

SCIENCE CLASS VIII

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
1. FOOD				
Crop production	Crop production: How are different food crops produced? What are the various foods we get from animal sources?	Crop production: Soil preparation, selection of seeds, sowing, applying fertilizers, irrigation; weeding, harvesting and storage; nitrogen fixation, nitrogen cycle;	Interaction and discussion with local men and women farmers about farming and farm practices; visit to cold storage, go- downs; visit to any farm/ nursery/ garden;	Preparing herbarium specimens of some crop plants; collection of some seeds etc; preparing a table/chart on different irrigation practices and sources of water in different parts of India; looking at roots of any legume crop for nodules, hand section of nodules
Micro-organisms	What living organisms do we see under a microscope in a drop of water? What helps make curd? How does food go bad? How do we preserve food?	Micro organisms - useful and harmful	Microscope, kit materials; information about techniques of food preservation	Making a lens with a bulb; Observation of drop of water, curd, other sources, bread mould, orange mould under the microscope; experiment showing fermentation of dough - increase in volume (using yeast) - collect gas in balloon, test in lime water.
2. MATERIALS				
Materials in daily life	Are some of our clothes synthetic? How are they made? Where do the raw materials come from?	Synthetic clothing materials. Other synthetic materials, especially plastics; usefulness of plastics and	Sharing of prior knowledge, source materials on petroleum products	Survey on use of synthetic materials. Discussion

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	Do we use other materials that are synthetic? Do we use cloth (fabric) for purposes other than making clothes to wear? What kind of fabric do we see around us? What are they used for?	problems associated with their excessive use. There are a variety of fibrous materials in use. A material is chosen based on desired property	Collection of material from neighbourhood or should be part of the kit.	Testing various materials - for action of water, reaction on heating, effect of flame, electrical conductivity, thermal conductivity, tensile strength.
Different kinds of materials and their reactions	Can a wire be drawn out of wood? Do copper or aluminium also rust like iron? What is the black material inside a pencil? Why are electrical wires made of aluminium or copper?	Metals and non-metals	Kit items	Simple observations relating to physical properties of metals and non-metals, displacement reactions, experiments involving reactions with acids and bases. Introduction of word equations.
How things change/react with one another	What happens to the wax when a candle is burnt? Is it possible to get this wax back? What happens to kerosene / natural gas when it is burnt? Which fuel is the best? Why?	Combustion, flame All fuels release heat on burning. Fuels differ in efficiency, cost etc. Natural resources are limited. Burning of fuels leads to harmful by products	"The Chemical History of a Candle", by M. Faraday, 1860. Collecting information from home and other sources.	Experiments with candles. Collecting information. Discussions involving whole class

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3. The World of the Living				
Why conserve?	What are reserve forests/ sanctuaries etc? How do we keep track of <i>our</i> plants and animals? How do we know that some species are in danger of disappearing? What would happen if you continuously cut trees?	Conservation of biodiversity/wild life/plants; zoos, sanctuaries, <i>forest</i> reserves etc. flora, fauna endangered species, red data book; endemic species, migration	Films on wild life, TV programmes, visit to zoo/forest area/ sanctuaries etc.; case study with information on disappearing tiers; data <i>on</i> endemic and endangered species <i>from</i> MEF, Govt. of India, NGOs	Discussion on whether we find as many diverse plants /animals in a 'well kept area' like a park <i>or</i> cultivated land, as compared to any area left alone. Discussion on depletion of wild life, why it happens, on poaching, economics.
The cell	What is the internal structure of a plant - what will we see if we look under the microscope? Which cells <i>from</i> our bodies can be easily seen? Are all cells similar?	Cell structure, plant and animal cells, use of stain to observe, cell organelles - nucleus, vacuole, chloroplast, cell membrane, cell wall	Microscope, onion peels, epidermal peels of any leaves, petals etc, buccal cavity cells, <i>Spirogyra</i> ; permanent slide of animal cells	Use of a microscope, preparation <i>of</i> a slide, observation of onion peel and cheek cells, other cells <i>from</i> plants e.g. <i>Hydrilla</i> leaf, permanent slides showing different cells, tissues, blood smear; observation of T.S stem to see tissues; observing diverse types of cells from plants and animals (some permanent slides).
How babies are formed?	How do babies develop inside the mother? Why does our body change when we reach our teens? How is the sex of the	The process of reproduction and types of reproduction, Sexual reproduction	Counsellors, films, lectures	Discussion with counsellors on secondary sexual characters, on how sex of the child is determined, safe SEX,

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	child determined? Who looks after the babies in your homes? Do all animals give birth to young ones?	and endocrine system in animals, secondary sexual characters, reproductive health; internal and external fertilization.		reproductive health; observation on eggs, young ones, life cycles. Discussion on Gender issues and social taboo's.
4. MOVING THINGS, PEOPLE AND IDEAS				
Idea of force	What happens when we push or pull anything? How can we change the speed, direction of a moving object? How can we shape the shape of an object?	Idea of force-push or pull; change in speed, direction of moving objects and shape of objects by applying force; contact and non-contact forces	Daily-life experience, kit items	Observing and analyzing the relation between force and motion in a variety of daily-life situations. Demonstrating change in speed of a moving object, its direction of motion and shape by applying force. Measuring the weight of an object, as a force (pull) by the earth using a spring balance.
Friction	What makes a ball rolling on the ground slow down?	Friction .- factors affecting friction, sliding and rolling friction, moving; , advantages and disadvantages of friction for the movement of automobiles, airplanes and boats/ships; increasing and	Various rough and smooth surfaces, ball bearings.	Demonstrating friction between rough/smooth surfaces of moving objects in contact, and wear and tear of moving objects by rubbing (eraser on paper, card board, sand paper). Activities on static, sliding and rolling friction.

