Class 8

Section I
Suggested pedagogical process
The learner is to be provided with opportunities in pairs /groups / individually in an inclusive setup and encouraged to —
Explore surroundings, natural processes, phenomena using senses viz. Seeing, touching, tasting, smelling, hearing.
Pose questions and find answers through reflection, discussion, designing and performing appropriate activities, role plays, debates, use of ICT, etc.
Record the observations during the activity, experiments, surveys, field trips, etc.
Analyse recorded data, interpret results and draw inference / make generalisations and share findings with peers and adults
Exhibit creativity presenting novel ideas, new designs /patterns, improvisation, etc.
Internalise, acquire and appreciate values such as cooperation, collaboration, honest reporting, judicious use of resources, etc

Section II	
Learning Outcomes of NCERT	**Measuring the LOs**
The learners -	
Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.	**Examines and explains properties, structure and functions of materials and organisms, in order to differentiate them.**
Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.	**Explains properties /characteristics of materials and organisms in order to classify them.**
Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?	**Conducts simple investigations on his /her own in order to seek answers to queries.**
Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.	**Examines and explains processes and phenomenon in order to relate them with causes.**
Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of	**Explains processes and phenomena in order to relate to science behind the phenomena /processes and develop scientific thinking skills.**

electric current; formation of multiple images; structure of flame, etc.	
Writes word equation for chemical reactions, e.g., reactions of metals and non-metals with air, water and acids, etc.	**Writes word equation in order to express chemical reactions.**
Measures angles of incidence and reflection, etc.	**Measures angles of incidence and reflection, etc.**
Prepares slides of microorganisms; onion peel, human cheek cells, etc., and describes their microscopic features	**Prepares slides of microorganisms and describes their microscopic features.**
Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.	**Draws labelled diagrams /flow charts of organisms /structures /processes in order to demonstrate knowledge of structure /processes /relationships**.
Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.	**Constructs models using materials from surroundings and explains their working in order to demonstrate scientific knowledge and understanding of how it works.**
Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.	**Applies learning of scientific concepts in daily life /real life situations in order to solve problems /give solutions /take preventive measures /etc.**
Discusses and appreciates stories of scientific discoveries	**Discusses stories of scientific discoveries /inventions, both orally and in writing, in order to critically appreciate them.**
Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.	**Makes efforts to apply to daily life the understanding of environment and steps to conserve it, in order to contribute to the protection of the environment.**
Exhibits creativity in designing, planning, making use of available resources, etc.	**Designs, plans, makes use of available resources, etc.in order to exhibit creativity.**
Exhibits values of honesty, objectivity, cooperation, freedom from fear and prejudices	**Designs, plans, makes use of available resources, etc.in order to exhibit values of honesty, objectivity, cooperation, freedom from fear and prejudices**

Section III		
LEARNING OBJECTIVES MAPPED WITH LEARNING OUTCOMES ADAPTED BY CBSE		
Chapter no	**Learning Objectives**	**Learning Outcomes**
1. Crop Production & Management	Compare the advantages of three major tools used for tilling and ploughing to justify the variety of agricultural practices	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Analyse the quality of seeds with respect to their germinability	
	Compare the advantages of two major tools used for sowing to justify the variety of agricultural practices used in the country	
	Distinguish between manure and fertilisers to identify ways in which nutrients in soil is replenished	
	Evaluate how weeds adversely affects the growth of the plants in order to justify their removal and control	
	Identify commonly known food items based on their sources to define animal husbandry	
	Classify the major crops based on the time they are sown in the field to explain the months Kharif and Rabi crops are cultivated	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	Sequence the tasks involved in cultivating the crop to list major steps of agricultural practices	
	Describe the process of crop rotation to explain ways in which nutrients in soil is replenished	
	Explain why it is important to loosen the soil before sowing in order to elaborate the effect of loose soil in plant's growth	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various
	Elaborate the process of harvesting to justify the reasons for employing combine and winnowing machine in the process of agriculture	

1. Crop Production & Management	Distinguish between the practices of large scale and small-scale storage of food in order to conclude that stored grains need protection from pests and microorganisms	purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Compare and analyse the traditional and modern methods of irrigation based on cost and efficiency in order to predict suitable irrigation method in real life situations	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.
	Describe the process of crop rotation to explain ways in which nutrients in soil is replenished	

Chapter no	**Learning Objectives**	**Learning Outcome**
2. Microorganisms- Friend and foe	Differentiate between microorganisms and viruses to establish that viruses reproduce only in the host body	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Recall four major categories of microorganisms (bacteria, fungi, protozoa, algae)	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	Define pathogens to list the class of harmful microorganisms	
	Elucidate the reason for increasing volume when yeast is added to dough in baking industry to explain fermentation	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Describe how mosquitoes spread malaria and dengue to explain the role of carriers in spreading communicable disease	
	List examples of diseases in humans, plants and animal caused by microorganisms in order to explain the harmful effects of microorganisms	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.

