# GENERAL SCIENCE
## SUBJECT CODE - C3
## Class - IX-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 - IX

**List of Experiments (Class - IX)**

**Sl. No.** **BIOLOGY**

1. Demostration of different parts of one Dicot and one Monocot plant.
2. Identification of plants
3. Morphological study of Honey bee/Ant/Fish/Spider/Mollusca
4. Charts on :
   (i) Animal Cell
   (ii) Plant cell.
   (iii) Types of tissues.
   (iv) List of three bacterial and two protozoal diseases with their symptoms.

**PHYSICS :**

1. To determine valocity and acceletration of a moving body.
2. To Verify Newton's Second Law of Motion.
3. To Study variation of Potential Energy with height.
4. To measure temperature of liquid at various state in Celsius and Fahrenheit scale.

**CHEMISTRY :**

1. To prepare sulphide from iron filings and sulphur power and to observe the changes in the properties on the consituent elements as they combine to form the compund.
3. To separate the components from mixture of (a) sand and ammonium chloride (b) Common salt and sand.
4. To Study the extent of cooling caused by evaporation on (i) Water (ii) Ethanol (alcohol) (iii) Ether.
5. To determine the Boiling point of water.

**List of equipments and materials (Class-IX)**

**BIOLOGY :**

1. Freshly collected paddy plant with roots, stem and leaves intact.
2. White drawing sheet.
3. Eraser
4. Scale
5. Freshly collected mustard plant with roots, stem and leaves intact.
6. Specimen of (i) Basket, grass, (ii) Bermuda grass, (iii) Honey bee (worker) (iv) Termite (worker), (v) Butterfly, (vi) Fish, (vii) Spider, (viii) Mollusca

**PHYSICS :**

1. A small rubber or marble
2. Two small wooden blocks or match-boxes
3. A foot scale
4. A small toy car
5. A few long paper strips
6. Paper clips
7. An inclined plane
8. A timer cup
9. Thread
10. Wire
11. Colored solution or ink
12. A few coins
13. A spring balance
14. Flour paste
15. A stone (Small size)
16. Cellotape
17. Scissors
18. A support with a hook and scale
19. A glass breaker
20. Thermometer

21. Few pieces of ice
22. Tripod stand
23. Water
24. Spirit burner
25. Wire holder

**CHEMISTRY :**

1. Porcelain basin
2. Tripod stand
3. Iron fillings
4. Sulphur powder
5. Carbon disulphide
6. Bar or horse shoe magnet
7. Test tubes (3 nos)
8. Beakes (3 nos)
9. Funnel
10. Filter paper
11. Bottle of distilled water
12. Lemon, salt/sugar
13. Sand
14. Starch or egg albumin
15. Spirit lamp
16. Wire gauze
17. Stirrer (glass rod)
18. Ammonium Chloride
19. Cotton
20. Water
21. Ethanol or rectified spirit
22. Ether
23. Thermometer
24. Petridish
25. Stopwatch
26. Pipette/syringe
27. Spring balance

❐❐❐

# 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

❐❐❐

# General Science, Class - IX

## Teaching Points and activities

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| 1. **Food**<br>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, vermicompost. | Collection of weeds found in fileds of different crops; collection of diseased crops; discussion and studying composing/ vermicomposing.<br>(periods 8) |
| 2. **Materials**<br>Material in our dothing | What kinds of clothes help us to keep cool?<br>Why do wet clothes feel cool? | Cooling by evaporation.<br>Absorption of heat. | Work done in class-VII; glassware, heat source, black paper, thermo- meters. | Experiments to show cooling by evaporation. Experiments to show that the white objects get less hot.<br>(periods 5) |
| Dfferent kinds of materials | In what way are materials different from each other? Is there some similarity in materials? | All things occupy space, possess mass.<br>Definition of matter. | Everyday substances like wood, salt, paper, ice, steel, water, etc. | To feel the texture, observe the colour and lustre, effect of air, water and heat, etc. on each of the materials.<br>(periods 4) |

# General Science, Class - IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| What are things made of? | In how many ways can you group the different materials you see around? How do solids, liquids and gases differ from each other? | Solid, liquid and gas; characteristics-shape, volume, density, change of state-melting, freezing. | Wax, water, ice, oil, suger, camphor/ammonium chloride/ naphthalene. | Sorting out a medley of materials, in various ways, Observe shape and physical state of different materials. |
| | Can materials exist in all the three states? | Evaporation, condensation, sublimation. | | Observe effect of heat on each of the resources. (Teacher to perform the experiment for camphor, ammonium chloride and naphthalene.) (periods 4) |
| | 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 difinite 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? | Particle nature, basic units; atoms and molecules. | Kits for making molecular models. | Discussion on the fact that elements combine in a fixed proportion. Through discussion on chemical formulae of familiar compounds. |
| | Are there any patterns which can help us to guess how things will combine with each other ? | Law of constant proportions, Atomic and molecular masses. | Historical account including experiments of Lavoisier and Priestly. | |

