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NSES CURRICULUM

High School: Science Content List

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Subject	TOTAL TOPIC	TOTAL DURATION
Physical Science	739	43.05.24
Life Science	202	09.25.49
Earth and Space Science	41	02.42.21
Science in Personal and Social Perspectives Standard	43	02.20.02
Add-On Categories	483	24.35.01
Total	1508	82.08.37

Science

Topic Name

Duration

Physical Science

- **Structure of atoms**
- **Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as mass and electrical charge. Each atom has a positively charged nucleus surrounded by negatively charged electrons. The electric force between the nucleus and electrons holds the atom together.**

1.	Physical Nature of Matter	00.02.27
2.	Atomic Mass, Molecular Mass and Formula Unit Mass	00.06.42
3.	The Mole Concept	00.04.12
4.	What is an Atom?	00.01.35
5.	Constitution of the Atomic Nucleus	00.02.00
6.	Molecular Arrangement	00.03.12
7.	Fundamental Forces in Nature	00.05.08
8.	Thermionic Emission	00.08.19
9.	Emission of Electrons	00.01.48
10.	Thomson's Atomic Model	00.04.07
11.	Rutherford's Atomic Model	00.04.02

Science

Topic Name	Duration
12. Rutherford's Alpha Particle Scattering Experiment	00.05.44
13. Millikan's Oil-Drop Experiment (Charge of an Electron)	00.06.46
14. Nucleus - A General Introduction	00.03.08
15. Properties of Nucleons	00.06.26
16. Application of High Specific Heat of Water	00.01.45
• Suggested topics	
1. Range of mass	00.05.43
• The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.	
1. What is an Atom?	00.01.35
2. Isobars	00.02.03
3. Constitution of the Atomic Nucleus	00.02.00
4. Isotopes	00.01.49
5. Isotopes of Hydrogen	00.01.40
6. Electronic Configuration of Elements	00.05.34
7. Thomson's Atomic Model	00.04.07
8. Rutherford's Atomic Model	00.04.02
9. Rutherford's Alpha Particle Scattering Experiment	00.05.44

Science

Topic Name	Duration
10. Nucleus - A General Introduction	00.03.08
11. Size of Nucleus and Nuclear Density	00.05.02
12. Radioactive Elements	00.03.42
<ul style="list-style-type: none">• The nuclear forces that hold the nucleus of an atom together, at nuclear distances, are usually stronger than the electric forces that would make it fly apart. Nuclear reactions convert a fraction of the mass of interacting particles into energy, and they can release much greater amounts of energy than atomic interactions. Fission is the splitting of a large nucleus into smaller pieces. Fusion is the joining of two nuclei at extremely high temperature and pressure, and is the process responsible for the energy of the sun and other stars	
1. Atoms, Molecules and Ions	00.05.40
2. Fundamental Forces in Nature	00.05.08
3. Binding Energy	00.06.33
4. Nuclear Fission	00.04.45
5. Energy Released in Nuclear Fission	00.04.29
6. Nuclear Chain Reaction	00.06.37
7. Nuclear Fusion	00.04.06
8. The Sun (Part-1)	00.05.15
9. The Sun (Part-2)	00.05.25
10. Stars (A)	00.04.46
11. Stars (B)	00.03.54

Science

Topic Name	Duration
12. Stars (C)	00.03.58
13. Energy Generation in stars	00.04.41
<ul style="list-style-type: none">• Radioactive isotopes are unstable and undergo spontaneous nuclear reactions, emitting particles and/or wavelike radiation. The decay of any one nucleus cannot be predicted, but a large group of identical nuclei decay at a predictable rate. This predictability can be used to estimate the age of materials that contain radioactive isotopes.	
1. Isotopes	00.01.49
2. Carbon-14 Decay	00.00.00
3. Radioactivity and Group Displacement Law	00.00.00
4. Isotopes of Hydrogen	00.01.40
5. Radioactive Elements	00.03.42
6. Natural Radioactivity	00.02.45
7. Radioactivity	00.07.44
8. Radioactive Isotopes	00.07.40
9. Artificially Produced Radioisotopes and Their Uses	00.06.23
10. Decay Rate, Half Life and Mean Life of a Radioactive Element	00.08.40
11. Emission of α - Particles	00.05.48
12. Alpha Emission	00.05.03

Science

Topic Name	Duration
13. Beta Emission	00.06.55
14. Absorption of gamma radiation	00.00.00
• Suggested topics	
1. Formulae of Compounds (Using Valencies)	00.02.48
• Structure and properties of matter	
• Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus. These outer electrons govern the chemical properties of the element.	
1. Atoms, Molecules and Ions	00.05.40
2. Electronic Configuration of Elements	00.05.34
3. Formal Charge	00.00.00
4. Valency	00.06.58
5. Chemical Bonding	00.05.11
6. Electrovalent Bond (Ionic Bond)	00.03.30
7. Covalent Bonds	00.05.16
8. Types of Covalent Bond and Lewis Representation	00.03.20
9. Polar and Non - Polar Covalent Bonds	00.03.13
10. Shapes of Covalent Molecules	00.00.00
11. Co-ordinate Bond	00.03.21
12. Hydrogen Bonding	00.06.12