2. Microorganisms- Friend and foe	Explain the role of antibiotics in order to demonstrate the medicinal uses of microorganisms	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Explain the role of vaccinations in fighting with diseases in order to appreciate the medicinal uses of microorganisms	
	Explain microorganisms role in decomposing to describe importance	
	Explain how microorganism help in increasing the nitrogen in soil to the agricultural uses of microorganisms	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	Illustrate the process of fixing the nitrogen back in the soil to explain the role of microorganisms in increasing the fertility of soil	
	List various methods of preserving food in order to demonstrate the restriction of growth of microorganism	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.

Chapter no	**Learning Objectives**	**Learning Outcome**
	Distinguish between Synthetic & Natural fibres based on their properties	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	List characteristics of plastic's ability to bend to differentiate between thermoplastics and thermosetting plastics	
	Differentiate between plastics based on their ability to decompose in order to explain why plastics are a threat to the environment.	

3. Synthetic fibres and plastics	Enlist different types of synthetic fibres and their characteristics in order to explain their specific uses	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Examine suggest the characteristics of plastic to explain its suitability in a variety of applications.	
	Distinguish between Synthetic & Natural fibres based on their properties	Discusses and appreciates stories of scientific discoveries
	Enlist different types of synthetic fibres and their characteristics in order to explain their specific uses	
	Differentiate between plastics based on their ability to decompose in order to explain why plastics are a threat to the environment	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.

Chapter no	**Learning Objectives**	**Learning Outcome**
	Elaborate the chemical reactions of metals and non-metals with oxygen, water, acids and bases in order to distinguish between them.	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Differentiate between the commonly known materials based on their ability to be bent and formed into sheets, be drawn into wires, ability to produce ringing sound, ability to conduct electricity, ability to conduct heat in order to define various properties of metal	

4. Materials : Metals and Non-metals	Categorize the commonly known materials as Metals & Non-metals in order to explain their physical properties.	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	Apply the concept of reactivity of a metal to predict if a given metal will displace other metal or not in a displacement reaction	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Elaborate the chemical reactions of metals and non-metals with oxygen, water, acids and bases in order to distinguish between them.	Writes word equation for chemical reactions, e.g., reactions of metals and non-metals with air, water and acids, etc.
	Apply the concept of reactivity of a metal to predict if a given metal will displace other metal or not in a displacement reaction	
	Apply the concept of reactivity of a metal to predict if a given metal will displace another metal in a displacement reaction	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
4. Materials : Metals and Non-metals	Predict the utility of a given material for a specific task to reinforce the physical and chemical properties of metals and non-metals	

Chapter no	Learning Objectives	Learning Outcome
	Classify natural resources based on their ability to replenish in order to distinguish between inexhaustible and exhaustible natural resources	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators;

		plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Classify natural resources based on their ability to replenish in order to distinguish between inexhaustible and exhaustible natural resources	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
5. Coal and petroleum	Classify different constituents of petroleum according to their use in daily life in order to deserve various by products besides fuel of petroleum that there is a large number of products obtained from petroleum other than fuel	
	Infer why gas, oil and water found in this particular sequence in location where petroleum is found in order to explain that gas, oil their densities and ability to mix with each other	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Discuss the process of formation of coal to explain why coal is an exhaustible natural resource	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
5. Coal and petroleum	List the useful by products after processing coal to explain that natural resources can be used to obtain useful products other than fuel	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.

Chapter no	Learning Objectives	Learning Outcome
6. Combustion and flame	Differentiate between the type of combustion taking place in gas stove, burning of phosphorus and bursting of firecrackers to assess rapid combustion, spontaneous combustion and explosion	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Compile and list the commonly known inflammable substances to explain that certain substance catch fire than others.	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Explain the process of combustion in order to describe the role of fuel and oxygen in the process as necessary conditions for combustion to take place	
	List harmful by-products of burning fuel to be aware of its harmful effects on individuals and environment such as global warming and acid rains	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
	Compare the calorific value of commonly used fuel to examine fuel efficiency	
6. Combustion and flame	Define ignition temperature to explain why minimum temperature is required for a substance to catch fire.	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Explain the different parts of flame in order to explain why goldsmiths blow the outermost zone of a flame to melt gold and silver	
	List the conditions necessary for producing fire to discover how combustible materials can be prevented from catching the fire.	Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.