## General Science, Class - IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | How do chemists weith and count particles of matter? | Mole concept.<br>Relationship of mole to mass of the particles and numbers.<br>Valency.<br>Chemical formulae of common compounds. | | Simple numericals to be done by the students.<br>A game for writing formulae. e.g. criss crossing of valencies to be taught through dividing students into pairs. Each student to hold two playcards: 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 or by some other means?<br>What is there inside an atom? | Atoms are made up of smaller particles: electrons, protons, and neutrons.<br>These smaller particles are present in all the atoms but their numbers vary in different atoms.<br>Isotopes and isobars. | Charts, films etc. | Brief historical account of Rutherford's experiment.<br>(Periods 18) |

# General Science, Class - IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **3. The world of the living**<br>Biological Diversity | How do the various plants around us differ from each other? How are they similar? 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 classes.) | Specimens of some animals, and plants not easily observable around you. | Discussion on Diversity and the characteristics associated with any group.<br>(Periods 14) |
| 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, Prokaryotic and eukaryotic cells, multicellular organisms; cell membrane and cell wall, cell organelles; chloroplast, mitochondria, vacuoles, ER, Golgi Apparatus; nucleus, chromosomes-basic structure, number. Tissues, organs, organ systems, organism, | 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 human), cheek cell, onion peel cell, Spirogyra, Hydrila leaves (cyclosis.)<br>(Periods 12) |

## General Science, Class - IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | | Structure and functions of animal and plant tissues (four types in animals; meristematic and permanent tissues in plants.) | | |
| 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-Typhiod, diarrhoea, malaria, hepatitis, rabies, AIDS, TB, polio; pulse polio programme. | Newspaper artricles, information from health centres, photographs of various causal organisms. Photographs, permanent slides of bacteria. | Surveying neighbourhood to collect information on disease occurence pattern. Studying the life cycle of the mosquito and malarial parasite. Discussion on how malaria is spread, how to prevent mosquito breeding. (Periods 10) |
| How do substance 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 substance that living organisms exchange with the external world? How do they obtain these substances? | Diffusion/exchange of sub-stances between cells and their evnironment, and between the cells themselves in the living system; role in nutrition, water and food transport, excretion, gaseous exchange. | Egg membrane, Rhoeo leaves, sugar, microscope, slides. | Looking at closed and open stomata, plasmolysis in Rhoeo leaf peels. (Periods 15) |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **4. Moving Things, People and Ideas Motion** | How do we describe motion? | Motion-displacement, velocity; uniform and non uniform motion along a straight line, accelecration, distance-time and velocity-time graphs for uniform and uniformly accelerated motion, equation 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 uniformly accelerated motion. (Periods 12) |
| Force and Newton's Laws | What makes things change their state of motion ? | Force and Motion, Newton's laws of motion: Interia of a body, interia mass, momentum, force and acceleration. Elementary idea of conservation of momentum, action and reaction forces. | Historical accounts; Experinences, 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 force 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 force. (Periods 10) |
| Gravitation | What makes things fall? | Gravitation : Universal law of gravition, | Spring balance | Analysis of motion of ball falling down. |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | Do all things fall in the same way? | Force of gravitation of the earth (gravity), acceleration due to gravity; mass and weight;free fall. | | and of ball thrown up. measuring mass and weight by a spring balance. (Periods 7) |
| 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. (Periods 6) |
| Floating bodies | How does a boat float on water? | Thrust and pressure. Archimedes' principle, buoyancy, elementary idea at relative density. | Cycle pump; board pins, bulletin board, mug, bucket, water etc. | Experiments with floating and sinking objects. (Periods 4) |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| How do we hear from a distance? | How does sound travel?<br>What kind of sounds can we hear?<br>What is an echo?<br>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.<br><br>Model or chart showing structure of human ear. | Experiment on reflection of sound.<br>(Periods 10) |