Science

Topic Name	Duration
13. Types of Hydrogen Bonds	00.01.07
14. Significance of Hydrogen Bonding	00.02.46
15. Geometry of Molecules	00.07.04
16. Electron Geometry and Molecular Geometry	00.03.43
17. VSEPR Theory	00.04.02
18. The Sigma (σ) and the Pi (π) Bond	00.07.25
19. Bonding in Carbon	00.05.05
20. Properties of Non-Metals Favouring the Formation of Covalent Bonds	00.06.42
21. Polarity of Bonds	00.04.25
22. Bond Energy	00.07.29
23. Electronegativity and Bond Character	00.04.09
24. Atomic Orbitals	00.06.18
25. Factors Favouring the Formation of Ionic Compounds-I	00.05.37
26. Factors Favouring the Formation of Ionic Compounds-II	00.05.41
27. Hydrogen Molecule : A VBT Approach	00.02.29
28. M O Diagram: Homonuclear Diatomic Molecules	00.00.00
29. The Hydrogen Molecule(Molecular Orbital Diagram)	00.06.02
30. Oxygen Molecule (The Molecular Orbital Diagram)	00.03.50
31. Fractional Bond Orders	00.04.01
32. Bond Order	00.04.15
33. M O Diagram : Heteronuclear Diatomic Molecules	00.00.00

Science

Topic Name	Duration
34. Molecular Orbital Diagram of Ions	00.00.00
35. Hybridization of Atomic Orbitals	00.03.11
36. Types of Hybridization in Organic Compounds: sp^2 Hybridization in Ethene	00.03.34
37. Bonding in Acetylene	00.04.19
38. Fission of a Covalent Bond	00.05.25
39. Resonance Structure	00.02.25
40. sp^3d Hybridization in PCl_5	00.01.33
41. sp^3d^2 Hybridization in SF_6	00.01.27
42. Types of Hybridization in Organic Compounds (sp^3 Hybridization in Ethane)	00.04.37
43. Hybridization in Organic Compounds	00.08.09
44. The Stability of an Expanded Octet of PCl_5 (Using the Sudgen's Concept of Singlet Linkages)	00.04.35
45. Stability of Completely Filled Orbitals (Pairing Energy)	00.05.12
46. Stability of Half Filled Orbitals (Exchange Energy)	00.04.25
47. Factors Affecting Electronegativity	00.04.08
48. Resonance Effect	00.00.00
49. Properties of Phosphine	00.04.25
50. Covalent or Network Solids	00.04.47

Science

Topic Name	Duration
<ul style="list-style-type: none">An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties. This “Periodic Table” is a consequence of the repeating pattern of outermost electrons and their permitted energies.	
1. Elements and their Symbols	00.00.00
2. Atoms, Molecules and Ions	00.05.40
3. Electronic Configuration of Transition Metal Elements	00.02.03
4. Valency	00.06.58
5. Chemical Bonding	00.05.11
6. Constitution of the Atomic Nucleus	00.02.00
7. Electronic Configuration of Elements	00.05.34
8. Newlands' Law of Octaves	00.04.17
9. Introduction to Modern Periodic Table	00.00.00
10. Modern Periodic Table	00.06.30
11. Differences between Lithium and other Alkali Metals - I	00.06.40
12. Differences between Lithium and other Alkali Metals - II	00.03.15
13. Mendeleev's Periodic Table and Periodic Law	00.04.57
14. Electronic Configuration of Noble Gases	00.00.00
15. General Characteristics of Groups	00.01.23

Science

Topic Name	Duration
16. General Characteristics of Periods	00.04.26
17. Position of Hydrogen in the Periodic Table	00.01.26
18. Dobereiner's Law of Triads	00.01.31
19. Diagonal Relationship of Beryllium and Aluminium	00.02.22
20. Electronic Configurations of Alkaline Earth Metals	00.00.00
21. Electronic Configurations of Group-13 Elements	00.00.00
22. Group 16 elements: Electronic configuration	00.00.00
23. Group 15 Elements: Electronic configuration	00.00.00
24. Anomalous Behaviour of Boron	00.04.22
<ul style="list-style-type: none">• Bonds between atoms are created when electrons are paired up by being transferred or shared. A substance composed of a single kind of atom is called an element. The atoms may be bonded together into molecules or crystalline solids. A compound is formed when two or more kinds of atoms bind together chemically.	
1. Chemical Bonding	00.05.11
2. Co-ordinate Bond	00.03.21
3. Covalent Bonds	00.05.16
4. Electrovalent Bond (Ionic Bond)	00.03.30
5. Covalent Character in Ionic Bonds	00.05.44
6. Hydrogen Bonding	00.06.12
7. Types of Hydrogen Bonds	00.01.07
8. Significance of Hydrogen Bonding	00.02.46