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		reducing friction		Studying ball bearings. Discussion on other methods of reducing friction and ways of increasing friction.
Pressure	Why are needles made pointed? Why does a balloon burst if too much air is blown into it? Why does an inverted glass/bottle/pitcher resist being pushed down into water? How can air /liquids exert pressure?	Idea of pressure; pressure exerted by air /liquid; atmospheric pressure	Daily-life experiences; Experimentation - improvised manometer and improvised pressure detector,	Observing the dependence of pressure exerted by a force on surface area of an object. Demonstrating that air exerts pressure in a variety of situations. Demonstrating that liquids exert pressure. Designing an improvised manometer and measuring pressure exerted by liquids. Designing improvised pressure detector and demonstrating increase in pressure exerted by a liquid at greater depths.
Sound	How do we communicate through sound? How is sound produced? What characteristics of different sound?	Various types of sound; sources of sound; vibration as a cause of sound; frequency; medium for propagation of sound; idea of noise as unpleasant and	Daily-life experiences; kit items: musical items; musical instruments	Demonstrating and distinguishing different types (loud and feeble, pleasant musical and unpleasant/ noise, audible and inaudible) of sound. Producing different types of sounds. using the same source. Making a ' <i>Jal</i>

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		unwanted sound and need to minimize noise.		<i>Tarang</i> '. Demonstrating that vibration is the cause of sound. Designing a toy telephone. Identifying various sources of noise. (unpleasant and unwanted sound) in the locality and thinking of measures to minimise noise and its hazards (noise pollution)
5. HOW THINGS WORK				
Electric current and circuits	Why do we get a shock when we touch an electric appliance with wet hands?	Water conducts electricity depending on presence /absence of salt in it. Other liquids may or may not conduct electricity	Rubber cap, pins, water, bulb or LED, cells, various liquids	Activity to study whether current flows through various liquid samples (tap water, salt solution, lemon juice, kerosene, distilled water if available)
	What happens to a conducting solution when electric current flows through it?	Chemical effects of current	Carbon rods, beaker, water, bulb, battery	Emission of gases from salt solution. Deposition of Cu from copper sulphate solution. Electric pen using KI and starch solution
	How can we coat an object with a layer of metal?	Basic idea of electroplating	Improvised electrolytical cell, CUS04	Simple experiment to show electroplating.
6. Natural Phenomena				
Rain, thunder and	What is lightning?	Clouds carry electric	Articles on clouds and	Discussion on sparks.

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lightning	What safety measures should we take against lightning strikes?	charge. Positive and negative charges, attraction and repulsion. Principle of lightning conductor	lightning; kit items	Experiments with comb and paper to show positive and negative charge. Discussion on lightning conductor
Light	<p>What are the differences between the images formed on a new utensil and an old one? Why is there this difference?</p> <p>When you see your image in the mirror it appears as if the left is on the right - why?</p> <p>Why don't we see images on all surfaces around us?</p> <p>What makes things visible?</p> <p>How do we see images of our back in a mirror?</p>	<p>Laws of reflection</p> <p>Characteristics of image formed with a plane mirror</p> <p>Regular and diffused reflection</p> <p>Reflection of light from an object to the eye.</p> <p>Multiple reflection</p>	<p>Mirror, source of light, ray source (mirror covered with black paper with a thin slit)</p> <p>Plane glass, candle, scale.</p> <p>Experience</p> <p>Mirrors and objects to be seen</p>	<p>Exploring laws of reflection using ray source and another mirror</p> <p>Locating the reflected image using glass sheet and candles</p> <p>Discussion with various examples.</p> <p>Activity of observing an object through an object through a straight and bent tube; and discussion.</p> <p>Observing multiple images formed by mirrors placed at angles to each other making a kaleidoscope</p>

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	<p>Why do we sometimes see colours on oil films on water?</p> <p>What is inside our eye that enables us to see?</p> <p>Why are some people unable to see?</p>	<p>Dispersion of light</p> <p>Structure of the eye</p> <p>Lens becomes opaque, light not reaching the eye. Visually challenged use other senses to make sense of the world around. Alternative technology available. Role of nutrition in relation to blindness</p>	<p>Plane mirror, water</p> <p>Model or chart of the human eye</p> <p>Experiences of children; case histories. Samples of Braille sheets.</p>	<p>Observing spectrum obtained on a white sheet of paper/wall using a plane mirror inclined on a water surface at an angle of 45°.</p> <p>Observing reaction of pupil to a shining torch. Demonstration of blind spot.</p> <p>Description of case histories of visually challenged people who have been doing well in their studies and careers. Activities with Braille sheet</p>
Night sky	What do we see in the sky at night? How can we identify stars and planets?	<p>Idea about heavenly bodies/celestial objects and their classification moon, planets, stars, constellations.</p> <p>Motion of celestial</p>	Observation of motion of objects in the sky during the day and at night; models, charts, role-play and games, planetarium.	<p>Observing and identifying the objects moving in the sky during the day and at night</p> <p>Observing and identifying some prominent stars and constellations Observing and identifying some</p>

