

NBSE Class 10 Science Syllabus

Objectives:

- to understand the basic concepts, principles and laws of science
- to apply basic scientific principles in finding solutions to problems related to agriculture, energy, health, nutrition, etc
- to develop problem- solving and decision- making skills
- to inculcate values that underline the study of science
- to develop and understand various processes of the environment and concern for its conservation and preservation
- to understand and appreciate the joint enterprise of science, technology and society
- to acquire process skills which form part of the attitude for developing a scientific temper
- to develop certain manipulative skills which are required in day-to-day situations
- to develop scientific attitude which will equip them to continue science education throughout life

DESIGN OF QUESTION PAPER SCIENCE

Weightage to different forms of questions:

Sl. no.	Forms of questions	Marks for each question	No. of questions	Total marks
1.	MCQ	1	10	10
2.	VSA	1	5	5
3.	SA -I	2	5	10
4.	SA -II	3	10	30
5.	LA	5	5	25
	Total		35	80

Weightage level of questions:

Sl.no.	Level	Percentage	Marks
1.	Easy	25	20
2.	Average	60	48
3.	Difficult	15	12
	Total	100	80

The expected length of answer and time to be taken under different forms of questions shall be as follows:

Sl.no.	Forms of questions	Expected length of	Expected time for	Total
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		answer	each question	expected time
1.	Reading	-	-	10 minutes
2.	MCQ	-	2 minutes	20 minutes
3.	VSA	one word/one sentence	2 minutes	10 minutes
4.	SA-I	20-30 words	4 minutes	20 minutes
5.	SA-II	40-60 words	5 minutes	50 minutes
6.	LA	70-100 words	12 minutes	60 minutes
7.	Revision	-	-	10 minutes
			Total time	180 minutes

Scheme of options:

There will be no overall choice. However, internal choice shall be provided in:

- i. 4 (four) questions of 3 marks each
- ii. 4 (four) questions of 5 marks each.

Numericals and diagrams:

- i. Weightage of about 5 (five) marks shall be given for numericals.
- ii. Weightage of about 8 (eight) marks shall be given for diagrams.

Typology of questions:

In order to assess different abilities related to the subject, the question paper shall include open-ended questions; drawing/illustrations based questions and questions testing higher order thinking skills of the learners.

Part 'A' External		Time : 3 hours	Marks : 80
Unit		Marks	
I.	Materials	25	
II.	Energy	24	
III.	Living World	20	
IV.	Natural Resources	05	
V.	Our environment	06	
Total :		80	
Part 'B' Internal		20	
Grand Total		100	

PART-A: EXTERNAL **80 marks/180 periods**

Unit I	Materials: Chemical substances- nature and behaviour	
	1.1 Rate of Chemical Reaction and Chemical Equilibrium	} 08
	1.2 Some Important Chemical Compounds	
	1.3 Metals and Non-metals	
	1.4 Carbon compounds	
Unit II	Energy: Light, Electricity and Energy	
	2.1 Light	10
	2.2 Electricity and its Effects	08
	2.3 Sources of Energy	06
Unit III	Living World: Life Processes	
	3.1 Life Processes I	10
	3.2 Life Processes II	} 10
	3.3 Heredity and Evolution	
Unit IV	Natural Resources	
	4.1 Management of Natural Resources	05
Unit V	Our Environment	
	5.2 Environment and Environmental Problems	06

Unit I: MATERIALS-CHEMICAL SUBSTANCES- NATURE AND BEHAVIOUR

62 Periods

Rate of chemical reaction and chemical equilibrium: Elementary idea of rate of reactions, slow and fast reactions, reversible and irreversible reactions. Chemical equilibrium-dynamic nature (in brief); acids and bases (Lowry and Bronsted theory); pH scale; heat changes during chemical reactions. **(10 periods)**

Some important chemical compounds: Preparation/manufacture (in brief), properties and uses of- washing soda, baking soda, bleaching powder and Plaster of Paris. Manufacture and properties of some important building materials–lime, cement, glass and steel.

