal. The layer of metal deposited has some desired property, which the metal of the object lacks. For example, chromium plating is done on many objects such as car parts, bath taps, kitchen gas burners, bicycle handlebars, wheel rims and many others.



(Source: NCERT text book)

Chromium has a shiny appearance. It does not corrode. It resists scratches. However, chromium is expensive and it may not be economical to make the whole object out of chromium. So the object is made from a cheaper metal and only a coating of chromium over it is deposited. Jewelers electroplate silver and gold on less expensive metals. These ornaments have the appearance of silver or gold but are much less expensive.

Tin cans, used for storing food, are made by electroplating tin onto iron. Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoilt.

Iron is used in bridges and automobiles to provide strength. However, iron tends to corrode and rust. So, a coating of zinc is deposited on iron to protect it from corrosion and formation of rust.

Q.1 The layer of metal deposited has some property, which the metal of the object

Q.2 Tin cans, used for storing food, are made by tin onto iron.

Q.3 Write three properties of chromium which make it suitable for electroplating.

Q.4 Give three reasons behind electroplating in three different fields.

Item Description:

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

Answer key:

Answer 1. Desired, lacks

Answer 2. electroplating

Answer 3. 1. Chromium has a shiny appearance.

2. It does not corrode.

3. It resists scratches.

Answer 4. 1. Jewelers electroplate silver and gold on less expensive metals. These ornaments have the appearance of silver or gold but are much less expensive.

2. Iron is used in bridges and automobiles to provide strength. A coating of zinc is deposited on iron to protect it from corrosion and formation of rust.

3. Tin cans, used for storing food, are made by electroplating tin onto iron. Tin is less reactive than iron. Thus, food does not come into contact with iron and is protected from getting spoilt.

27.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.

28. LIGHT PINHOLE CAMERA

Area: Frontiers for science and technology

Class – 8

Chapter- 16

Chapter Name: Light

Concept : Laws of Reflection

Learning Outcomes:

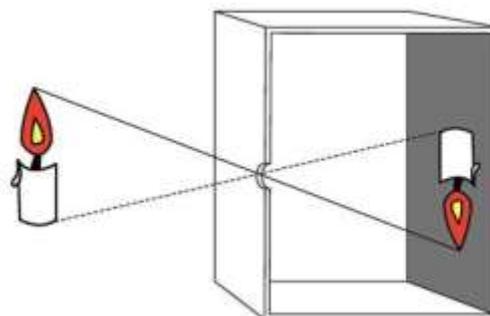
Students will be able to relate processes and phenomenon with causes.

A pinhole camera is a simple camera without lens in shape of a box, one of the sides has a small hole and produces an inverted image of outside world at other side.

The box should be painted black from outside for better clarity.

The object, whose image to be seen should in bright light. Smaller the hole, sharper the image.

Temporary black and white image is formed in the screen if tracing paper is used. Permanent colored and black and white images can be obtained using photographic film instead of tracing paper.



Questions:

1. Which property of light does it show?

a) Reflection b) refraction c) rectilinear propagation

2. What happens if hole is made bigger?

3. Why the box should be painted black from outside than inside?

4. How can you differentiate between an image and shadow?

Item Description:

Q.no .	Question type	Competency	Knowledge	Context	Difficulty level
1	Closed constructed	explaining phenomenon scientifically	Content	Local	Low
2	Closed constructed	Evaluating and designing scientific enquiry	Content	Local	Low
3	Closed constructed	interpreting data and evidence scientifically	Content	Global	Medium

4	Closed constructed	explaining scientifically	phenomenon	Content	Global	High
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Answer Key:

1. c)
2. no image will be visible thereafter.
3. To avoid extra light which can reduce contrast/clarity
4. There may different views pertaining to the image is formed when rays meeting and shadow when rays are blocked/not reaching on surface

29. STARS AND SOLAR SYSTEM

Area: Frontiers for science and technology

Class – 8

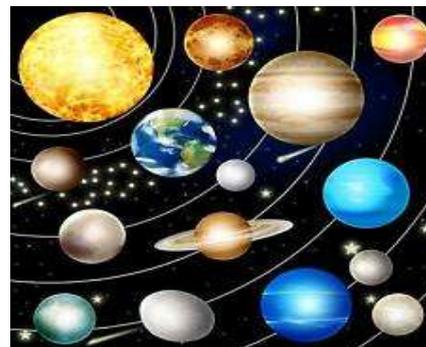
Chapter- 17

Chapter Name: Stars And The Solar System

Concept : Stars

Learning Outcomes :

Students will be able to relate phenomenon and interpret data.