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		objects in space; the solar system		prominent planets, visible to the naked eye, (Venus, Mars, Jupiter) in the night sky and their movement Design and preparing models and charts. of the solar system, constellations, etc. Role-play and games for understanding movement of planets, stars etc.
Earthquakes	What happens during an earthquake? What can we do to minimize its effects?	Phenomena related to earthquakes	Earthquake data; visit to seismographic centre	Looking at structures/large objects and guessing what will happen to them in the event of an earthquake; activities to explore stable and unstable structures
7. NATURAL RESOURCES				
Man's intervention in phenomena of nature	What do we do with wood? What if we had no wood? What will happen if we go on cutting trees/grass without limit?	Consequences of deforestation: scarcity of products for humans and other living beings, change in physical properties of soil, reduced rainfall.	Data and narratives on deforestation and on movements to protect forests	Narration and discussions. Project- Recycling of paper.

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	<p>What do we do with coal and petroleum?</p> <p>Can we create coal and petroleum artificially?</p>	<p>Reforestation; recycling of paper.</p> <p>Formation of coal and petroleum in nature. (fossil fuels?)</p> <p>Consequences of over extraction of coal and petroleum.</p>	Background materials, charts etc.	Discussion
Pollution of air and water	<p>What are the various activities by human beings that make air impure?</p> <p>Does clear, transparent water indicate purity?</p>	<p>Water & air are increasingly getting polluted and therefore become scarce for use. Biological and chemical contamination of water; effect of impure water on soil & living beings; effect of soil containing excess of fertilizers & insecticides on water resources. Potable water</p>	Description of some specific examples of extremely polluted rivers.	Case study and discussion. Purification of water by physical and chemical methods including using sunlight. Discussion on other methods of water purification

SCIENCE CLASS IX

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1. FOOD				
Higher yields	What do we do to get higher yields in our farms?	Plant and animal breeding and selection for quality improvement, use of fertilizers, manures; protection from pests and diseases; organic farming.	Visit to any fish/bee/dairy/pig etc farms; data showing harmful effects of insecticides; process for the preparation of compost, vermi-compost	Collection of weeds found in fields of different crops; collection of diseased crops; Discussion and studying com posting/ vermi-com posting
2. MATERIALS				
Material in our clothing	What kinds of clothes help us keep cool? Why do wet clothes feel cool?	Cooling by evaporation. Absorption of heat	Work done in class VII; glassware, heat source, black paper, thermometers.	Experiments to show cooling by evaporation. Experiments to show that the white objects get less hot
Different kinds of materials	In what way are materials different from each other? Is there some similarity in materials? In how many ways can you group the different materials you see around? How do solids, liquids	All things occupy space, possess mass. Definition of matter Solid, liquid and gas; characteristics - shape, volume, density; change of state melting, freezing, evaporation,	Everyday substances like wood, salt, paper, ice, steel, water, etc. Wax, water, ice, oil, sugar, camphor/ammonium chloride/naphthalene	To feel the texture, observe the colour and lustre, effect of air, water and heat, etc. on each of the materials Sorting out a medley of materials, in various ways. Observe shape and physical state of

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	and gases differ from each other? Can materials exist in all the three states?	condensation, sublimation		different materials. Observe effect of heat on each of the resources. (Teacher to perform the experiment for camphor, ammonium chloride and naphthalene.)
What are things made of?	What are things around you made of? What are the various types of chemical substances?	Elements, compounds and mixtures. Heterogeneous and homogeneous mixtures. Colloids and suspensions.	Samples of commonly available elements, compounds and mixtures. Samples of solution, suspension and colloid.	Discussion on claims 'Air is a mixture' (mixture of what? How can these be separated?), 'Water is compound' and 'Oxygen is an element'.
	Do substances combine in a definite manner?	Equivalence - that x grams of A is chemically not equal to x grams of B.	Historical accounts. Glassware, chemicals (oxalic acid, sodium hydroxide, magnesium ribbon).	Titration using droppers or syringes, quantitative experiments.
	How do things combine with each other? Are there any patterns which can help us guess how things will combine with each other?	Particle nature, basic units: atoms and molecules. Law of constant proportions. Atomic and molecular masses.	Kits for making molecular models. Historical account including experiments of Lavoisier and Priestley.	Discussion on the fact that elements combine in a fixed' proportion through discussion on chemical formulae of familiar compounds.
	How do chemists weigh	Mole concept.		Simple numericals to be

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	and count particles of matter?	Relationship of mole to mass of the particles and numbers Valency. Chemical formulae of common compounds		done by the students. A game for writing formulae. e.g. criss crossing of valencies to be taught through dividing students into pairs. Each student to hold two placards: one with the symbol and the other with the valency. Keeping symbols in place, Teacher to move only valencies to form the formula of a compound
What is there inside an atom?	Can we see an atom or a molecule under a microscope by some other means? What is there inside an atom?	Atoms are made up of smaller particles: electrons, protons, and neutrons. These smaller particles are present in all the atoms but their numbers vary in different atoms. Isotopes and isobars.	Brief historical account of Rutherford's experiment. Charts, films etc.	Brief historical account of Rutherford's experiment. Charts, films etc.