Chapter no	Learning Objectives	Learning Outcome
7. Conservation of plants and animals	List causes of deforestation to reflect on its rampant existence despite forest being essential to life	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
	Describe how droughts are caused to elaborate the consequence of deforestation	
	Describe the process of desertification to explain the consequence of deforestation	
	Interpret the importance of Red Data Book to explain why keeping a track of endangered species is important	
	List the flora and fauna in surroundings to establish the term used for locally found plants and animals	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	List the flora and fauna exclusive to a particular region to describe the term endemic species	
7. Conservation of plants and animals	List some famous biosphere and wildlife sanctuaries to describe different mechanisms through which governments protect and conserve forest and wildlife	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.
	List famous animal reserve e.g. Satpura Tiger Reserve to describe measures taken by government in protecting endangered animals	
	Explain reforestation to describe ways to reduce it	

	Explain recycling to describe ways to reduce deforestation	Exhibits creativity in designing, planning, making use of available resources, etc.

Chapter no	Learning Objectives	Learning Outcome
8. Cell - structure and functions	Classify animals based on their cell number, shape and size in order to describe unicellular and multicellular animals	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	List the different parts and functions of a typical cell in order to appreciate the unit structure in an organism	Prepares slides of microorganisms; onion peel, human cheek cells, etc., and describes their microscopic features
	Distinguish between plant and animal cells to explain the function of cell wall	
	List the different parts and functions of a typical cell in order to appreciate the unit structure in an organism	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	Distinguish between plant and animal cells to explain the function of cell wall	

Chapter no.	Learning Objectives	Learning Outcome
9. Reproduction in animals	Differentiate between asexual and sexual reproduction in order to list two modes of reproduction	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Differentiate between sex cells corresponding to parent in order to explain male and female gamete	
	Differentiate between internal and external fertilization in order to describe two modes of fertilization in animals	

9. Reproduction in animals	Classify animals based on their ability to give birth or lay eggs to differentiate between viviparous and oviparous animals	
	Classify animals based on their ability to give birth or lay eggs to differentiate between viviparous and oviparous animals	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	Describe the process of fertilization in order to explain zygote formation	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Describe the process of embryo and foetus formation to explain how an individual is formed inside mother's womb	
	Describe the life cycle of frogs from eggs to adult frogs in order to explain metamorphosis	
	Describe the process of reproduction in hydra in order to explain the process of asexual reproduction	
	Differentiate between asexual and sexual reproduction in order to describe two modes of reproduction in animals	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.

Chapter no	Learning Objectives	Learning Outcome
10. Reaching the age of adolescence	Identify the consequences of taking drugs in order to explain why drugs are not a solution to confused and insecure feeling during adolescent	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Enumerate different variations that take place in body at puberty to explain the effect of adolescence on changing human body	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric

	Summarize the functions of sex and other hormones to establish their role secondary sexual characteristics	current; formation of multiple images; structure of flame, etc.
10. Reaching the age of adolescence	Define adolescence and adolescent age in order to explain changes at puberty	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Enumerate different variations that take place in body at puberty to explain the effect of adolescence on changing human body	
	Explain the effects of hormones in the development of secondary sexual characteristics in order to illustrate growth during puberty	
	Elaborate the functions of hormones secreted by endocrine glands in order to explain the growth in male and female body at puberty	
	Describe mensuration , menarche and menopause to explain the reproductive phases of life in humans	
	Illustrate the procedure for the determining the sex of a baby in order to establish that the gender of the child is decided by the chromosome from male sperm	
	Elucidate the need for a balanced diet in order to explain the nutritional needs of adolescents	
	Identify the harmful consequences of taking drugs in order to explain why drugs are not solution to confused and insecure feeling during adolescence	

