Science Class IX

Theme: Materials
Unit I: Matter-Nature and Behaviour
Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state melting (absorption of heat), freezing, evaporation (cooling by evaporation), condensation, sublimation.

Nature of matter: Elements, compounds and mixtures. Heterogeneous and homogenous mixtures, colloids and suspensions. Physical and chemical changes (excluding separating the components of a mixture).

Particle nature and their basic units: Atoms and molecules, Law of Chemical Combination, Chemical formula of common compounds, Atomic and molecular masses.

Structure of atoms: Electrons, protons and neutrons, Valency, Atomic Number and Mass Number, Isotopes and Isobars.

Theme: The World of the Living
Unit II: Organization in the Living World
Cell - Basic Unit of life: Cell as a basic unit of life; prokaryotic and eukaryotic cells, multicellular organisms; cell membrane and cell wall, cell organelles and cell inclusions; chloroplast, mitochondria, vacuoles, endoplasmic reticulum, Golgi apparatus; nucleus, chromosomes - basic structure, number.

Tissues, Organs, Organ System, Organism: Structure and functions of animal and plant tissues (only four types of tissues in animals; Meristematic and Permanent tissues in plants).

Theme: Moving Things, People and Ideas
Unit III: Motion, Force and Work
Motion: Distance and displacement, velocity; uniform and non-uniform motion along a straight line; acceleration, distance-time and velocity-time graphs for uniform motion and uniformly accelerated motion, elementary idea of uniform circular motion.
Force and Newton's laws: Force and Motion, Newton's Laws of Motion, Action and Reaction forces, Inertia of a body, Inertia and mass, Momentum, Force and Acceleration.
Gravitation: Gravitation; Universal Law of Gravitation, Force of Gravitation of the earth (gravity), Acceleration due to Gravity; Mass and Weight; Free fall.
Floatation: Thrust and Pressure. Archimedes' Principle; Buoyancy.
Work, Energy and Power: Work done by a Force, Energy, power; Kinetic and Potential energy; Law of conservation of energy (excluding commercial unit of Energy).

Sound: Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo.

Theme: Food

Unit IV: Food Production

Plant and animal breeding and selection for quality improvement and management; Use of fertilizers and manures; Protection from pests and diseases; Organic farming.

PRACTICALS

Practicals should be conducted alongside the concepts taught in theory classes.

(LIST OF EXPERIMENTS)

1. Preparation of: Unit-I

a) a true solution of common salt, sugar and alum

b) a suspension of soil, chalk powder and fine sand in water

c) a colloidal solution of starch in water and egg albumin/milk in water and distinguishbetween these on the basis of

- transparency
- filtration criterion
- stability

2. Preparation of Unit-I

a) A mixture

b) A compound using iron filings and Sulphur powder and distinguishing between these on the basis of:

(i) appearance, i.e., homogeneity and heterogeneity

(ii) behaviour towards a magnet

(iii) behaviour towards carbon disulphide as a solvent

(iv) effect of heat

3. Perform the following reactions and classify them as physical or chemical changes: Unit-I

a) Iron with copper sulphate solution in water

b) Burning of magnesium ribbon in air

c) Zinc with dilute sulphuric acid

d) Heating of copper sulphate crystals

e) Sodium sulphate with barium chloride in the form of their solutions in water

4. Preparation of stained temporary mounts of

(a) onion peel,

(b) human cheek cells & to record observations and draw their labeled diagrams. Unit-II

5. Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants, striped, smooth and cardiac muscle fibers and nerve cells in animals, from prepared slides. Draw their labeled diagrams. Unit-II

6. Determination of the melting point of ice and the boiling point of water. Unit-I

7. Verification of the Laws of reflection of sound. Unit-III

8. Determination of the density of solid (denser than water) by using a spring balance and a measuring cylinder. Unit-III

9. Establishing the relation between the loss in weight of a solid when fully immersed in Unit-III

a) Tap water

b) Strongly salty water with the weight of water displaced by it by taking at least two different solids.

10. Determination of the speed of a pulse propagated through a stretched string/slinky (helical spring).

Unit-III

11. Verification of the law of conservation of mass in a chemical reaction. Unit-III

Disclaimer
Dropped Topics

Chapter 1: Matter in Our Surroundings
Box item titled 'Plasma and Bose–Einstein Condensate'.

Chapter 2: Is Matter Around Us Pure?
2.3 Separating the components of a mixture, 2.3.1 How can we obtain coloured component (dye) from blue/black ink?, 2.3.2 How can we separate cream from milk?, 2.3.3 How can we separate a mixture of two immiscible liquids?, 2.3.4 How can we separate a mixture of salt and camphor?, 2.3.5 Is the dye in black ink a single colour?, 2.3.6 How can we separate a mixture of two miscible liquids?, 2.3.7 How can we obtain different gases from air ? and 2.3.8 How can we obtain pure copper sulphate from an impure sample?

Chapter 3: Atoms and Molecules
Mole concept.

Chapter 7: Diversity in Living Organisms
Full Chapter.

Chapter 8: Motion
8.5 Equations of motion by graphical method, 8.5.1 Equation for Velocity–Time Relation, 8.5.2 Equation for Position–Time relation and 8.5.3 Equation for Position– Velocity.

Chapter 9: Force and Laws of Motion
9.6 Conservation of Momentum, Activity 9.5, 9.6, Example 9.6, 9.7, 9.8 and Box item 'Conservation Laws'.

Chapter 10: Gravitation
Following Box Items: a. Brief Description of Isaac Newton, b. How did Newton guess the inverse–square rule? 10.7 Relative Density and Example 10.7.

Chapter 11: Work and Energy
11.3.1 Commercial Unit of Energy.

Chapter 12: Sound
Box item titled 'Can sound make a light spot dance?', Box item titled 'Sonic Boom', 12.2.1 Sound Needs a Medium– Travel, 12.5.1 Sonar and 12.6 Structure of Human Ear.

Chapter 13: Why Do We Fall Ill?
Full Chapter.

Chapter 14: Natural Resources
Full chapter.