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3. THE WORLD OF THE LIVING				
Biological Diversity	How do the various plants around us differ from each other? ~ow are they sim ilar! What about animals? How are they similar to and different from each other?	Diversity of plants and animals basic issues in scientific naming, Basis of classification, Hierarchy of categories/groups, Major groups of plants (salient features) (Bacteria, Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms). Major groups of animals (salient features) (Non-chordates up to phyla and Chordates up to classes).	Specimens of some animals, and plants not easily observable around you	Discussion on diversity and the characteristics associated with any group
What is the living being made up of?	What are we made up of? What are the different parts of our body? What is the smallest living unit?	Cell as a basic unit of life; basic idea of cell division, Prokaryotic and eukaryotic cells, multicellular organisms; cell membrane and cell wall, cell organelles: chloroplast, mitochondria, vacuoles, ER, Golgi Apparatus; nucleus, chromosomes -	Permanent slides, model of the human body.	Observation of model of human body to learn about levels of organization - tissue, organ, 'system, and organism, observe blood smears (frog and hum an), cheek cells, onion peel cell, <i>Spirogyra</i> , <i>Hydrilla</i> leaves. (cyclosis).

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		basic structure, number. Tissues, organs, organ systems, organism. Structure and functions of animal and plant tissues(four types in animals; meristematic and permanent tissues in plants).		
How do substances move from cell to cell?	How do food and water move from cell to cell? How do gases get into the cells? What are the substances that living organisms exchange with the external world? How do they obtain these substances?	Diffusion / exchange of substances between cells and their environment, and between the cells themselves in the living system; role in nutrition, water and food transport, excretion, gaseous exchange	Egg membrane, <i>Rhoeo</i> leaves, sugar, microscope, slides	Looking at closed and open stomata, plasmolysis in <i>Rhoeo</i> leaf peels
How do we fall sick?	What are the various causes of diseases? How can diseases be prevented? How can we remain healthy?	Health and its failure. Disease and its causes. Diseases caused by microbes and their prevention - Typhoid, diarrhoea, malaria, hepatitis, rabies, AIDS,	Newspaper articles, information from health centres, photographs of various causal organisms. Photographs. permanent slides of bacteria.	Surveying neighbourhood to collect information on disease occurrence pattern. Studying the Life cycle of the mosquito and malarial parasite. Discussion on how malaria is spread, how to

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		TB, polio; pulse polio programme.		prevent mosquito breeding.
4. MOVING THINGS, PEOPLE AND IDEAS				
Motion	How do we describe motion?	Motion - displacement, velocity; uniform and non-uniform motion along a straight line, acceleration, distance-time and velocity time graphs for uniform and uniformly accelerated motion, equations of motion by graphical method; elementary idea of uniform circular motion		Analysis of motion of different common objects. Drawing distance-time and velocity-time graphs for uniform motion and for uniformly accelerated motion
Force and Newton's laws	What makes things change their state of motion?	Force and motion, Newton's laws of motion: inertia of a body, inertia and mass, momentum, force and acceleration. Elementary idea of conservation of momentum, action and reaction forces.	Historical accounts; Experiences from daily life; wooden and glass boards, sand, balls; wooden support, some coins (say of Rs. 2 or Rs. 5); tumbler; balloons etc.	Demonstrating the effect of <i>force</i> on the state of motion of objects in a variety of daily-life situations. Demonstrate the change in direction of motion of an object by applying <i>force</i>
Gravitation	What makes things fall? Do all things fall in the same way?	Gravitation; universal law of gravitation, <i>force of gravitation</i> of the earth (gravity), acceleration due to	Spring balance	Analysis of motion of ball falling down and Of ball thrown up Measuring mass and weight by a

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		gravity; mass and weight; <i>free fall</i> .		spring balance
Work, energy and power	How do we measure work done in moving anything? How does falling water make a mill run?	Work done by a force, energy, power; kinetic and potential energy; law of conservation of energy	Rope (or string), board or plank, wooden block, ball, arrow, bamboo stick, spring, etc.	Experiments on body rolling down inclined plane pushing another body. Experiments with pendulum Experiments with spring. Discussion
Floating bodies	How does a boat float on water?	Thrust and pressure. Archimedes principle, buoyancy, elementary idea of relative density.	Cycle pump; board pins bulletin board, mug, bucket, water etc	Experiments with' floating and sinking objects.
How do we hear from a distance?	How does sound travel? What kind of sounds can we hear? 'What is an echo? How do we hear?	Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo and sonar Structure of the human ear (auditory aspect only)	String, ball or stone as bob, water tank, stick, slinky, rope, echo tube, rubber pipe etc. Model or chart showing structure of the ear	Experiment on reflection of sound.