Chapter no	Learning Objectives	Learning Outcome

11. Force and pressure	Classify common actions involving motion of object as push or pull in order to define the term force	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
11. Force and pressure	Provide examples where force is being applied in order to explain that two objects must interact for a force to come into play	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Analyse motion of an object when force is applied in the same and opposite direction in order to conclude that forces in same direction add while forces in opposite directions subtract	
	Discover the direction of pressure applied by liquid when put in a container to conclude that liquids exert pressure on the walls of the container	
	Demonstrate and calculate the atmospheric pressure exerted due to the air column above a given area in order to establish that great atmospheric pressure is exerted without us realizing it	
	Derive the formula and calculate pressure for given force applied on a given area in order to explain common daily phenomenon requirement of sharp knife etc.	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Predict the motion of an object when force is applied viz-a-viz force is not applied in order to explain that a force may bring a change in the state of motion of an object	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Predict the changes when force is applied to a body that is not free to move in order to explain that force can cause change in shape of objects	

	Cite examples from daily life where an action causes change in movement or shape due to the contact between two objects in order to define contact forces	
	Illustrate with examples from daily life an action that causes change in movement or shape without contact between two objects in order to define non-contact forces.	

Chapter no.	Learning Objectives	Learning Outcome
12. Friction	Differentiate between rolling friction and sliding friction in order to explain why ball bearings are employed in machines e.g. bicycle wheels	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Analyse situations where resistance is felt while applying force to move a body in order to explain friction force where acts inopposite direction	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Analyse and identifynumber of bodies interacting whenfriction force is felt in order to establish that friction is a contact force.	
	Discover the factors that cause friction when two bodies moving relatively in order to explain why it is easier to move an object on a smooth surface compared to a rough surface	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Provide advantages and disadvantages of friction in order to justify friction as necessary evil	
	Differentiate between rolling friction and sliding friction in order to explain the use of different friction reducing strategies	

	Explain why the engine of an airplane is needed when flying in order to explain drag caused by air (friction caused by fluids)	
	Identify factors causing friction in order to come up with formulate strategies to reduce	Exhibits creativity in designing, planning, making use of available resources, etc.

Chapter no	Learning Objectives	Learning Outcome
13. Sound	Differentiate between frequency and amplitude in order to describe factors responsible for loudness and pitch of the sound	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	Provide examples where sound travels from one point to another in order to establish that sound needs a medium to propagate	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
	List examples of body moving in to and fro motion in order to explain vibration	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Provide examples where sound travels from one point to another in order to establish that sound needs a medium to propagate	
	Recall the audible range of sound for humans in order to explain why certain sounds cannot be heard by humans	

13. Sound	Describe the structure and function of an eardrum in order to explain how humans hear sound	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	List commonly known musical instrument and identify parts that vibrate in order to explain that vibration produces sound	Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.
	List commonly known musical instrument and identify parts that vibrate in order to explain that vibration produces sound	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	List and identify functions of parts of human body that produces sound in order to explain the process of sound production	
	List the harmful effects of noise pollution in order to mitigate it	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.

Chapter no	Learning Objectives	Learning Outcome
	Distinguish between good and poor conductors of electricity in order to explain that various materials can conduct electricity under certain conditions	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.

14. Chemical effects of electric current	List commonly known chemical effects of electricity in order to establish that electricity causes chemical reactions	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Describe the process of electroplating in order to explain the application of chemical effects of electricity on metals	Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.
	Describe the process of electroplating in order to explain the application of chemical effects of electricity on metals	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.

Chapter no	Learning Objectives	Learning Outcome
15. Some natural phenomenon	Identify and explain seismic zones around earth to explain why some areas are more affected by earthquakes than others	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
	Analyse if two charged objects attract or repel each other in order to establish that similar charge repel each other while opposite charge attract each other	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Examine the sequence of lightening occurring in clouds in order to explain the process of electric discharge in nature	
	Justify the phenomenon of earthquake in order to explain that the ground beneath us is not static	

15. Some natural phenomenon	Illustrate with a diagram the movement of earth in order to explain how earthquakes cause tsunami	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	Examine the working of electroscope to detect if an object is charged or not in order to apply the concept of similar charge objects repel each other	Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.
	Recall examples of visible sparks in order to explain the phenomenon of lightning	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Investigate the process of earthing in order to assess the process of transferring charge from a charged object to earth in order to explain the advantages of earthing of electric circuits in households	
	Predict how lightning travels from the cloud to the ground in order to describe the measures that must be taken during lightning	
	Examine the sequence of lightening occurring in clouds in order to explain the process of electric discharge in nature	Discusses and appreciates stories of scientific discoveries

Chapter no	Learning Objectives	Learning Outcome
	Distinguish between reflection from a rough and a smooth reflecting surface in order to differentiate between diffused and regular reflection	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.

