GENERAL SCIENCE

SUBJECT CODE - C3

Class -X

Science is taught as General Science at the secondary stage (classes IX-X) of school education. It is a compulsory subject of study. Students learn it as a composite subject and not as a separate discipline like Physics, Chemistry and Biiology.

The aims of teaching science in the Secondary Stage are to :

- ❖ Enable the learners to attain some basic scientific and technological literary.
- ❖ Take the study of science meaningful by linking teaching of scientific principles with daily life experiences of the learners.
- ❖ Provide guidance to the teachers on methods and techniques of learning science to suit the needs of learners of different backgrounds.
- ❖ Nurture the natural curiosity, aestheitc sense and creativity of the learners.
- ❖ Acquire skills for developing scientific temper
- ❖ Enable the learners to acquire some practical knowledge and skills to enter the world of work.

Objectives

The pupils

- ❖ Develop an understanding of facts, concepts, basic principles and laws of science.
- ❖ Understand the methods and process that lead to logical development of scientific knowledge.

- Understand applications of basic scientific principles to solve problems related to daily life.
- Learn about the application of technology in daily life and understand the principles on which they work.
- Learn the techniques, skills and methods of exploring the environment and enrich their experience.
- Learn to observe, collect data, take measurements, formulate hypotheses, perform simple experiments and comunicate scientifically.
- Recongnize the relationship of science, technology and society.
- Recognize the relationship of science, technology and society.
- Develop a scientific attitude and inculcate qualities like open-mindedness, honesty, integrity, co-operation, love and concern for life and environment.
- Learn to think critically.
- Learn to infer and interpret facts, principles and experiments.
- Acquire the skill to solve simple problems based on scientific relations.
- Learn to do experimentation.
- Participate in co-curricular activites like doing projects to solve problems related to agriculture, health, nutrition, protection and preservation of environment etc.
- Cultivate the habit of reading scientific journals, papers reports.
- Develop problem solving and decision making skills.
- The Board has adopted the NCERT science syllabi for Secondary stage w.e.f. the academic session 2013.

NCERT has revised the syllabus on the basis of NCF 2005. In the words of NCERT.

"The exercise of revising the syllabus for science and technology has been carried out with 'Learning without burden' as a guiding light and the position papers of the National Focus Groups as points of reference. The aim is to make the syllabus an enabling document for the creation of textbooks that are interesting and challenging without being loaded with factual information.

The themes chosen for class IX-X are : Food; Materials; The world of the living; How things work; Moving things; People and ideas; Natural phenomena and Natural resources. However the theme 'food has been excluded in class X.

The syllabus is presented in four columns : Questions, Key concepts, Resources and Activites/Process.

The questions lead to delve into the themes/subthemes. In the process the key concepts emerge. The resource and activity/process column guides the teachers to meaningful classroom transaction.

Evaluation :

Assessment of learning is to be done by the process of continuous and comprehensive evaluation and periiodic evaluation (half yearly and annual examination, preparatory examination.) Assessment of learning is to be done continously hand in hand with the process of teaching. This gives a feedback to the teachers to plan strategies for meaningful teaching and learning in the classroom. The areas of evaluation are assessment of knowledge, application of knowledge, understanding of concepts, skill in solving simple numerical problems and drawing. Regular remedial teaching is to be imparted to ensure desirable level of learning of the students.

Science Practicals :

Experimentation is an integral part in science education. The board has made an endeavour to make students learn science in a joyful manner through simple activites.

Experimentation (Practical) has a weightage of 10%. The is School based assessment i.e. Internal assessment.

Experimental activites :

There are three categories of experiments/activities.

A. Teacher's activity : These have to be demostrated by the teacher in the laboratory.

B. Student's activity : These include simple experiments/activites (from which one is allotted to student in examination on the lottery system). The students shall perform the experiment and write the procedure and results/ conclusion methodically. The minimum number of experiments a students will perform is 3 (covering one each from Phyisics and Chemistry and 1 from Botany or Zoology) The experiments/activity will cary 6 marks. This 6 marks will be distributed in the following way :

I. Performance in examination -3 marks :

For this item any experiment either from Physics or Chemistry or Biology will be selected by the students and perform.

II. Practical record book - 3 marks :

C. Activities relating to model/project preparation, specimen collection etc. For this type of activities the teacher will engage students to develop models of instruments/ideas to prepare science projects based on the facts of their own observations/practical experiences/ field experience/ideas, to prepare charts depicting the life process/ to colect speciments (plants and animals). The teachers will entrust the students for this kind of activities at least six months before their final examination. The students

will have to submit their work at leaset 15 days before their commencement of final examination. This item will carry 4 marks.