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5. NATURAL RESOURCES				
Balance in Nature	<p>Why do air, water and soil seem not to be consumed?</p> <p>How does the presence of air support life on earth?</p> <p>How have human activities created disturbances in the atmosphere?</p> <p>How does nature work to maintain balance of its components?</p>	<p>Physical resources: air, water, soil Air for respiration, for combustion, for moderating temperatures, movements of air and its role in bringing rains across India.</p> <p>Air, water and soil pollution (brief introduction)</p> <p>Holes in ozone layer and the probable damages.</p> <p>Bio-geo chemical cycles in nature: water, oxygen, carbon, nitrogen</p>	<p>Daily newspaper, magazines and other reading material.</p> <p>Weather reports over a few months and air quality reports over the same time period.</p> <p>Case study material</p>	<p>Case studies of actual situation in India with more generalized overview of inter relationship of air, water, soils, forests.</p> <p>Debates on these issues using resources mentioned alongside, visit to/from an environmental NGO; discussion.</p>

PRACTICALS
CLASS IX

TOTAL MARKS = 20

PASS MARKS = 6

PHYSICS

NOTE: Every student will perform at least ten experiments (at least two experiments from each unit) during the academic year.

UNIT: MOVING THINGS AND HOW THINGS WORK

1. To determine the density of a solid (denser than water) by using a spring balance and measuring cylinder.
2. To study the variation in time period of a simple pendulum with length and to plot L-T graph.
3. To determine the value of acceleration due to gravity by simple pendulum
4. To verify Archimede's principle.
5. To determine the boiling point of water and melting point of solid(eg Ice, Urea)
6. To measure the temperature of hot water as it cools and plot a time-temperature graph.
7. To determine the velocity of a pulse propagated through a stretched string/slinky

BIOLOGY

NOTE: Every student will perform at least two experiments from each unit during the academic year.

1. To study the main parts of compound microscope
2. To make a temporary stained mount of onion peel under a microscope
3. To study major groups of plants (Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms) and their salient features.
4. Study of major groups of animals (non-chordates and chordates) and their salient features.
5. To study the Life Cycle of mosquito.
6. Collection of newspaper articles regarding health information.

CHEMISTRY

NOTE: A student is expected to perform fifteen practical exercises from the list suggested below: At least two exercises from each unit.

1. To prepare a solution of common salt/ sugar of a given percentage composition by mass.
2. To prepare a colloidal solution of sulphur and differentiate it from (i.) true solution and (ii) suspension, on the basis of transparency and filtration criterion respectively.
3. To differentiate between a mixture (containing two components) and pure compounds.
4. To carry out the following chemical reactions and record the observation:
 - i. Iron nail with copper sulphate solution in water,
 - ii. Zinc with sulphuric acid
 - iii. Sodium sulphate with Barium Chloride in the form of their aqueous solutions.
5. To distinguish between saturated and un-saturated organic compounds.
6. To prepare carbon dioxide gas and study its properties.
7. To study the sublimation of iodine or camphor or NH_4Cl or Naphthalene.
8. To study the interconversion of three different states of water and to show that they are the three states of the same substance.
9. To separate the constituents of mixture of two substances (any one):
 - i. Iron and sand,
 - ii. Iodine and sand
 - iii. Sand and salt or sugar,
 - iv. Salt and water
 - v. Sugar and water
10. To prepare one homogeneous and one heterogeneous mixture (preferably one liquid) and distinguish them on the basis of at least one common property of such solution like
 - i. Colour
 - ii. Filtration
 - iii. Settling or
 - iv. Any other

**Science
Class X**

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
1. MATERIALS				
Different kinds of materials	<p>Why are some substances sour and some bitter in taste?</p> <p>Why does soap solution feel slippery?</p> <p>Why does seawater taste salty?</p>	<p>Acids, bases and salts: General properties, examples and uses.</p>	<p>Orange juice, lemon juice, soap solution, litmus solution, zinc, copper and aluminium metals, acids: hydrochloric acid, sulphuric acid, nitric acid, Bases: Sodium hydroxide, common salt</p>	<p>Testing different substances with indicators.</p> <p>Neutralisation Reactions</p>
	<p>Why does iron rust?</p> <p>Why does painted iron not rust? Why is burning sensation removed when one takes antacids?</p> <p>Why do substances stop burning in the absence of air?</p> <p>Why is flame seen when substances burn?</p> <p>Can substances burn without flame? Why does a matchstick kept in the blue part of the flame not burn?</p>	<p>Types of chemical reactions: combination; decomposition, displacement, double displacement, precipitation, neutralization, oxidation and reduction in terms of gain and loss of oxygen and hydrogen</p>	<p>Turmeric, limejuice, vinegar, baking soda, washing soda, yeast, hot water.</p> <p>Materials such as iron nails, copper strip, aluminium strip, zinc strip, galvanised strip, Petri dishes with and without covers, container that can be tilled with water, cotton wool, etc.</p>	<p>Mixing pairs of substances mentioned alongside, to see the reactions - discussion on chemistry in the kitchen, chemistry inside our bodies. Carrying out simple reactions that encompass decomposition, displacement, double displacement, precipitation, neutralization, oxidation and reduction</p>