# General Science, Class - IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **5. How things work**<br>**6. Natural Phenomena**<br>**7. Natural Resources**<br><br>Balance in Nature | Why do air, water and soil, seem not to be consumed?<br>How does the presence of air support life on earth? How have human activities created disturbances in the atmosphere?<br>How does nature work to maintain balance of its components? | Physical resources: air, water, soil, air for respiration, for combustion, for moderarting temperatures, movements of air and role in bringing rains across India.<br>Air, water and soil pollution (brief introduction.)<br>Holes in ozone layer and the probable damages. Bio-geo chemical cycles in nature; water, oxygen, carbon, nitrogen. | Daily newspapers, magazines and other reading materials. Weather reports over a few months and air quality reports over the same time period. Case study material. | Case studies of actual situation in India with more generalised overview of inter relationship of air, water, soils, forests. Debates on these issues using resources mentioned alongside, visit to/from an environment NGO; discusssion.<br>(Periods 15) |

# GENERAL SCIENCE
## Subject Code : C3

**Class : IX** **Time : 3 hours**
**Full Marks : 100** **Pass Marks : 30**

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

| Sl. No. | Chapters | Marks | |
|---|---|---|---|
| | | Half Yearly | Annual |
| 1. | Matter in our surroundings | ✓ | ✓ |
| 2. | Is matter arround us pure | ✓ | ✓ |
| 3. | Atoms and molecules | | ✓ |
| 4. | Structure of the atom | | ✓ |
| 5. | The fundamental unit of life | ✓ | ✓ |
| 6. | Tissues | ✓ | ✓ |
| 7. | Diversity in living organisms | | ✓ |
| 8. | Motion | ✓ | ✓ |
| 9. | Force and Laws of Motion | ✓ | ✓ |
| 10. | Gravitation | ✓ | ✓ |
| 11. | Work and energy | | ✓ |
| 12. | Sound | | ✓ |
| 13. | Why do we fall ill | ✓ | ✓ |
| 14. | Natural resources | ✓ | ✓ |
| 15. | Improvement in Food resources | | ✓ |
| | **Total (Theory)** | **90** | **90** |

**Experimental Activites Practicals/Internal Assessment**
**Marks - 10**

| Sl. No. | CHAPTERS | Marks | |
|---|---|---|---|
| | | Half Yearly | Annual |
| 1. | Category A : Teacher's activity- (Teacher will evaluate the students as he/she demonstrates) | | ✓ |
| 2. | Category B : Student's activity- | | ✓ |
| | Activity | | |
| | Practical record book | | |
| 3. | Category C : Chart/Model/ Speciment Collection | | ✓ |
| | **Total** | **10** | **10** |
| | **Grand Total :** | **100** | **100** |

**Textbook :** Science (for Class IX), published by The Assam State Textbook Production and Publication Corporation Ltd. Guwahati-1

* Questions from each Unit/Lesson will carry marks 2-10.

# 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.<br>Acids :<br>hydrochloric acid, sulphuric acid, nitric acid. Bases : sodium hydroxide.<br>Common salt. | Testing different substances with indicators.<br>Neutralisation reactions<br>(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?<br>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 |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | stop burning in the adsence of air?<br>Why is flame seen when substances burn?<br>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,<br>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.<br>(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?<br>What is petrol?<br>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.<br>(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) |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | materials be used for cleaning clothes?<br>Why does a man lose control on his body after drinking alcohol?<br>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<br>(Periods 5) |

# General Science, Class X

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **3. The World of the Living**<br>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.<br>(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.<br>(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<br>(Periods 10) |

# General Science, Class X

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **4. Moving Things, People and Ideas**<br>**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-<br>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-<br>and given set of resistors. | Using the Ohm's law circuit, establishing the properties of series combination and the rule for resistance. |

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| Magnets | 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) |
| | 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. Demonstrating the magnetic field produces by a current carrying coil or solenoid. |
| | 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 that a current carrying conductor when placed in a magnetic field experiences force. |