Evaluation :

Evaluation will be school based. (Internal Assessment)

1. For experiments under category A, the teacher while demonstating the experiments will ask studens relevant questions and will evalute the student out of a total weightage of 2 in eah demonstration. The marks for each student will found by calculating the average mark.

2. (i) For experiments under category B, students will be evaluated on their performance out of a total weightage 3.

   The 3 marks will be distributed as follows : (i) Theory/ Principle : 1 mark, Experiment and result : 2 marks, Total : 3 marks.

(ii) The students are required to maintain a neat well recorded practical book. Marks on the record book is 3.

3. Students will prepare charts/models. The total marks is 2.

SCIENCE PRACTICAL

Class - X

List of Experiments (Class - X)

BIOLOGY

1. To prepare a temporary mount of a leaf to demonstrate its stomata.
2. To show that light is essential for potosynthesis.
3. To study binary fission of Amoeba or yeast with the help of prepared slide.
4. To dissect and display differet parts of a complete flower (China rose)
5. To study the morphological characters of cockroach.

PHYSICS

6. To find the image distance due to an object placed in front of convex lens and hence to determine its focal length.
7. To study the image distance corresponding to an object placed at 2f, 3f, 4f distance in front of a convex lens.
8. To study the phenomenon of refraction through prism (by pin method) and hence to determine the angle of deviation.
9. To study the change of current due to variation of resistance in an electric circuit.
10. To study and demonstate the principle of working of electric motor.

CHEMISTRY

11. To show that electrovalent compounds are soluble in water but convalent compounds are not.
12. To show that aqueous solution of ionic compounds conduct electricity.

13. (i) To test the properties of hydrochloric acid with the help of reagents
    (a) Litmus solution (blue/red) or litmus paper.
    (b) Zinc metal
    (c) Sodium carbonate

(ii) To test properties of sodium hydroxide with the help of
    (a) Blue/red litmus solution
    (b) zinc metal
    (c) Sodium carbonate

(iii) Demonstration of a neutralization reaction.

14. To detect the presence of the functional group in carboxylic acid.

15. To study some redox reactions.

List of equipments and materials (Class-X)

BIOLOGY

1. Simple microscope
2. Compund microscope
3. Forceps, brush
4. Watch glass
5. Needle, dissecting needle
6. slides and coverslips
7. Ganong's light screen or black paper
8. Potted plant
9. Beaker
10. Chemical reagents - Ethanol, Iodine solution
11. Slides of Binary fission of Amoeba and yeast

PHYSICS AND CHEMISTRY

1. Insulating copper wire
2. Torch light blub.
3. Lens (convex) focal length, 5cm)

4. Candle/match box
5. Prism
6. Pencil
7. Torch bulb or LED (bulb)
8. Razor Blade
9. Test Tubes, Test tube holders, Bunsen burner or spirit lamp
10. Chemical reagents viz. sodium chloride, copper sulphate, carbon tetrachloride, candle wax, nepthalene, sodium carbonate, pieces of zinc, phenolphthalein, distilled water, ethanoic acid/benzoic acid
11. Flexible wire
12. Adhensive tape
13. Litmus paper-blue and red
14. Match box
15. Bent glass tube (bent at the same angle at both ends)
16. Cork
17. Tissue paper
18. Droppers
19. Pipette
20. Burette
21. Conical flask
22. Beakers
23. Glass rod

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General Science, Class X
Teaching Points and Activities

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
1. Food Materials				
2. Different kinds of materials	Why are some substances sour and some bitter in taste? Why does soap solution feel slippery? Why does seawater taste salty?	Acids, bases and salts : General Properties, examples and uses	Orange juice, lemon juice, soap solution, limus solution, zinc, copper and aluminium metals. Acids : hydrochloric acid, sulphuric acid, nitric acid. Bases : sodium hydroxide. Common salt.	Testing different substances with indicators. Neutralisation reactions (Periods 5)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	Why does iron rust? Why does painted iron not rust? Why is burning sensatin removed when one takes antacids? Why do substances	Types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, neutralisation, oxidation and reduction in terms of gain and loss of oxygen and hydrogen.	Turmeric, limejuice, vinegar,	Mixing pairs of substances mentioned alongside, to see the reactions-discussion on chemistry in the kitchen, chemistry inside our bodies. Carrying out simple projects