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	<p>Why is a red coating formed on the zinc rod when it is kept in copper sulphate solution?</p> <p>What is the material of the <i>coating</i>?</p>			
How things change/react with one another	<p>How do copper, silver, iron exist in nature?</p> <p>What is the composition of natural gas used for cooking?</p> <p>What is petrol?</p> <p>What is vinegar?</p>	<p>Brief discussion of basic metallurgical processes.</p> <p>Properties of common metals.</p> <p>Elementary idea about Bonding</p> <p>Carbon compounds, elementary idea about bonding.</p> <p>Saturated hydrocarbons, alcohols, carboxylic acids: (no preparation, only properties).</p>	<p>Samples of metals: iron, copper, lead, silver, zinc, aluminium, gold; of non-metals: sulphur, graphite of alloys: steel, brass</p> <p>Models</p>	<p>Discussions on metallurgical processes and simple experiments involving metals, with chemical reactions.</p> <p>Experiments involving reactions of carbon and its compounds with chemical reactions.</p> <p>Use of models.</p>

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Materials of common use	<p>How is common salt obtained? Besides its use in food, is it used for other purposes?</p> <p>What makes washing soda and baking soda different materials? How does bleaching powder make paper and cloth white?</p> <p>What is the white material that is used for making casts?</p> <p>How do soaps clean clothes?</p> <p>Can some other material be used for cleaning clothes?</p> <p>Why does a man lose control on his body after drinking alcohol?</p> <p>Why do people become blind on drinking denatured alcohol?</p>	Soap - cleansing action of soap	Kit containing various materials like common salt, washing soda, baking soda, lime, lime stone, bleaching powder, plaster of Paris, soaps; alcohol.	Use of kit materials for demonstration as well as performing of experiments by student of properties. Visits to factories
How are elements classified?	How do chemists study such a large number of elements?	Gradations in properties: Mendeleeev periodic table.	Brief historical account, Charts, films etc.	Predicting trends on the basis of the table.

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2. THE WORLD OF THE LIVING				
Our Environment	What will happen if we bury different materials in the soil? What will happen if we kill all insects? Some <i>of</i> us eat meat: some <i>do</i> not what about animals?	Our Environment: Environmental problems, what can we do? Bio degradable, non-biodegradable. <i>Ozone</i> depletion.	Discussion on food habits <i>of</i> animals, Finding out the various waste materials produced and their disposal in different parts of the country	Activity <i>of</i> burying different materials in the soil and studying periodically what happens; construction <i>of</i> food web using models, classification of some common plants and animals as consumers etc.
How do we stay alive?	What are the processes needed for living?	Define 'living' things; Basic concept of nutrition, respiration, transport and excretion in plants and animals.	Models and charts of various systems in animals, and parts in plants	Study various things around to decide whether they are living/non living.
Control in the living	Why do roots grow towards the ground? Can we make them <i>grow</i> upwards? Why do stems <i>grow</i> upwards?	Tropic movements in plants; Introduction to plant hormones; Control and coordination in animals: voluntary, involuntary and reflex action, nervous system; chemical coordination: animal hormones.	Young plants for experiments, seeds; Kit materials; Pavlov's experiment on conditioned reflex;	Experiments on tropic movements in plants - geotropism, hydrotropism, phototropism, interaction of factors; experiment on apical dominance; demonstration of reflex action
Reproduction in the living	Do plants and animals have similar reproductive cycles?	Reproduction in, plants and animals. Need for and methods of	Permanent slide L.S. grain; charts/ specimens, of	Study pollen tube growth and pollen tubes Oh a stigmatic mount,

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	Can we decide how many children are born in a family?	family planning. Safe sex vs. HIV/AIDS. Childbearing and women's health.	embryos, egg Charts and other materials on family planning. Newspaper reports on HIV/AIDS.	mount soaked seeds to see embryonal axis, cotyledons etc., seed germination - epigeal and hypogeal; structure of the hen's egg. Discussion on family planning and responsible parenting.
Heredity and evolution	Why are we like our parents? Did similar plants and animals exist in the past? Did life always exist?	Heredity; Origin of life: brief introduction; Basic concepts of evolution and basic idea on nucleic acids.	Data and worksheet from Mendel's experiments, specimen of fossil,	Phenotypic ratio 3 : 1, 2: 1., 9 : 3: 3 : 1
3. HOW THINGS WORK				
Electric circuits	In which direction does current flow inside a conductor? How is potential difference across a	Potential difference, potential. Ohm's law	Battery, conductor voltmeter, ammeter, connecting wire, key. -do- And rheostats	Using a simple electric circuit, show that charges flow from higher potential to lower potential. Use the analogy of flow of water from higher (potential to highest energy) lower height (lower potential energy). Using a circuit