Science

Topic Name	Duration
9. Elements, Compounds and Mixtures	00.05.24
10. Formation of Covalent Molecules or Compounds	00.02.56
11. Atoms, Molecules and Ions	00.05.40
12. Distinguishing Between a Mixture and a Compound	00.00.00
13. Brittleness in Ionic Crystals	00.01.10
14. Primitive Unit Cells (Part - I)	00.05.18
15. Primitive Unit Cells (Part - II)	00.04.55
16. Unit Cells in Crystal Lattices or Space Lattices Part-II	00.05.57
17. Simple Cubic Crystal Lattices (AAA Arrangement)	00.03.15
18. Face Centred Cubic Crystal Lattice-ABCABC Arrangement	00.05.12
19. AB Type Ionic Crystals	00.04.52
20. The Sodium Chloride Lattice	00.04.19
21. Density of a Cubic Crystalline Solid	00.00.00
22. Number of Particles in a Cubic Unit Cell	00.06.32
23. Structures of Silicon Dioxide and Carbon Dioxide	00.05.48
24. Electrovalent or Ionic Compounds and their Properties	00.03.46
25. Difference Between Electrovalent (Ionic) and Covalent Compounds	00.07.31
26. Atomic Imperfections	00.03.30
27. Packing Efficiency in Simple Cubic Lattice	00.00.00
28. Packing Efficiency in a BCC Lattice	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">The physical properties of compounds reflect the nature of the interactions among its molecules. These interactions are determined by the structure of the molecule, including the constituent atoms and the distances and angles between them.	
1. Hydrogen Bonding	00.06.12
2. Types of Hydrogen Bonds	00.01.07
3. The Boiling Points of Alcohols and van Der Waals' Forces	00.03.22
4. The Boiling Points of Alcohols and Hydrogen Bonding	00.05.11
5. Physical Properties of Alcohols	00.03.15
6. Dipole Dipole Interactions	00.04.04
7. Attractions Between Molecules - London Dispersion Forces	00.04.11
8. Molecular Display	00.00.00
9. 3D Representation of Organic Molecules	00.00.00
10. Determining Melting and Boiling Points	00.00.00
11. Melting and Boiling Point of Water	00.02.46
12. Viscosity	00.03.18
13. Measurement of Viscosity	00.00.00
14. Depression in Freezing Point	00.05.35
15. Polarity of Bonds	00.04.25
16. Dipole Moment	00.05.31
17. Applications of Dipole Moment	00.06.43

Science

Topic Name	Duration
18. Dipole Moment and Bond Character	00.03.02
19. Dipole-Induced Dipole Forces	00.04.00
20. Physical Properties of Alkyl Halides	00.05.46
<ul style="list-style-type: none">• Solids, liquids, and gases differ in the distances and angles between molecules or atoms and therefore the energy that binds them together. In solids the structure is nearly rigid; in liquids molecules or atoms move around each other but do not move apart; and in gases molecules or atoms move almost independently of each other and are mostly far apart.	
1. Physical Nature of Matter	00.02.27
2. States of Matter (Part-II)	00.03.16
3. Properties of Different States of Matter	00.06.16
4. Effect of Pressure on the Gaseous State of Matter	00.02.46
5. Heat of Combustion of a Candle	00.00.00
6. Effect of Temperature on the Liquid State of Matter	00.03.36
7. Arrangement and Diffusion of Molecules in Solids, Liquids and Gases	00.02.55
8. Graham's Law of Diffusion of Gases	00.03.25
9. Mole Fraction	00.03.04
10. Diffusion	00.02.50
11. Avogadro's Law	00.00.00
12. Partial Pressure	00.04.47

Science

Topic Name	Duration
13. Maxwell Speed Distribution	00.00.00
14. Volatile Liquids	00.00.00
15. Kinetic Molecular Theory of Gases	00.01.24
16. Solid State	00.02.05
17. Schottky Defect	00.00.00
18. Kinetic Theory of Matter-1 (SOLID)	00.05.27
19. Kinetic Theory of Matter-2 (Liquids)	00.04.13
20. Kinetic Theory of Gases	00.06.10
• Suggested topics	
1. Expansion of Liquid	00.00.00
• Carbon atoms can bond to one another in chains, rings, and branching networks to form a variety of structures, including synthetic polymers, oils, and the large molecules essential to life.	
1. Carbon	00.02.32
2. Bonding in Carbon	00.05.05
3. Fullerenes	00.01.25
4. Allotropy	00.01.45
5. Difference Between Diamond and Graphite	00.04.46
6. Charcoal	00.01.21
7. Experiments to Demonstrate Properties of Charcoal	00.02.30

Science

Topic Name	Duration
8. Methane	00.01.53
9. Alkanes	00.04.30
10. Classification of Carbon and Hydrogen Atoms in Alkanes	00.02.23
11. Organic Compounds (Classification of Hydrocarbons)	00.02.04
12. Chemical Properties of Organic Compounds (Part - I)	00.05.12
13. Chemical Properties of Organic Compounds (Part-II)	00.02.57
14. Addition Reactions of Alkenes	00.02.54
15. Addition Reactions of Alkenes - II	00.03.20
16. Diene Compounds	00.01.32
17. Alkynes	00.05.01
18. Classification of Functional Groups (Part- 1)	00.04.52
19. Classification of Functional Groups (Part - II)	00.06.27
20. Alkenes	00.06.04
21. Addition Polymerization (Free Radical Polymerization)	00.03.09
22. Preparation of Teflon	00.02.54
23. Tacticity of Polymers	00.03.16
24. IUPAC Nomenclature-I(Alkanes)	00.02.09
25. IUPAC Nomenclature of Acyclic Organic Compounds	00.06.02
26. Nomenclature and Isomerism	00.02.11
27. Configuration and Conformation	00.01.04
28. Conformational Analysis in Ethane	00.03.45

