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**CLASS 9
SCIENCE
SYLLABUS
2022-23**



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SYLLABUS

CHAPTER-1: MATTER IN OUR SURROUNDINGS

- 1.1. Physical Nature of Matter
 - 1.1.1. Matter Is Made Up of Particles
 - 1.1.2. How Small Are These Particles of Matter?
- 1.2. Characteristics of Particles of Matter
 - 1.2.1. Particles of Matter Have Space Between Them
 - 1.2.2. Particles of Matter Are Continuously Moving
 - 1.2.3. Particles of Matter Attract Each Other
- 1.3. States of Matter
 - 1.3.1. The Solid State
 - 1.3.2. The Liquid State
 - 1.3.3. The Gaseous State
- 1.4. Can Matter Change Its State?
 - 1.4.1. Effect of Change of Temperature
 - 1.4.2. Effect of Change of Pressure
- 1.5. Evaporation
 - 1.5.1. Factors Affecting Evaporation
 - 1.5.2. How Does Evaporation Cause Cooling?

CHAPTER-2: IS MATTER AROUND US PURE?

- 2.1. What Is A Mixture?
 - 2.1.1. Types of Mixtures
- 2.2. What Is A Solution?
 - 2.2.1. Concentration of A Solution
 - 2.2.2. What Is A Suspension?
 - 2.2.3. What Is A Colloidal Solution?
- 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?
 - 2.3.8. How Can We Obtain Pure Copper Sulphate from An Impure Sample?
- 2.4. Physical and Chemical Changes
- 2.5. What Are the Types of Pure Substances?
 - 2.5.1. Elements
 - 2.5.2. Compounds

CHAPTER-3: ATOMS AND MOLECULES

- 3.1 Laws of Chemical Combination
 - 3.1.1. Law of Conservation of Mass
 - 3.1.2. Law of Constant Proportions
- 3.2 What Is an Atom?
 - 3.2.1. What Are the Modern-Day Symbols of Atoms of Different Elements?
 - 3.2.2. Atomic Mass
 - 3.2.3. How Do Atoms Exist?
- 3.3 What Is A Molecule?
 - 3.3.1. Molecules of Elements
 - 3.3.2. Molecules of Compounds
 - 3.3.3. What Is an Ion?
- 3.4 Writing Chemical Formulae
 - 3.4.1 Formulae of Simple Compounds
- 3.5 Molecular Mass and Mole Concept
 - 3.5.1 Molecular Mass
 - 3.5.2 Formula Unit Mass
 - 3.5.3 Mole Concept

CHAPTER-4: STRUCTURE OF THE ATOM

- 4.1 Charged Particles in Matter
- 4.2 The Structure of An Atom
 - 4.2.1. Thomson's Model of An Atom
 - 4.2.2. Rutherford's Model of An Atom
 - 4.2.3. Bohr's Model of Atom
 - 4.2.4. Neutrons
- 4.3. How Are Electrons Distributed in Different Orbits (Shells)?
- 4.4. Valency
- 4.5. Atomic Number and Mass Number
 - 4.5.1. Atomic Number
 - 4.5.2. Mass Number
- 4.6. Isotopes
 - 4.6.1. Isobars

CHAPTER-5: THE FUNDAMENTAL UNIT OF LIFE

- 5.1 What Are Living Organisms Made Up Of?
- 5.2 What Is A Cell Made Up Of? What Is the Structural Organisation of a Cell?
 - 5.2.1. Plasma Membrane or Cell Membrane
 - 5.2.2. Cell Wall
 - 5.2.3. Nucleus
 - 5.2.4. Cytoplasm
 - 5.2.5. Cell Organelles
 - i. Endoplasmic Reticulum (ER)
 - ii. Golgi Apparatus
 - iii. Lysosomes
 - iv. Mitochondria
 - v. Plastids
 - vi. Vacuoles

CHAPTER-6: TISSUES

- 6.1. Are Plants and Animals Made of Same Types of Tissues?
- 6.2. Plant Tissues
 - 6.2.1. Meristematic Tissue
 - 6.2.2. Permanent Tissue
 - i. Simple Permanent Tissue
 - ii. Complex Permanent Tissue
- 6.3. Animal Tissues
 - 6.3.1. Epithelial Tissue
 - 6.3.2. Connective Tissue
 - 6.3.3. Muscular Tissue
 - 6.3.4. Nervous Tissue

CHAPTER-7: DIVERSITY IN LIVING ORGANISMS

- 7.1 What Is the Basis of Classification?
- 7.2 Classification and Evolution
- 7.3 The Hierarchy of Classification- Groups
 - 7.3.1. Monera
 - 7.3.2. Protista
 - 7.3.3. Fungi
 - 7.3.4. Plantae
 - 7.3.5. Animalia
- 7.4 Plantae
 - 7.4.1. Thallophyta
 - 7.4.2. Bryophyta
 - 7.4.3. Pteridophyta
 - 7.4.4. Gymnosperms
 - 7.4.5. Angiosperms
- 7.5 Animalia
 - 7.5.1. Porifera
 - 7.5.2. Coelenterata (Cnidaria)
 - 7.5.3. Platyhelminthes
 - 7.5.4. Nematoda
 - 7.5.5. Annelida
 - 7.5.6. Arthropoda
 - 7.5.7. Mollusca
 - 7.5.8. Echinodermata
 - 7.5.9. Protochordata
 - 7.5.10. Vertebrata
 - i. Cyclostomata
 - ii. Pisces
 - iii. Amphibia
 - iv. Reptilia
 - v. Aves
 - vi. Mammalia
- 7.6 Nomenclature