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	stop burning in the adsence of air? Why is flame seen when substances burn? Can substances burn without flame? Why does a matchstics kept in the blue part of the flame not burn? Why is a red coating formed on the zinc rod when it is kept in copper sulphate solution? What is the meterial of the coating?		baking soda, washing soda, yeast, hot water. Materials such as iron nails, copper strip, aluminium strip, zinc strip, galvanised strip petri dishes with and without covers, container that can be filled with water, cotton wool, etc.	reactions that encompass decomposition, displacement, double displacement, precipitation, neutralisation, oxidation and reduction. (Periods 10)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
How things change/react with one another?	How do copper, silver, iron exist in nature?	Brief discussion of basic metallurgial processes. Properties of common metals. Elementary idea about bonding.	Samples of metals : iron, copper, lead, silver, zinc, aluminium, gold; samples of non-metals : sulphur, graphite Alloys: steel, brass Models	Discussions on metallurgical processes and simple experiments involving metals, with chemical reactions.
	What is the composition of natural gas used for cooking? What is petrol? What is Vinegar?	Carbon compounds, elementray idea about bonding. Saturted hydrocarbons, alcohols, carboxylic acids: (no preparation only properties)		Experiments involving reactions of carbon and its compounds with chemical reactions. Use of models. (Periods 16)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
Meterials of common use	How is common salt obtained? Besides its use in food, is it used for other purpose? What makes washing soda and banking soda different materials? How does bleaching powder make paper and cloth white? What is the white material that is used for making casts? How do soaps clean clothes? Can some other?	Soap-cleansing action of soap.	Kit Containing various materials like common salt, washing 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. (Periods 8)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	materials be used for cleaning clothes? Why does a man lose control on his body after drinking alcohol? Why do people become blind on drinking denatured alcohol?			
How are elements classified?	How do chemists study such a large number of elements?	Gradation in properties: Mendeleev periodic table.	Brief historical account, charts, films etc.	Predicting trends on the basis of the table (Periods 5)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
3. 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 of us eat meat; some do not-what about animals?	Our environment: Environmental problems, what can we do? Bio degradable, non-bio-degradable. Ozone depletion	Discussion on food habits of animals, finding out the various waste materials producd and their disposal in different parts of the country.	Activity of burying different materials in the soil and studying periodically what happens. Construction of food web using models, classification of some common plants and animals as consumers etc. (Periods 8)
How do we stay alive	What are 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. (Periods 15)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
Control in the living	Why do roots grow towards the ground? Can we make them grow upwards? Why do stems grow 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 movments in plants geotropism, hydrotropism, phototropism, interaction of factors; experiment on apical dominance; demonstration of reflex action. (Periods 10)
Reproduction in the living	Do plants and animals have similar reproductive cycle? Can we decide how many children are born in a family?	Reproduction in plants and animals. Need for and methods of family planning. Safe sex vs. HIV/AIDS. Childbearing and women/s health.	Permanent slide L.S. grain;charts/speciments of embroyos, egg. Charts and other materials on family planning. Newspaper reports on HIV/AIDS.	Study pollen tube growth and pollen tubes on a sigmatic mount, mount soaked seeds to see embroynal axis, cotyledons etc., seeds germination- epigeal and hypogeal structure of the hen's egg. Discussion on family planning and responsible parenting. (Periods 10)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
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.	Data and worksheet from Mendel's experiments, specimen of fossil.	Phenotypic ratio 3 : 1, 2 : 1, 9 : 3 : 3 : 1 (Periods 10)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
4. Moving Things, People and Ideas **5. How things work**				Using a simple electric circuit, show that charges flow from higher potential to lower potential. Use the analogy of flow of water from higher to (potential to highest energy) lower height (lower potential energy).
Electric Circuits	In which direction does current flow inside a conductor?	Potential difference, potential	Battery, conductor voltmeter, ammeter, connecting wire, key.	
	How is potential difference across a conductor related to current through the conductor?	Ohm's law	-do- And reheostats	Using a circuit consisting of a conductor, battery, key, voltmeter and ammeter, establish a relationship between potential difference and current and hence Ohm's law.
	How can you arrange a given set of resistors so that the same current flows through all?	Series combination of resistances.	-do- and given set of resistors.	Using the Ohm's law circuit, establishing the properties of series combination and the rule for resistance.

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	How are appliances connected in a house?	Parallel combination of resistances.	-do- and given set of resistors. Appliances based on heating effect of current in daily life.	Establishing the rule for parallel combination of resistors.
	How much heat is generated when a current I flows through a resistor?	Power dissipated due to current. Inter relation between P,V,I and R.		Identification of appliances in daily life base on heating effect of current. Calculation of power in daily life situations. (Periods 12)
Magnets	How does the needle of a compass change direction when placed at different points near a magnet?	Magnetic field lines	A magnet, compass, white sheet, drawing board, drawing pins.	Drawing magnetic field lines in the vicinity of a bar magnet.
	Does a current carrying conductor produce a magnatic field?	Field due to a current carrying wire. Field due to current carrying coil or solenoid.	A battery, a conductor, compass, key, A coil, A solenoid.	Demonstrating that a current carrying conductor produces a magnetic field.
	What happens to a current carrying conductor when it is placed in a magnetic field?	Force on current carrying conductor Fleming's left hand rule.	A small rod, stand and two wires for suspending the rod, a strong horseshoe magnet.	Demonstrating the magnetic field produces by a current carrying coil or solenoid.
				Demonstrating that a current carrying conductor when placed in a magnetic field experiences force.