Science

Topic Name	Duration
29. Conformational Analysis in Propane	00.00.40
30. Conformational Analysis in Butane	00.01.48
31. Conformational Analysis in Cyclohexane	00.01.51
32. Origin of Chirality	00.01.35
33. Chirality and Molecular Asymmetry	00.03.06
34. Structural Isomerism in Alkanes	00.03.38
35. Nomenclature of Geometric Isomers	00.02.26
36. Geometrical Isomerism in Hydrocarbons	00.05.39
37. Geometrical and Optical Isomerism in Complex Compounds	00.03.58
38. C.I.P. Rule	00.00.00
39. Destructive Distillation of Coal	00.02.49
40. Biodiesel	00.04.56
41. Polythene	00.04.00
42. Effect of Heat on Polythene	00.02.45
43. Kevlar-The Bullet Resistant Polymer	00.04.03
44. Polycyclic Aromatic Hydrocarbons	00.05.30
45. Bond line Structures	00.00.00
46. The Criteria for Aromaticity	00.06.11
47. Acidic Nature of Alkynes	00.03.55
48. Classification of Polymers (Based On Their Sources)	00.01.31
49. Classification of Polymers (Based On Molecular Forces)	00.02.07

Science

Topic Name	Duration
50. Structural Isomerism in Coordination Compounds - I	00.00.00
51. Synthetic Fibres	00.03.45
52. Homologous Series	00.00.00
53. Nomenclature of Esters	00.00.00
54. Nomenclature of Alcohols	00.00.00
• Suggested topics	
1. Dalton's Law of Partial Pressures	00.01.38
2. Application of Law of Partial Pressure	00.02.31
3. Gay-Lussac's Law (Pressure-Temperature Law)	00.01.46
4. The Limiting Reactant	00.03.05
5. Shapes of Orbitals	00.00.00
6. Ionization Energy	00.02.54
7. Ionization Energy-II	00.02.24
8. Atomic Radius and its Types	00.02.52
9. Atomic Size and Ionization Potential (Transition Element)	00.01.38
10. Periodic Trends in Atomic Radii	00.02.39
11. Factors Affecting Atomic Radii	00.05.19
12. Atomic Radius and the Halogen Elements	00.03.24
13. Electronegativity	00.04.39
14. Electron Affinity	00.04.03
15. Factors Affecting the Magnitude of Electron Affinity	00.05.09

Science

Topic Name	Duration
16. Noble Gases	00.04.11
17. Properties of Nitrogen Gas	00.00.00
18. Quantum Numbers for 3d Electrons	00.00.00
19. Quantum Numbers (Part -I)	00.06.11
20. Quantum Numbers (Part -II)	00.09.29
21. Rules for Filling of Atomic Orbitals	00.07.09
22. Formula Weight	00.00.00
23. The Empirical Formula and Molecular Formula of a Compound Part-1	00.04.39
24. The Empirical Formula and Molecular Formula of a Compound Part-2	00.05.40
25. Formality	00.00.00
26. Normality	00.00.00
27. Concentrations of Solutions Molarity (M)	00.05.50
28. Concentration of Solutions Molality (m)	00.03.11
29. Calculation of Molality	00.02.10
30. Concentration of Solution	00.02.40
31. Mass Percentage of Elements	00.01.42
32. Laboratory Preparation of Hydrogen (Quantitative Aspect)	00.00.00
33. Flame Test	00.00.00
34. Principles of Extraction of Metals	00.04.52
35. Nomenclature of Aliphatic Amines	00.06.32
36. Basic Nature of Amines	00.05.59

Science

Topic Name	Duration
37. Basicity of Aryl Amines Versus Ammonia	00.03.40
38. Tests to Detect Amines	00.04.48
39. Preparation of Amines	00.04.46
40. Separation of Primary, Secondary and Tertiary Amines	00.01.17
41. Sulphonation of Benzene	00.00.00
42. Chlorination of Benzene	00.01.56
43. Friedel-Crafts Alkylation of Benzene	00.00.00
44. Friedel-crafts Acylation of Benzene	00.00.00
45. Nitration of Benzene	00.00.00
46. Structure of Benzene	00.00.00
47. Reactions of Amines with Nitrous Acid	00.03.04
48. Azo Coupling Reaction	00.04.41
49. Laboratory Preparation and Physical Properties of Phenol	00.03.25
50. Inductive Effect	00.08.11
51. Molecular Size and Solubility	00.02.02
52. Factors Affecting the Solubility of a Solute in a Solvent	00.07.14
53. Electromeric Effect	00.06.31
54. Oxidation of Aldehydes	00.07.24
55. Oxidation of Ketones	00.03.32
56. Structure and Reactivity of Carbonyl Group	00.05.48
57. Carbonyl Compounds	00.02.56

Science

Topic Name	Duration
58. Condensation Reactions of Aldehydes and Ketones (Mechanism)	00.07.04
59. Hyperconjugation In Carbocations (No Bond Resonance)	00.02.47
60. Carbocation Stability (Inductive Effect)	00.03.36
61. Nomenclature of Aldehydes and Ketones	00.05.07
62. Rosenmund Reduction	00.00.00
63. Classification of Ethers	00.02.21
64. Soaps and Detergents	00.03.36
65. Applications of Inductive Effect	00.04.41
66. Chemiluminescence	00.02.00
67. Combustion Analysis (Liebig's Method)	00.00.00
68. Nomenclature of Carboxylic Acids	00.01.54
69. Laboratory Preparation of Acetylene	00.00.00
70. Isomers and Isomerism	00.00.00
71. Nomenclature of Phenol	00.00.00
72. Classification of Carbocations	00.00.00
73. Nomenclature of Ether	00.00.00
74. Laboratory Preparation of Soap	00.00.00
75. Nomenclature of Halogenated Compounds	00.00.00
76. Drawing Resonance Structures	00.05.11
77. Formal Charge	00.00.00
78. Laboratory Preparation of Nitric Acid	00.05.11