| 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. |

| 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) |

| 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 |

| 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**<br>Conservation of Natural Resources | How can we contribute to protect environment in our locality?<br>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.<br>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 | ✓ | ✓ |
| Chapter 2 | Acids, Bases and Salts | ✓ | ✓ |
| Chapter 3 | Metals and Non-metals | | ✓ |
| Chapter 4 | Carbon and its Compounds | | ✓ |
| Chapter 5 | Periodic Classification of Elements | ✓ | ✓ |
| Chapter 6 | Life Processes | ✓ | ✓ |
| Chapter 7 | Control and Coordination | ✓ | ✓ |
| Chapter 8 | How do Organisms Reproduce | | ✓ |
| Chapter 9 | Heredity and Evolution | ✓ | ✓ |
| Chapter 10 | Light-Reflection and Refraction | ✓ | ✓ |
| Chapter 11 | Human Eye and Colourful World | ✓ | ✓ |
| Chapter 12 | Electricity | | ✓ |
| Chapter 13 | Magnetic Effects of Electric Current | | ✓ |
| Chapter 14 | Sources of Energy | ✓ | ✓ |
| Chapter 15 | Our Environment | | ✓ |
| Chapter 16 | Management of Natural Resources | | ✓ |
| | **Total (Theory)** | **90** | **90** |
| | **Internal Assessment** | 10 | 10 |
| | **Grand Total** | **100** | **100** |

* Questions from each Unit/Lesson will carry marks 2-10.

## 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. | Category B : Student's activity- Activity<br>Practical record book | |
| 3. | Category C : Chart / Model / Specimen Collection | |
| | **Total** | **10** |

**Textbook :** Science (for Class X), published by The Assam State Textbook Production and Publication Corporation Ltd., Guwahati-1

* Questions from each Unit/Lesson will carry marks 2-10.

# General Science, (for blind Students), Subject Code - 48, Class IX
## Teaching Points and Activities

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| 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. | Describe visit to any fish/bee/ dairy/pig etc. farms; data showing harmful effects of insecticides; process for the preparation of compost, vermicompost. | Let the students feel by touching the collection of weeds found in fields of different crops; collection of diseased crops; discussion and studying compositing/vermi- compositing (Periods 8) |
| **Material in our clothing** | What kinds of clothes help us to keep cool? Why do wet clothes feel col? | Cooling by evaporation. Absorption of heat. | Work done in Class VII; glassware, heat source, black paper thermometers. | Describe : Experiments to show cooling by evaporation. Experiments to show that the white objects get less hot. (periods 5) |
| 2. **Different kinds of materials** | In what ways are materials different from each other? Is there some similarity in materials? | All things occupy space, possess mass. Definition of matter. | Everyday substances like wood, salt, paper, ice, steel, water, etc. | Tell the texture, the colour and lustre, effect of air, water and heat, etc. on each of the materials. (Periods 4) |
| | In what way are materials you see around? How do solids, liquids and gases | Solid, liquid and gas; chatracteristics-shape, volume, density; change of state-melting, freezing. | Wax, water, ice, oil, suger, camphor/ammonium chloride/ naphthalene. | Sorting out a medley of materials, in various ways Tell shape and physical state of different materials. |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | differ from each other?<br>Can materials exist in all the three states? | evaporation, condensation, sublimation. | | Tell the effect of heat on each of the resources. (Teacher to perform the experiment for camphor, ammonium chloride and naphthalene.)<br>(Period 4) |
| What are things made of ? | What are things around you made of?<br>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 a 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.<br>Glassware, chemicals (Oxalic acid, sodium hydroxide, magnesium ribbon). | |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | How do things combine with each other?<br>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.<br><br>Historical account including experiments of Lavoisier and Priestley. | Discussion on the fact that elements combine in a fixed proportion. Discussion on chemical formulate of familiar compounds. |
| | How do chemists weigh and count particles of matter? | Mole concept.<br>Relationship of mole to mass of the particles and numbers. Valency. Chemical formulae of common compounds. | | Simple numericals to be done by the students.<br>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. |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| What is there inside an atom? | Can we see an atom or a molecule under a microscope or 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. | Charts, films etc. | Brief historical account of Rutherford's experiment. (Periods 18) |
| 3. **The World of the Living** Biological Diversity. | How do the various plants around us differ from each other? How are they similar? 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.) | Speciments of some animals, and plants not easily observable around you | Discussion on diversity and the characteristics associated with any group. (Periods 14) |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| 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 units? | Cell as a basic unit of life; Prokaryotic and eukaryotic cells. wal, cell organelles; cell membrane and cell wall, cell organelles; chloroplast, mitochondria, vacuoles, ER, Golgi Aparatus; nucleus, chromosomes-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). | Permanent slides, model of the human body. | Discuss model of human body to learn about levels of organization-tissue, organ system, and organism, tell the difference of blood smears (frog and human) cheek cells, onion peel cell, Spirogyra, Hydrilla leaves (cyclosis). (Periods 12) |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| 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, TB, polio; pulse polio programme. | Newspaper articles, information from health centres, photographs of various casual organisms. Photographs, permanent slides of bacteria. | Tell about disease occurrence pattern. studying the life cycle of the mosquito and malarial parasite. Discussion on how malaria is spread, how to prevent mosquito breeding. (Periods 10) |
| 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, Rhoeo leaves, sugar. | |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| **4. Moving Things, People and Ideas Motion** | How do we describe motion? | Motion-displacement, velocity, uniform and nonuniform 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. Tell distance-time and velocity time graphs for uniform motion and for uniformly accelerated motion. (Periods 12) |
| Force and Newton's laws | What makes things change their state of motion? | Force and motion, Newton's laws of motion: intertia of a body, intertia 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, ballons etc. | Tell effect of force on the state of motion of objects in a variety of daily-life situations. Tell change in direction of motion of an object due to application of force. (Periods 10) |
| Gravitation | What makes things fall? | Graviation; universal law of gravitation, | Spring balance | Analaysis of motion of ball falling down and of ball thrown up. |