On a dark clear night, we can see many bright specks of light in sky. We can see moon, stars and planets in the night sky. Moon does not have its own light. It shines due to the light of the sun falls on it. The planets appear like the stars but they don't twinkle. These all are the natural celestial bodies. The distance between the earth and these bodies is very large and can't be expressed in kms. In Astronomy these large distances are expressed in Light year. A light year is the distance travelled by light in one year. Some time we can also see bright streaks of light in the night sky. These are called meteors

Q1 A star is ten light years away from the earth. Suppose it brightens up suddenly today. After how much time shall we see this change?

- a) after ten years only.
- b) after five years as the star is brightened up.
- c) any time between five to ten years.
- d) immediately due to its brightness.

Q2 The Meteors are not visible during day time because

- a) they occur only during night.
- b) the brightness of streaks of light formed by meteors is too high.
- c) the brightness of streaks of light of sun is too high as compared to that of meteors.
- d) they are too far away.

Q3 If the moon emits light of its own, then would it still have phases?

Q4 If the distance between earth and sun becomes half of the present distance, what is likely to happen to life. Justify your answer with suitable reason.

Q5 Why do we always see the same side of moon?

Item description:

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

Answer Key

Ans 1 (Full credit=2) if answer is a) after ten years only because this change will occur today will reach to our eyes after ten years only.

No credit for any other response.

Ans 2 (Full credit=2) if answer is c) the brightness of streaks of light of sun is too high as compared to that of meteors.

No credit for any other response.

Ans 3 Moon shines when it reflects the light of the sun. So phases of moon are formed. If moon emits light of its own then no shadow will be formed. So no will phases will be there.

Ans 4 It will end all the life on the earth.

(Partial credit =1)

Because the temperature of earth will increase. The water on the earth will evaporate leaving it dry. Plants will die. So ultimately ending all the life on the earth.

(Full credit=2)

Ans 5 The period of rotation of the moon on its own axis is equal to the period of revolution around the earth.

Full credit=2

No credit for any other response.

30. GREEN HOUSE EFFECT

Area: Environment

Class – 8

Chapter- 18

Chapter Name:

Concept : Green House Effect

Learning Outcomes :

Students will be able to relate processes and phenomenon with causes.

Green House Effect is the long term effect concentration of carbon dioxide. This has been measured at Mauna Loa in Hawaiian Island for more than 10 years. The present value is increased from 290 ppm in 1890 to 320 ppm now with a gradual increase of 0.7 ppm per year. There are some seasonal variation also.

The increasing Ultraviolet, Visible and IR energy have maximum intensity 483 nm at earth surface. While energy remitted is mainly IR intensity 10000 nm. These IR are absorbed by water vapour, CO₂ and re-emitted in all direction.

Q1. Considering seasonal variation, in which season of the Year do you expect the decrease in the level of CO₂ in atmosphere?

Q2. If we compare earth as greenhouse. In which layer of Earth atmosphere do you expect the CO₂ act as glass of greenhouse.

Q3. A consequence of green house effect can be more hurricane and cyclone in tropical ocean. Is it correct? Justify.

Q4. Estimate the rise in temperature with increasing CO₂ concentration from 0.1 to 4.9 degree Celsius with a mean around 2 degree celsius for doubling the CO₂ concentration to 600 ppm. Give scientific explanation

Item Description:

Q.No.	Q. Type	Competency	Knowledge	Context	Difficulty
1	Closed ended	Explaining phenomenon	Content	Local	Medium
2	Closed ended	Explaining phenomenon	Content	Global	Low
3	Open ended	Explaining phenomenon	content	Global	Low
4	Closed ended	Evaluate and design scientific enquiry.	content	Global	Medium

Answer key/Marking scheme

Ans.1. Full credit if the answer is

In spring, due to flowering growth they require more CO₂ or other such scientific reason Otherwise no credit

Ans.2. Full credit if the answer is

Troposphere

Otherwise no credit

3. Full credit if the answer is

Yes because warmer sea water will lead to above said phenomenon or other such scientific reason

Otherwise no credit

4. Full credit if the answer is

With increased level of CO₂, the IR waves will be trapped more. or similar scientific reason.

Otherwise no credit