Science

Topic Name	Duration
79. Allotropic Forms of Phosphorus	00.03.59
80. Construction of a Blast Furnace	00.03.14
81. Laboratory Preparation of Nitrogen Gas	00.00.00
82. Commercial Preparation of Nitrogen Gas	00.00.00
83. Preparation of Carboxylic Acids from Primary Alcohols and Aldehydes	00.04.49
84. Preparation of Carboxylic Acids from Ester	00.03.07
85. Kolbe's Reaction	00.00.00
86. Oxides of Nitrogen	00.03.25
87. Haloarenes Nucleophilic Substitution Reactions (I)	00.04.37
88. Haloarenes (Electrophilic Substitution Reactions)	00.06.30
89. Haloarenes Nucleophilic Substitution Reactions (II)	00.03.22
90. The Transition Elements (d-block)	00.03.54
91. Carboxylic Acid: Preparation From Acyl Halide	00.00.00
92. Nucleophilic Addition of HCN	00.04.49
93. Directive Influence of Functional Groups in Mono Substituted Benzene	00.00.00
94. Esterification	00.00.00
95. Oxidation States of d-Block Elements	00.00.00
96. Gabriel Phthalimide Synthesis	00.00.00
97. Sulphonation of Aniline	00.00.00
98. Diffusion	00.08.15
99. Brownian Motion (Introduction)	00.05.46

Science

Topic Name	Duration
100. Factors Affecting Brownian Motion	00.04.07
101. Boyle's Law (Part-1)	00.02.40
102. Boyle's Law (Part-2)	00.02.36
103. To Verify Boyle's Law	00.00.00
104. Charles' Law	00.05.03
<ul style="list-style-type: none">• Chemical reactions	
<ul style="list-style-type: none">• Chemical reactions occur all around us, for example in health care, cooking, cosmetics, and automobiles. Complex chemical reactions involving carbon-based molecules take place constantly in every cell in our bodies.	
1. Synthesis of Aspirin	00.04.22
<ul style="list-style-type: none">• Chemical reactions may release or consume energy. Some reactions such as the burning of fossil fuels release large amounts of energy by losing heat and by emitting light. Light can initiate many chemical reactions such as photosynthesis and the evolution of urban smog.	
1. Combustion and its Types	00.01.51
2. Compressed Natural Gas (CNG)	00.04.18
3. Types of Fuels	00.02.18
4. Types of Organic Reactions	00.05.40

Science

Topic Name	Duration
5. Heat Change During Chemical Reactions	00.01.30
6. Heat of Neutralization	00.02.50
7. Heat of Combustion of a Candle	00.00.00
8. Heat of Solution	00.03.57
9. Calorific Value and Fuel Efficiency	00.04.25
10. Determination of Calorific Value of Fuels	00.00.00
11. Biogas	00.02.30
12. Combustible and Non Combustible Substance	00.00.00
<ul style="list-style-type: none">• A large number of important reactions involve the transfer of either electrons (oxidation/reduction reactions) or hydrogen ions (acid/base reactions) between reacting ions, molecules, or atoms. In other reactions, chemical bonds are broken by heat or light to form very reactive radicals with electrons ready to form new bonds. Radical reactions control many processes such as the presence of ozone and greenhouse gases in the atmosphere, burning and processing of fossil fuels, the formation of polymers, and explosions.	
1. Oxidation - Reduction and Electron Transfer Method	00.01.10
2. Redox Reaction	00.05.34
3. Photo-Oxidation	00.03.42
4. Experiment on Oxidation-Reduction	00.02.19
5. Oxidation Numbers	00.04.11
6. Polyatomic Ions	00.02.36

Science

Topic Name	Duration
7. Arrhenius Theory of Acids & Bases	00.05.17
8. Bronsted Lowry Acid Base Theory	00.06.19
9. Disproportionation Reaction	00.04.01
10. Lewis Theory of Acids and Bases	00.04.16
11. Acids, Bases and Salts	00.06.12
12. Di and Polybasic Acids and Di and Polyacidic Bases	00.05.12
13. Physical Properties of Bases	00.02.24
14. Physical and Chemical Changes	00.03.14
15. Green House Gases	00.04.01
16. Effect of Temperature on pH of Water	00.00.00
17. The Common Component of all Acids	00.00.00
18. Properties of Ethanoic Acid	00.02.58
19. Determining pH	00.00.00
20. Properties of Acids and Bases	00.00.00
21. Classification of Acids, Bases and Salts	00.00.00
22. pH of Rain Water	00.00.00
23. Acid Rain	00.05.00
24. Acidic Buffer	00.05.49
25. Basic Buffer	00.04.07
26. pH Scale and its Limitations	00.07.31
27. Salt Hydrolysis	00.00.00
28. Calculating pH for Strong and Weak Acids	00.00.00
29. Calculating pH for Strong and Weak Bases	00.00.00