## General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | Do all things fall in the same way? | force of gravitation of the earth (gravity), acceleration due to gravity; mass and weight; free fall. | | Tell about measuring mass and weight by a spring balance. (Periods 7) |
| 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. | Discuss : Experiments on body rolling down inclined plane pushing another body. Experiments with pendulum. Experiments with spring balance. (Periods 6) |
| Floating Bodies | How does a boat float on water? | Thrust and pressure. Archimedes' principle, buoyancy, elementary idea of relative density. | Cycle pump; board pins, bulleting board, mug, bucket, water etc. | Discuss : Experiments with floating and sinking objects. (Periods 4) |
| 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 sounds, range of hearing in humans; ultrasound; reflection | String, ball or stone as bob, water tank, stick, slinky, rope, echo tube, | Discuss : Experiment on reflection of sound. (Periods 10) |

# General Science, (for blind Students), Class IX

| Theme/Sub-theme | Questions | Key concepts | Resources | Activities/Processes |
|---|---|---|---|---|
| | | echo and sonar. Structure of the human ear (auditory aspect only). | Model or chart showing structure of the ear. | |
| **5. How Things Work**<br><br>**6. Natural Phenomena**<br><br>**7. Natural Resources**<br>Balance in Nature | Why do air, water and soil seem not to be consumed? How does the presence of air support life on earth? How have human activities created disturbances in the atmosphere? How does nature work to maintain balance of its components? | Physical resources: air, water, soil. Air for respiration, for combustion, for moderating temperatures, movements of air and its role in bringing rains across India. Air, water and soil pollution (brief introduction), Holes in ozone layer and the probable damages, Bio-geo chemical cycles in nature: water, oxygen, carbon, nitrogen. | Daily newspapers, magazines and other reading materials. Weather reports over a few months and air quality reports over the same time period. Case study materials. | Case studies of actual situation in India with more generalised overview of inter relationship of air, water, soils, forests. Debates on these issues using resources mentioned alongside, visit to/from and environmental NGO; discussion.<br>(Periods 15) |

# List of Practicals for Class IX
## (For Blind Students)

1. To detect sound of high frequency and low frequencey. (pitch of high frequency is high and that of low frequency is low)

   **Instruction :** Students will be provided different sourcess of sound with different frequencies. Hearing the sound and feeling the pitch they will detect high and low frequency sounds.

2. To understand the amplitude of sound.
   (Sound of high amplitude is louder)

   **Instruction :** Students will make sounds of different loudness using different sources and detect the amplitude (high or low) accordingly.

3. To feel the air pressure or pressure of gas.

   **Instruction :** Students will blow several ballons and feel the air pressure inside the ballon by holding the ballon with hand.

4. To understand atomic model.

   **Instruction :** Several atomic models (3-D) will be provided. Students have to identify those with the help of teachers.

5. To identify sublimable and non-sublimable substances.

   **Instruction :** Several substances should be provided to the students and they will identify the sublimable ones by smelling them from a distance.

6. To understand multiple reflection of sound.

   **Instruction :** Two students will stand at a distance of 5 feet (say) one will make a sound and the other will hear. Same shall be done again using a pipe of 5 feet long. They will find the difference and feel the effect of multiple reflections of sound (Variation of this activity may be included).

7. To study cell.

   **Instruction :** 3-D models of plant cells and animal cells to be provided and the students will identify the cell organelles with the help of teachers.

8. To study nuron, peranocium, annelide, monocot seeds, diacot seeds, gymnosperm. angiosper etc.

   **Instruction :** Students will be provided 3-D model of each and teachers will help them to identify from the models.