CHAPTER-8: MOTION

- 8.1 Describing Motion
 - 8.1.1. Motion Along A Straight Line
 - 8.1.2. Uniform Motion and Nonuniform Motion
- 8.2 Measuring the Rate of Motion
 - 8.2.1. Speed with Direction
- 8.3 Rate of Change of Velocity
- 8.4 Graphical Representation of Motion
 - 8.4.1. Distance–Time Graphs
 - 8.4.2. Velocity-Time Graphs
- 8.5 Equations of Motion by Graphical Method
 - 8.5.1. Equation for Velocity-Time Relation
 - 8.5.2. Equation for Position-Time Relation
 - 8.5.3. Equation for Position-Velocity Relation
- 8.6 Uniform Circular Motion

CHAPTER-9: FORCE AND LAWS OF MOTION

- 9.1. Balanced and Unbalanced Forces
- 9.2. First Law of Motion
- 9.3. Inertia and Mass
- 9.4. Second Law of Motion
 - 9.4.1. Mathematical Formulation of Second Law of Motion
- 9.5. Third Law of Motion
- 9.6. Conservation of Momentum

CHAPTER-10: GRAVITATION

- 10.1 Gravitation
 - 10.1.1. Universal Law of Gravitation
 - 10.1.2. Importance of The Universal Law of Gravitation
- 10.2 Free Fall
 - 10.2.1. To Calculate the Value Of ‘g’
 - 10.2.2. Motion of Objects Under the Influence of Gravitational Force of The Earth
- 10.3 Mass
- 10.4 Weight
 - 10.4.1. Weight of An Object on The Moon
- 10.5 Thrust and Pressure
 - 10.5.1. Pressure in Fluids
 - 10.5.2. Buoyancy
 - 10.5.3. Why Objects Float or Sink When Placed on The Surface of Water?
- 10.6 Archimedes’ Principle
- 10.7 Relative Density

CHAPTER-11: WORK AND ENERGY

- 11.1. Work
 - 11.1.1. Not Much 'Work' In Spite of Working Hard!
 - 11.1.2. Scientific Conception of Work
 - 11.1.3. Work Done by A Constant Force
- 11.2. Energy
 - 11.2.1. Forms of Energy
 - 11.2.2. Kinetic Energy
 - 11.2.3. Potential Energy
 - 11.2.4. Potential Energy of An Object at A Height
 - 11.2.5. Are Various Energy Forms Interconvertible?
 - 11.2.6. Law of Conservation of Energy
- 11.3. Rate of Doing Work
 - 11.3.1. Commercial Unit of Energy

CHAPTER-12: SOUND

- 12.1 Production of Sound
- 12.2 Propagation of Sound
 - 12.2.1. Sound Needs A Medium to Travel
 - 12.2.2. Sound Waves Are Longitudinal Waves
 - 12.2.3. Characteristics of A Sound Waves
 - 12.2.4. Speed of Sound in Different Media
- 12.3 Reflection of Sound
 - 12.3.1. Echo
 - 12.3.2. Reverberation
 - 12.3.3. Uses of Multiple Reflection of Sound
- 12.4 Range of Hearing
- 12.5 Applications of Ultrasound
 - 12.5.1. Sonar
- 12.6 Structure of Human Ear

CHAPTER-13: WHY DO WE FALL ILL?

- 13.1 Health and Its Failure
 - 13.1.1. The Significance of 'Health'
 - 13.1.2. Personal and Community Issues Both Matter for Health
 - 13.1.3. Distinctions Between 'Healthy' And 'Disease-Free'
- 13.2 Disease and Its Causes
 - 13.2.1. What Does Disease Look Like?
 - 13.2.2. Acute and Chronic Diseases
 - 13.2.3. Chronic Diseases and Poor Health
 - 13.2.4. Causes of Diseases
 - 13.2.5. Infectious and Non-Infectious Cause
- 13.3 Infectious Diseases
 - 13.3.1. Infectious Agents
 - 13.3.2. Means of Spread
 - 13.3.3. Organ-Specific and Tissue Specific Manifestations
 - 13.3.4. Principles of Treatment
 - 13.3.5. Principles of Prevention

CHAPTER-14: NATURAL RESOURCES

- 14.1 The Breath of Life: Air
 - 14.1.1. The Role of The Atmosphere in Climate Control
 - 14.1.2. The Movement of Air: Winds
 - 14.1.3. Rain
 - 14.1.4. Air Pollution
- 14.2 Water: A Wonder Liquid
 - 14.2.1. Water Pollution
- 14.3 Mineral Riches in The Soil
- 14.4 Biogeochemical Cycles
 - 14.4.1. The Water-Cycle
 - 14.4.2. The Nitrogen-Cycle
 - 14.4.3. The Carbon-Cycle
 - i. The Greenhouse Effect
 - 14.4.4. The Oxygen-Cycle
- 14.5 Ozone Layer

CHAPTER-15: IMPROVEMENT IN FOOD RESOURCES

- 15.1. Improvement in Crop Yields
- 15.1.1. Crop Variety Improvement
 - 15.1.2. Crop Production Management
 - i. Nutrient Management
 - Manure
 - Fertilizers
 - ii. Irrigation
 - iii. Cropping Patterns
 - 15.1.3. Crop Protection Management.
 - Storage of Grains
- 15.2. Animal Husbandry
- 15.2.1. Cattle Farming
 - 15.2.2. Poultry Farming
 - Egg and Broiler Production
 - 15.2.3. Fish Production
 - i. Fish Production
 - ii. Inland Fisheries
 - 15.2.4. Bee-Keeping

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