Science

Topic Name	Duration
30. Structure of Ozone and its Importance	00.01.51
31. Acid Base Titration	00.06.10
32. Ionization of Acids	00.01.34
33. Neutralization	00.03.14
34. Indicators	00.06.55
35. Preparation of Soluble Salts	00.05.00
36. Preparation of Insoluble Salts	00.02.16
37. Preparation of Bases	00.02.18
38. Strength of an Acid or a Base	00.03.03
39. Common Ion Effect	00.04.07
40. Nernst Equation	00.03.38
41. Electrophilic and Nucleophilic Reagents	00.05.17
42. Oxidation and Reduction	00.02.11
43. Properties of Acetic Acid	00.00.00
44. Enthalpy of Formation	00.00.00
45. pH of Salt Solutions	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">• Chemical reactions can take place in time periods ranging from the few femtoseconds (10-15 seconds) required for an atom to move a fraction of a chemical bond distance to geologic time scales of billions of years. Reaction rates depend on how often the reacting atoms and molecules encounter one another, on the temperature, and on the properties—including shape—of the reacting species.	
1. Rate of Reaction	00.00.00
2. Rate of Reaction (Effect of Surface Area and Catalyst)	00.04.17
3. Initial Rate Method	00.00.00
4. Carbon-14 Decay	00.00.00
5. Average and Instantaneous Rate of Reaction	00.07.38
6. Kinetics of First Order Reaction	00.00.00
7. Kinetics of Second Order Reaction	00.00.00
8. Collision Theory	00.07.19
9. Adsorption and the Nature of Adsorbent	00.04.27
10. Kinetic Molecular Theory of Gases	00.01.24
11. Bond Length	00.04.44
12. Periodic Trends and Chemical Reactivity	00.05.36
13. Classification of Chemical Reactions	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">Catalysts, such as metal surfaces, accelerate chemical reactions. Chemical reactions in living systems are catalyzed by protein molecules called enzymes.	
1. Homogeneous Catalysts	00.03.40
2. Heterogeneous Catalysts	00.03.20
3. Catalytic Converter	00.06.21
4. Enzymes as biocatalysts	00.03.22
<ul style="list-style-type: none">Suggested Topics	
1. Ion Electron Method	00.00.00
2. Thermite Reaction	00.04.08
3. Destructive Distillation of Wood	00.01.13
4. Carbides	00.03.54
5. Reaction of Sodium Bicarbonate with Hydrochloric Acid	00.01.10
6. Re-arrangement and Elimination Reactions	00.01.23
7. Reimer-Tiemann Reaction	00.00.36
8. Aldol Condensation	00.05.03
9. Contact Process for the Manufacture of Sulphuric Acid	00.08.19
10. Extraction of Mercury	00.00.47
11. Ostwald's Process (Manufacturing of Dilute Nitric Acid)	00.03.04
12. Manufacturing of Steel (Bessemer Converter)	00.03.13

Science

Topic Name	Duration
13. Extraction of Silver	00.00.54
14. Hoop's Process for Refining Aluminium	00.01.58
15. Lead Acid Storage Battery	00.04.47
16. Mechanism of a Nucleophilic Substitution Reaction	00.07.37
17. Nucleophilic Substitution Reactions of Ethers	00.03.10
18. Ring Substitution Reactions of Carboxylic Acids	00.00.00
19. Sandmeyer's Reaction	00.00.00
20. Williamson Synthesis	00.05.28
21. Rosenmund Reduction	00.00.00
• Motions and forces	
• Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship $F = ma$, which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object.	
1. Motion	00.02.33
2. Types of Motion	00.04.02
3. Rolling motion	00.09.25
4. Force: A Push or a Pull	00.02.22

Science

Topic Name	Duration
5. Effects of Force	00.03.01
6. Types of Force (Part-1)	00.02.49
7. Types of Force (Part-2)	00.01.51
8. Balanced Forces	00.04.24
9. Interacting Forces	00.02.27
10. Newton's First Law of Motion	00.03.11
11. Momentum and Newton's Second Law of Motion	00.07.07
12. Newton's Third Law of Motion	00.04.09
13. Third Law of Motion using Two Spring Balances	00.00.00
14. Galileo's Experiments and the Law of Inertia	00.02.46
15. Galileo's Experiments	00.01.42
16. Free Body Diagrams	00.04.35
• Suggested Topics	
1. Equilibrium of a Particle	00.06.52
2. Linear Momentum of a System of Particles	00.09.45
3. Angular Velocity and Angular Frequency	00.07.18

Science

Topic Name	Duration
<ul style="list-style-type: none">• Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.	
1. Centripetal Force	00.05.21
2. Factors Affecting Centripetal Force	00.03.22
3. Gravitation	00.02.35
4. Mass and Weight	00.05.05
5. Weightlessness	00.04.26
6. Spring Balance	00.04.23
7. Freely Falling Body	00.00.00
8. Acceleration due to Gravity 'g' Using a Simple Pendulum	00.00.00
9. Gravitational Field and Gravitational Potential	00.00.00
10. Variation of Gravitational Acceleration with Altitude	00.00.00
11. Escape Speed	00.09.00
<ul style="list-style-type: none">• Suggested Topics	
1. To Find the Range of a Projectile	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">The electric force is a universal force that exists between any two charged objects. Opposite charges attract while like charges repel. The strength of the force is proportional to the charges, and, as with gravitation, inversely proportional to the square of the distance between them.	
1. Electrostatic Force (A Non-contact Force)	00.04.49
2. Pith Ball Electroscope	00.03.41
3. Gold-Leaf Electroscope	00.08.35
4. Identifying Conducting and Non-Conducting Materials Using Gold-leaf Electroscopes	00.04.13
5. Electric Charge	00.05.15
6. Properties of Electric Charge	00.05.29
7. Electrostatic Force and Coulomb's Law	00.05.35
8. Coulomb's law	00.00.00
9. Charging by Induction	00.01.47
<ul style="list-style-type: none">Suggested Topics	
1. Electrostatic potential	00.04.45