(10 periods)

Metals and non-metals: Metals- Minerals and ores; metallurgy- enrichment of ores, extraction of metals from ores, their refinement and purification (with reference to iron and aluminium); activity series of metals, general properties and corrosion of metals. Alloys –

components, properties and uses of steel, stainless steel, brass and magnesium, Alloying of gold. Non-metals – physical and chemical properties of non-metals; preparation, properties and uses of hydrogen, ammonia, sulphur, sulphuric acid. **(26 periods)**

Carbon compounds: Carbon; carbon-tetravalency and catenation; Functional groups (oxygen containing only); Preparation, properties and uses of ethanol and formaldehyde; Carboxylic acids – preparation, properties and uses of acetic acid; some common synthetic polymers, soaps and detergents. **(16 periods)**

Unit II: ENERGY-LIGHT, ELECTRICITY AND ENERGY 48 Period

Light : Nature of light – theories of light; reflection of light – laws of reflection, reflection from plane and curved surfaces; mirror – plane, concave and convex; sign conventions; derivation of mirror formula, magnification. Laws of refraction; refraction through a rectangular slab; image formation by concave and convex lenses; lens formula (with simple treatment); sign conventions; power of lens; some optical phenomena in nature (twinkling of stars, mirage); defects of vision and their correction. Construction and working of a compound microscope and an astronomical telescope; Dispersion of white light by a glass prism; composition of white light, colour of objects and pigments, super imposition of light of primary colours. **(20 periods)**

Electricity and its effects: Potential and potential difference, electric current, Ohm's Law, combination of resistances in series and parallel; heating effects of electric current and its applications; Power, commercial unit of electrical energy. Electrolysis– Faraday's Laws (excluding equations), electroplating, electrochemical cells– dry cell; Magnetic field due to current carrying conductor–straight, coil, solenoid (qualitative idea only), electromagnetic induction, electric motor and generator (DC), direct and alternating current (qualitative idea), domestic electric circuits, safety measures in using electricity. **(18 periods)**

Sources of energy: Renewable and non-renewable sources. Renewable sources–solar energy- solar cooker, solar water heater, solar cell; wind energy–hydro energy- hydroelectricity, geothermal, biogas, hydrogen; Non- renewable sources– fossil fuels-coal-destructive distillation of coal (in brief), petroleum and natural gas; conditions of combustion; choice of a good fuel; efficient use of fuels. Nuclear fusion, nuclear fission, chain reaction, nuclear reactors (basic principle and safety measures), advantages and hazards of using nuclear energy; judicious use of energy. **(10 periods)**

Unit III: LIVING WORLD - LIFE PROCESSES 46 Periods

Life processes I: Nutrition– modes of nutrition–autotrophic, heterotrophic, saprophytic, holozoic and parasitic; nutrition in plants–photosynthesis (main steps), factors affecting photosynthesis; nutrition in animals (main steps) – in amoeba and grasshopper; Human digestive system. Respiration and breathing, types of respiration (aerobic and anaerobic), respiration in plants and animals, respiration through skin, gills, air tube, lungs (earthworm, fish, grasshopper and human); structure and functions of respiratory organs in humans (elementary idea). Transportation in plants and animals; transportation in plants (water and minerals, food), transportation in human– role and composition of blood, blood clotting, blood groups and blood transfusion; structure and function of heart and blood vessels (elementary idea), lymphatic system; Excretion in animals (amoeba and earthworm); excretion in humans; osmoregulation. **(20 periods)**

Life processes II: Control and coordination – coordination in plants and animals; nervous system, reflex action, hormones in human beings (in brief). Reproduction – types, significance; Reproduction in plants- asexual reproduction- vegetative propagation in plants-

cutting, grafting and layering; parthenogenesis; sexual reproduction- reproductive parts in plants; Pollination and fertilization. Reproduction in animals – fission, budding, regeneration; reproduction in humans; sexual cycle in female (in brief); fertilization in humans; artificial insemination, cloning (elementary idea only). **(16 periods)**

Heredity and evolution: Heredity and variation; physical basis of heredity– chromosomes, DNA (elementary idea only); genes; sex determination; organic evolution– theories of evolution (elementary idea only). **(10 periods)**

Unit IV: NATURAL RESOURCES 8 Periods

Management of natural resources: Conservation and judicious use of natural resources, Regional Environment: Adverse effects of hunting, logging, fishing with chemicals; Water harvesting, sustainability of natural resources.