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	How does the above effects help us to design machines to do work?	Electric motor.	Appliances using motors.	Demonstrating the working of a motor. Identifying the appliances based on electric motors.
	What do you observe when a magnet is moved towards a wire connected to a galvanometer?	Electromagnetic induction.	Two coils of wire, a magnet, a galvanometer.	Demonstrating the phenomenon of electromagnetic induction.
	How can the phenomenon of electromagnetic induction be used to design a device to generate electricity?	Induced potential differences, induced current.	Iron nails, battery, switch.	Demonstrating that current is induced in a coil kept near another coil in which current changes.
		Electric genetor : 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 Generetor	Familiaising with voltage and frequency of AC in our homes.

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	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 circuits. (Periods 12)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
6. Natural Phenomena	Why is paper burnt when light passing through a lens strikes it?	Convergence and divergence of light.	Experience, Double convex lens	Observation of convergence and divergence with lenses.
	Does a spherical mirror also exhibit similar phenomenon? Can we see a full image of a tall building using a small mirror?	Images formed by a concave mirror, related concepts centre of curvature, principal axis. Optical centre, focus, focal length.	A candle, stand to hold a mirror, meter scale.	Exploring and recording features of images formed by a concave mirror, by placing an 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 viewd 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.	Convex lens.	Activity exploring and recording features of images formed by convex lens, Ray digrams. Studying the glasses used by

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
		Application of spherical mirrors and lenses		human beings to correct different vision defects.
	Why does the path of light change on entering a different medium?	Appreciation of concept of refraction; velocity of light; refractive index; twinkling of stars; dispersion of light.	Concepts learnt earlier.	Activities studying refraction.
	Why or how does a prism disperse light?	Dispersion of light.	Prism, pins.	Observation of objects through prism; 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. (Periods 25)

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
7. 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?	Management of natural resources, Conservation and judicious use of natural resources. Forest and wild life, coal and petroleum conservation.	Articles/stories on conservation; Posters on evnironmental awareness.	Case studies with focus on commercial activities exploiting natural resources. Effect of these on various cycles in natures.

General Science, Class X

Theme/Sub-theme	Questions	Key concepts	Resources	Activities/Processes
	What are the steps expected on the part of local administration to maintain balances in nature in your region? How can we help?	People's participation. Chipko movement. Legal perspectives in conservation and international scenario.	Case studies on Chipko movement; CNG use.	Making posters/slogans for creating awareness.
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. (Periods 8)

GENERAL SCIENCE
Subject Code : C3

Class : X **Time : 3 hours**
Total Marks : 100 **Pass Marks : 30**

Theory : 90
Internal Assessment : 10
Pass marks in written examination : 27

Unit	CONTENTS	Marks	
		Half Yearly	Final
Chapter 1	Chemical Reactions and Equations	12	6
Chapter 2	Acids, Bases and Salts	10	6
Chapter 3	Metals and Non-metals		7
Chapter 4	Carbon and its Compounds		6
Chapter 5	Periodic Classification of Elements	10	4
Chapter 6	Life Processes	12	8
Chapter 7	Control and Coordination	8	6
Chapter 8	How do Organisms Reproduce		5
Chapter 9	Heredity and Evolution	10	5
Chapter 10	Light-Reflection and Refraction	14	8
Chapter 11	Human Eye and Colourful World	8	5
Chapter 12	Electricity		6
Chapter 13	Magnetic Effects of Electric Current		5
Chapter 14	Sources of Energy	6	4
Chapter 15	Our Environment		4
Chapter 16	Management of Natural Resources		5
	Total (Theory)	**90**	**90**
	Internal Assessment	10	10
	Grand Total	**100**	**100**

Experimental Activites Practicals/Internal Assessment

Marks - 10

Sl. No.	CHAPTERS	Marks
1.	Category A : Teacher's activity- (Teacher will evaluate the students as he/she demonstrates)	2
2.	Category B : Student's activity- Activity	3
	Practical record book	3
3.	Category C : Chart / Model / Specimen Collection	2
	Total	**10**

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