Science

Topic Name

Duration

- **Between any two charged particles, electric force is vastly greater than the gravitational force. Most observable forces such as those exerted by a coiled spring or friction may be traced to electric forces acting between atoms and molecules.**
 1. Electrostatic Force (A Non-contact Force) 00.04.49
 2. Fundamental Forces in Nature 00.05.08
 3. Tension Produced in a String 00.02.37
 4. Electrostatic Force and Coulomb's Law 00.05.35
- **Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. These effects help students to understand electric motors and generators.**
 1. Electromagnet (Strength of its Magnetic Field) 00.03.40
 2. Electromagnetic Induction 00.03.40
 3. Magnetic Effect of Electric Current 00.07.42
 4. Magnetic Field due to a Straight Wire Carrying Current (Part-1) 00.06.02
 5. Magnetic Field due to a Straight Wire Carrying Current (Part-2) 00.03.09
 6. Magnetic Field due to a Current Carrying Circular Coil (Part-1) 00.02.56

Science

Topic Name	Duration
7. Magnetic Field due to a Current Carrying Circular Coil (Part-2)	00.04.02
8. Magnetic Field due to a Current Carrying Solenoid (Part-1)	00.03.47
9. Magnetic Field due to a Current Carrying Solenoid (Part-2)	00.02.58
10. Fleming's Left Hand Rule	00.02.01
11. Force on a Current-Carrying Conductor in a Magnetic Field	00.05.12
12. Explanation of Motor Force	00.03.06
13. Fundamentals of a DC Motor	00.07.31
14. AC Motor	00.04.43
15. Fleming's Right Hand Rule	00.02.15
16. DC Generator	00.04.35
17. AC Generator	00.06.05
18. Electromagnet	00.02.33
19. Electromagnetic Force	00.02.06
20. Magnetic Field due to a Current in a Long Straight Wire (Using Ampere's Law)	00.02.15
21. Magnetic Field of a Solenoid	00.02.33
22. Ampere's Circuital Law	00.02.06
23. Solenoid and Bar Magnet	00.03.39
24. Torque on a Current Carrying Loop in a Uniform Magnetic Field	00.06.41
25. DC Motor	00.03.52

Science

Topic Name	Duration
26. Permanent Magnets and Electromagnets	00.01.40
27. Faraday's Laws	00.03.52
28. Faraday's Experiments	00.02.26
29. Lenz's Law	00.04.13
30. Eddy Current (Introduction)	00.02.17
31. Eddy Currents	00.09.28
32. Effects Of Eddy Currents (Electromagnetic Damping)	00.09.07
33. Effects of Eddy Currents (Levitation)	00.03.56
34. Motion of Charge in a Magnetic Field (Part-1)	00.04.17
35. Motion of Charge in a Magnetic Field (Part-2)	00.05.23
• Suggested Topics	
1. Distance and Displacement	00.05.10
2. Lightning Conductor	00.01.59
3. Molecular Theory of Magnetism	00.04.44
4. Electric Potential (Part-1)	00.04.20
5. Electric Potential (Part-2)	00.02.39
6. Electric Potential Difference	00.06.24
7. Electric Potential Energy and Potential Difference	00.06.32
8. Reed Switch	00.03.29
9. Magnetic Relay	00.03.59
10. Equations of Motion (Using Graph)	00.09.47
11. Motion of a Projectile	00.03.33

Science

Topic Name	Duration
12. Uniform Circular Motion	00.04.05
13. Motion of a Block on an Inclined Plane	00.00.00
14. To find the downward force acting on a roller, along an inclined plane	00.00.00
15. Mechanical Power	00.05.29
16. Electric Field	00.04.02
17. Electric Field Lines	00.02.56
18. Gauss's Theorem (Part-1)	00.04.10
19. Gauss's Theorem (Part-2)	00.03.59
20. Application of Gauss's Theorem (Part-1)	00.03.53
21. Applications of Gauss's Theorem (Part-2)	00.06.48
22. Capacitor	00.08.35
23. Dielectrics: Polar and Non-polar	00.05.28
24. Dielectrics in a Capacitor	00.05.51
25. Capacitance of a Parallel Plate Capacitor	00.00.00
26. Energy Stored in a Capacitor in terms of Energy Density of Electric Field	00.01.46
27. Van de Graaff Generator	00.04.26
28. Photocopier	00.04.38
29. Domain Theory of Magnetism	00.00.00
30. Magnetic Dipole Moment	00.07.05
31. Types of Magnetism	00.02.53
32. Diamagnetism	00.01.46