Unit V: OUR ENVIRONMENT 16 Periods

Environment and environmental problems: Biodegradable and non-biodegradable materials; Solid waste management; Ecological balance – sustainable development, inter-relationship of population; Climate change; Global warming. Efforts for conservation and protection of the environment, environmental laws (mention only).

PART-B: INTERNAL 20 Marks

Area of Assessment	Marks
1. Experiments/Activities	10
2. Records	5
3. Formal Test	5
Total	20

Experiments and activities should be conducted alongside the concepts taught in theory classes. The students should be assessed on a continuous and comprehensive basis. The role of a teacher assumes a very significant part, as such, they are expected to be fair and assess the performance of the students without any bias.

A student is expected to perform and record at least 3 experiments and 2 activities in each period of assessment from the list suggested below. Thus, a student shall perform a total of at least 6 (six) experiments and 4 (four) activities, at least one from each unit, throughout the academic year.

List of Experiments :

• **CHEMICAL SUBSTANCES- NATURE AND BEHAVIOUR**

- To find the pH of given samples by using pH paper-
(a) Dilute hydrochloric acid, (b) Dilute solution of sodium hydroxide, (c) Dilute solution of ethanoic acid, (d) Lemon juice, (e) Water (distilled), (f) dilute solution of sodium bicarbonate.
- To measure the change in temperature during chemical reactions (at least 4) and conclude whether the reaction is exothermic or not.
- To identify bleaching powder from a given sample of chemicals (4-5 samples).
- To identify washing soda or baking soda from given samples of chemicals (4 samples).

- To verify the dynamic nature of equilibrium by conducting any two reversible reactions.
 - (a) To carry out the reactions of an acid (HCL) with (i) litmus solution (blue and red), (ii) zinc metal (iii) sodium carbonate and (iv) sodium hydroxide.(b) To carry out the reactions of a base (NaOH) with (i) litmus solution (blue and red), (ii) aluminium metal, and (iii) hydrochloric acid.
- **LIGHT, ELECTRICITY AND ENERGY**
 - To verify the laws of reflection of light using plane mirror.
 - To determine the focal length of a concave mirror by obtaining image of a distant object.
 - To trace the path of a ray of light passing through a rectangular glass slab and measure the angle of incidence and the angle of emergence.
 - To determine the focal length of a convex lens by focusing a distant object.
 - To trace the path of the rays of light passing through a glass prism.
 - To study the dependence of current on the potential difference across a resistor and determine its resistance.
 - To find out the resultant resistance of two resistors connected in (i) series, and (ii) parallel.
- **LIFE PROCESSES**
 - To study binary fission for budding with the help of prepared slides.
 - To determine the percentage of water absorbed by raisins.
 - To prepare a temporary mount of a leaf peel to show stomata.
 - To show that light is necessary for photosynthesis.
 - To show that oxygen evolves during photosynthesis.
 - To show that carbon dioxide is produced during respiration.
 - To show transpiration in plants.
 - To grow different plants by different methods of propagation.
 - To make a list of the different blood groups of your class.
 - To dissect and study the structure of a complete flower.
- **NATURAL RESOURCES**
 - To find out about the organisations in your neighbourhood/village/town, those are active in the spread of awareness about our environment and promote activities and attitudes that lead to the conservation of our environment and natural resources.
 - To find about any two forest produce that are the basis for an industry. And to find out whether this industry is sustainable in the long run and whether do we need to control our consumption of these products.
- **OUR ENVIRONMENT**
 - To find out what happens to the waste generated at home. And to find out how the local body (Panchayat, Municipal Corporation, resident welfare organisations) deal with the waste.
 - To find out how the sewage in your locality is treated.
 - To find out how the local industries in your locality treat their wastes.
 - To search from the library/internet how to treat hazardous materials before disposing them.

- To find out the areas suffering chronic water shortage.
- To study the rainfall patterns of your state. Identify the regions where water is abundant and the regions of water scarcity.

List of Activities:

- Group/Individual Assignments
- Information gathering and deducing
- Discussion and debate
- Science symposium/seminar
- Presentation on science concepts/experiments
- Model making
- Field Trip

Prescribed textbook:

Science Class X

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