16. Light	Compare and contrast between blind spot and field of view in order to explain how humans see object in the presence of light	Conducts simple investigations to seek answers to queries, e.g., what are the conditions required for combustion? Why do we add salt and sugar in pickles and *murabbas*? Do liquids exert equal pressure at the same depth?
	Conclude the law of reflection and represent it by drawing a ray diagram identifying incident ray, reflected ray and the normal	Explains processes and phenomenon, e.g., reproduction in human and animals; production and propagation of sound; chemical effects of electric current; formation of multiple images; structure of flame, etc.
	Identify and calculate the angles of incidence and reflection of a ray of light to illustrate the laws of reflection in real life.	Measures angles of incidence and reflection, etc.
	Conclude the law of reflection and represent it by drawing a ray diagram identifying incident ray, reflected ray and the normal	
16. Light	Illustrate with a line diagram how images invert when reflecting from a mirror in order to see the applications of the laws of reflection	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	Describe various parts of human eye and identify their functions in order to explain how humans see object in presence of light	
	Establish that light can reflect multiple time with a set of mirrors by constructing a kaleidoscope	Constructs models using materials from surroundings and explains their working, e.g., *ektara*, electroscope, fire extinguisher, etc.
	Recommend different measures for protecting eyes when a problem is felt in order to establish the importance of eye care	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various

	Describe the braille system in order to explain how people with visual impairment manage to read and write	purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.

Chapter no.	Learning Objectives	Learning Outcome
17. Stars and the solar system	Differentiate between asteroids, comet and meteor in order identify the celestial body.	Differentiates materials and organisms, such as, natural and human made fibres; contact and non-contact forces; liquids as electrical conductors and insulators; plant and animal cells; viviparous and oviparous animals, on the basis of their properties, structure and functions.
	List commonly seen objects in the sky as celestial objects are	Classifies materials and organisms based on properties / characteristics, e.g., metals and non-metals; *kharif* and *rabi* crops; useful and harmful microorganisms; sexual and asexual reproduction; celestial objects; exhaustible and inexhaustible natural resources, etc.
	Categorize the name of commonly known group of stars in order to explain that constellations are a group of stars with recognisable shape	
	Explain with diagram the different phases of moon in order to explain that moon rotates around earth	Draws labelled diagram / flow charts, e.g., structure of cell, eye, human reproductive organs; experimental set ups, etc.
	Categorize the name of commonly known group of stars in order to explain that constellations are a group of stars with recognisable shape	

	Outline and illustrate the planets of the solar system in order to correctly identify them	
	Identify the name of different celestial bodies in the solar system in order to explain the constituting bodies of a solar system	
	Describe artificial satellites in order correctly classify them as man-made celestial body	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production; using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.

Chapter no	Learning Objectives	Learning Outcome
18. Pollution of air and water	Analyse the problem of air pollution in order to explain why it is a threat to human beings.	Relates processes and phenomenon with causes, e.g., smog formation with the presence of pollutants in air; deterioration of monuments with acid rain, etc.
	Elaborate the formation and effects of acid rain in order to explain the reasons for discolouration of the marble of monuments (Taj Mahal)	
	Explain the effect of greenhouse gases on the planet in order to explain potential reason for rising temperature of the planet.	
	Describe water pollution in order to assess it as a threat to human beings.	
	Elaborate the formation and effects of acid rain in order to explain the reasons for discolouration of the marble of monuments (Taj Mahal)	Writes word equation for chemical reactions, e.g., reactions of metals and non-metals with air, water and acids, etc.
	Enumerate steps that can be taken to clean water for drinking in order to explain how water can be made safe for drinking i.e. portable water	Applies learning of scientific concepts in day- to-day life, e.g., purifying water; segregating biodegradable and non-biodegradable wastes; increasing crop production;

	Explain how reducing, reusing and recycling industrial waste helps in reducing the water pollutants in order to explore measures for dealing with water pollution	using appropriate metals and non-metals for various purposes; increasing / reducing friction; challenging myths and taboos regarding adolescence, etc.
	Identify commonly known air pollutants in order to examine their harmful effects	Makes efforts to protect environment, e.g., using resources judiciously; making controlled use of fertilisers and pesticides; suggesting ways to cope with environmental hazards, etc.
	Suggest alternate mechanism to lower carbon emission in order to suggest steps to curb the air pollution.	
	Cite steps taken to prevent water pollution in major river(s) in order to explain measures to deal with water pollutants	