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	<p>conductor related to current through the conductor?</p> <p>How can 'you arrange a given set of resistors so that the same current flows through all?</p> <p>How are appliances connected in house?</p> <p>How much heat is generated when a current I flows through a resistor?</p>	<p>Series combination of resistances.</p> <p>Parallel combination of resistances</p> <p>Power dissipated due to current. Inter relation between P, V, I and R.</p>	<p>-do and given set of resistors.</p> <p>-do and given set of resistors</p> <p>Appliances based on heating effect of current in daily life.</p>	<p>consisting of a conductor, battery, key, voltmeter and ammeter, establish a relationship between potential difference and current and hence Ohm's law.</p> <p>Using the Ohm's law circuit, establishing the properties of series combination and the rule for resistance.</p> <p>Establishing the rule for parallel combination of resistors.</p> <p>Identification of appliances in daily life base on heating effect of current.</p> <p>Calculation of power in daily life situations.</p>
Magnets	<p>How does the needle of a compass change direction when placed at different points near a magnet?</p> <p>Does a current carrying</p>	<p>Magnetic field</p> <p>Field lines</p> <p>Field due to a current carrying wire.</p> <p>Field due to current</p>	<p>A magnet, compass, white sheet, drawing board, drawing pens.</p> <p>A battery, a conductor, compass, key.</p> <p>A coil, a solenoid.</p>	<p>Drawing magnetic field lines in vicinity of a bar magnet.</p> <p>Demonstrating that a current carrying conductor produces a</p>

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	<p>conductor produce a magnetic field?</p> <p>What happens to a current carrying conductor when it is placed in a magnetic field?</p> <p>How does the above effect help us to design machines to do work?</p> <p>What do you observe when a magnet is moved towards a wire connected to a galvanometer?</p>	<p>carrying coil or solenoid.</p> <p>Force on current carrying conductor Fleming's left hand rule</p> <p>Electric motor</p> <p>Electromagnetic induction induced potential differences, induced current.</p>	<p>A small rod, stand & two wires for suspending the rod, a strong ?Horseshoe magnet</p> <p>Appliances using motors</p> <p>Two coils of wire, a magnet, a galvanometer, Iron nails, battery, switch</p>	<p>magnetic field.</p> <p>Demonstrating the magnetic field produced by a current carrying coil or solenoid.</p> <p>Demonstrating that a current carrying conductor when placed in a magnetic field. experiences force.</p> <p>Demonstrating the working of a motor: Identifying the appliances based on electric motors.</p> <p>Demonstrating the phenomenon of electromagnetic induction. Demonstrating that current is induced in a coil kept near a coil in which current changes.</p>

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	How can .the phenomenon of electromagnetic induction be used to design a device to generate electricity?	Electric generator, principle and working.	A simple model of electric generator.	Demonstrating the principle and working of a generator
	Does the current produced by a generator have the same direction all the time?	Direct current. Alternating current, frequency of AC. Advantage of AC over DC	Model of electric generator.	Familiarizing with voltage and frequency of AC in our homes.
	How are the bulbs etc. connected to the AC source in our homes?	Domestic electric circuits	Demonstration board for domestic electric circuit	Explaining the working of domestic electric circuits Demonstrating the use of a fuse in domestic circuit.
4.NATURAL PHENOMENA				
	Why is paper burnt when light passing through a lens strikes it? Does a spherical mirror: also exhibit similar phenomenon? Can we see a full image of a tall	Convergence and divergence of light Images formed by a concave mirror; related concepts centre of curvature, principal axis. Optical centre, focus, focal length.	Experience. Double convex lens, A candle, stand to hold a mirror, meter scale.	Observation of convergence and divergence with lenses Exploring and recording features of images formed by a concave mirror, by placing an

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	building using a small mirror?			object beyond c.c., between c.c. and focus, and between pole and focus; ray diagrams.
	Why does a spoon partly immersed in water in a transparent glass appear broken at the level of water when viewed from the sides?	Refraction; laws of Refraction	Glass slab, pins.	Activity to explore laws of refraction
	What do lenses do? How do they correct defects in vision?	Images formed by a convex lens; functioning of lens in human eye; problems of vision and remedies. Application of spherical mirrors and lenses.	Convex lens.	Activity exploring and recording features of images formed by convex lens. Ray diagrams. Studying the glasses used by human beings to correct different vision defects.
	Why does the path of <i>light</i> change on entering a different	Appreciation of concept of refraction; velocity of light; refractive index; twinkling of stars; dispersion of light	Concepts learnt earlier	Activities studying refraction

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
	medium? Why or how does a prism dispersed light?	Dispersion of light	Prism, pins	Observation of objects through prisms; tracing rays refracted through a prism; discussion.
	Why is the sky blue?	Scattering of light	Observations and experience	Activity showing scattering of light in emulsion etc.
5. NATURAL RESOURCES				
Conservation of Natural Resources	How can we contribute to protect environment in our locality? What are the major global environmental issues of direct relevance to us? What are the steps expected on the part of local administration to maintain balances in nature in your region? How can we help?	Management of natural resources. Conservation and judicious use of natural resources. Forest and wild life, coal and petroleum conservation. People's participation. Chipko movement. Legal perspectives in conservation and international scenario.	Articles/stories on conservation; Posters on environmental awareness. Case studies on Chipko movement; CNG use.	Case studies with focus on commercial activities exploiting natural resources. Effect of these on varies cycles in natures. Making posters/slogans for creating awareness

Sub-Theme	Questions	Key Concepts	Resources	Activities/ Processes
The regional environment	How does the construction of big dams affect the life of the people and the regional environment? Are rivers, lakes, forests and wild life safe in your area?	Big dams: advantages and limitations; alternatives if any. Water harvesting. Sustainability of natural resources.	Case study material on dams Resource material on water harvesting	Case studies with focus on issues of construction of dams and related phenomena (actual / probable). Debates on issues involved
Sources of energy	What are the various sources of energy we use? Are any of these sources limited? Are there reasons to prefer some of them over others?	Different forms of energy, leading to different sources for human use: fossil fuels, solar energy; biogas; wind, water and tidal energy; nuclear energy Renewable versus non-renewable sources.	Experience; print material on various sources of energy; materials to make a solar heater	Discussion. Making models and charts in groups. Making a solar heater/cooker

PRACTICALS

CLASS- X

Total Marks: 20

Pass Marks = 6

PHYSICS

Note: Every student will perform at least 10 Experiments (at least two experiments from each unit) during the academic year.

UNIT: ENERGY

- 1 To verify the laws of reflection of light by using plane mirror
- 2 To determine the focal length of a concave mirror by obtaining image of distant object.
- 3 To trace the path of a ray of light passing through a rectangular glass slab and measure the angle of incidence and angle of emergence.
- 4 To determine the focal length of a convex lens by focusing a distant object.
- 5 To trace the path of a ray of light passing through a glass prism and measure the angle of deviation.
- 6 To study the dependence of current on the potential difference across a resistor and determine its resistance.
- 7 To find out the equivalent resistance of two resistors connected in(i) series and (ii) parallel

BIOLOGY

NOTE: Every student will perform at least two experiments from each unit during the academic year.

1. To study land food chain from the given chart
2. Construction of food web using models
3. To study the different parts of a Hibiscus flower
4. To study germination of grams/ pea seeds
5. To test the presence of starch in a given food sample
6. To study various things around and classify them into living and non-living
7. To study various waste materials and classify them into bio-degradable and non-biodegradable wastes.
8. Collection of news paper reports on HIV/ AIDS

CHEMISTRY

NOTE: A student is expected to perform fifteen practical exercises from the list suggested below, at least three exercises from each unit.

UNIT: CHEMICAL REACTIONS AND SOME IMPORTANT CHEMICAL COMPOUNDS

1. To measure the change in temperature during chemical reactions (at least four) and conclude whether the reaction is exothermic or not.
2. To identify bleaching powder from the given samples of chemicals (four samples)
3. To identify washing soda or baking soda from given samples of chemicals (four samples)
4. To study on precipitation reaction and isolation of the precipitate:
 - i. NaCl with AgNO_3 ,
 - ii. Na_2SO_4 with BaCl_2
5. To prepare Sulphur dioxide gas and study its two physical and two chemical properties.
6. To carry out the reactions for an acid (HCl) with (i) Litmus solution (blue and red), (ii) Zinc metal, (iii) Sodium carbonate and (iv) Sodium hydroxide
7. To prepare ammonia gas and study its two physical and two chemical properties
8. To study any two physical and two chemical properties of acetic acid
9. To identify whether a given solution is acidic or basic performing following tests:
 - i. Litmus test,
 - ii. Reaction with NaHCO_3 / Na_2CO_3 ,
 - iii. Reaction with NH_4OH / $(\text{NH}_4)_2\text{CO}_3$
 - iv. Reaction with little excess of volumes of HCl or NaOH (as a case may be) and performing the litmus test with the resulting solution (strength of unknown solution supplied and acid/ base solution given for experiment 4 must be the same)
10. To study the decomposition of CaCO_3 and prove that CO_2 is evolved during the reaction (lime water test)
11. To perform the reaction of 1 : 1 molar acetic acid and carboxylic acid and observe the changes in terms of:
 - i. Colour
 - ii. Litmus test (acidic/ alkaline)
12. To examine the heating effect on sugar and common salt, observe the change and hence to comment on the nature of bonding in the two compounds.
13. To determine the pH values of equimolar concentration of four acids and arrange them in order of their increasing acidity.

Suggested Textbooks

1. FRANK EVERYDAY SCIENCE CLASS VIII – X by GUPTA, K.K. & MALHOTRA STALIN FRANK BROS & CO
2. NCERT, Text books

Class – VIII

Units	Periods	Marks
Term – I		
1. Food	25	10
2. Materials	30	15
3. The World of the living	44	25
Term – II		
4. Moving things, people and ideas	28	15
5. How things work	15	10
6. Natural Phenomena	26	14
7. Natural Resources	20	11
Total	188	100
Revision	10	
Grand Total	198	

Class – IX

Units	Periods	Marks
Term – I		
1. Food	12	5
2. Materials	43	22
3. The World of the living: Biological diversity, Cell	44	23
Term – II		
4. Moving things, people and ideas: Motion, Force, Gravitation, Work, Energy, power etc	65	30
5. Practical	20	20
Total	184	100
Revision	10	
Grand Total	194	

Class – X

Units	Periods	Marks private	Marks regular
1. Materials	40	24	19
2. The World of the living	45	28	24
3. How things work	35	20	16
4. Natural Phenomena	30	20	15
5. Natural Resources	20	8	6
6. Practical	20	nil	20
Total	190	100	100
Revision	10		
Grand Total	200		