Science

Topic Name	Duration
33. Variation in the Earth's Magnetic Field	00.01.18
34. Magnetic Declination	00.01.20
35. Oscillation Magnetometer	00.02.55
36. Force between two Parallel Wires Carrying Current	00.03.46
37. Conversion of a Galvanometer into Ammeter	00.00.00
38. Conversion of a Galvanometer into Voltmeter	00.00.00
39. Transformers	00.09.18
40. Energy Losses in a Transformer	00.06.20
41. RC Circuit	00.04.54
42. RL Circuit (Growth Phase)	00.08.06
43. RL Circuit (Decay Phase)	00.06.01
44. Orbital Magnetic Moment of Atomic Electron	00.02.13
45. Cyclotron	00.03.30
46. LC Oscillations	00.06.50
47. Electric Field due to a Dipole along its Axis	00.00.00
48. Electric Field and Potential Due to a Point Charge	00.00.00
49. Potential energy in an external field	00.06.39
50. Electrostatic Shielding	00.04.44
51. Electric Field due to a Dipole on its Equatorial Plane	00.00.00
52. Alternating Voltage applied to an Inductor	00.00.00
53. Alternating Voltage applied to a Capacitor	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">• Conservation of energy and increase in disorder	
<ul style="list-style-type: none">• The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiations, and in many other ways. However, it can never be destroyed. As these transfers occur, the matter involved becomes steadily less ordered.	
1. Kinetic Molecular Theory of Gases	00.01.24
2. Solar Cooker	00.06.25
3. Wind Energy	00.03.41
4. Windmills	00.06.46
5. Flames	00.04.58
6. Types of Coal	00.01.58
7. Verification of Law of conservation of energy by Double-Inclined Plane Method	00.00.00
8. Transformation of Energy	00.08.02
9. Conservation of Energy	00.06.44
<ul style="list-style-type: none">• All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.	
1. Kinetic Molecular Theory of Gases	00.01.24

Science

Topic Name	Duration
2. Work and the First Law of Thermodynamics	00.04.23
3. Thermochemical Equations	00.00.00
4. Kinetic Energy	00.05.16
5. Potential Energy	00.05.44
6. Elasticity and Potential Energy	00.01.52
7. Elastic Potential Energy	00.03.52
• Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.	
1. Kinetic Molecular Theory of Gases	00.01.24
2. Maxwell Speed Distribution	00.00.00
3. Heat and Temperature	00.01.57
4. Heat and Temperature: The Concept	00.06.57
5. Maxwell's Law of Molecular Speed Distribution	00.02.19
6. Mean Free Path	00.01.23
7. Law of Equipartition of Energy (Introduction)	00.02.19

Science

Topic Name	Duration
<ul style="list-style-type: none">• Everything tends to become less organized and less orderly over time. Thus, in all energy transfers, the overall effect is that the energy is spread out uniformly. Examples are the transfer of energy from hotter to cooler objects by conduction, radiation, or convection and the warming of our surroundings when we burn fuels.	
1. Entropy, Free Energy and Spontaneity of a Reaction	00.05.13
2. Entropy and the Second Law of Thermodynamics	00.03.53
3. Change in Entropy	00.00.00
4. Conduction of Heat	00.02.24
5. Pressure - Volume(P-V) Work	00.00.00
6. Basic Concepts of Thermodynamics-I	00.03.15
7. Coffee Cup Calorimeter	00.04.08
8. Calorimeter	00.02.10
9. Calorific Value and Fuel Efficiency	00.04.25
10. Work Done in Chemical Systems	00.00.00
11. Hess's Law	00.01.58
12. Electrical Conductivity : Liquids	00.00.00
13. Heat and Temperature	00.01.57
14. Transfer of Heat (Conduction)	00.04.12
15. Convection	00.02.30
16. Transfer of Heat (Radiation)	00.04.13
17. Room Coolers	00.01.23

Science

Topic Name	Duration
18. Transformation of Energy	00.08.02
19. Heat and Temperature: The Concept	00.06.57
20. Heat Conduction and Steady State	00.04.38
21. Thermal Conductivity	00.06.31
22. Heat and Thermal Equilibrium	00.03.40
23. Newton's Law of Cooling	00.03.23
24. Refrigerator	00.02.54
• Suggested Topics	
1. Vertical Axis Windmill	00.06.55
2. Newton's Cradle	00.00.00
3. Simple Harmonic Oscillator	00.02.27
4. Energy of a Simple Harmonic Oscillator	00.00.00
5. Geometrical Representation of Simple Harmonic Motion	00.04.49
6. Graphical Representation of Simple Harmonic Motion	00.03.33
• Interactions of energy and matter	
• Waves, including sound and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter	
1. Sound	00.03.52

Science

Topic Name	Duration
2. Propagation of Sound Waves through Different Media	00.02.47
3. Superposition of Waves	00.00.00
4. Musical Sound and Noise	00.01.15
5. Loudness and Pitch	00.02.29
6. Sound Quality or Timbre	00.03.48
7. Sound Propagation in Air	00.02.40
8. The Propagation of Sound Waves through Air	00.04.35
9. Characteristics of Sound Wave	00.08.11
10. Speed of Sound	00.06.39
11. Speed of Sound in Air	00.00.00
12. Effect of Temperature, Humidity, and Wind on the Speed of Sound in Air	00.01.39
13. Hearing Aid - Reflection of Sound	00.01.07
14. Echo	00.03.49
15. Applications of Echo	00.01.32
16. Reverberation	00.04.08
17. SONAR	00.04.41
18. Sound from Stringed Instruments	00.05.16
19. Doppler Effect in Sound	00.06.11
20. Different Cases of Doppler Effect	00.05.32
21. Waves	00.04.18
22. Longitudinal and Transverse Waves	00.01.27
23. Resonance	00.03.38

Science

Topic Name	Duration
24. Diffraction	00.02.12
25. Speed of Waves in a Medium	00.02.14
26. Speed of a pulse along the string	00.00.00
27. Diffraction of Sound Wave	00.06.45
28. Beats	00.06.43
29. Ripple Tank Experiment to Illustrate Interference	00.06.59
• Suggested Topics	
1. Relative Displacement of Progressive Wave	00.07.44
2. Force Law for Simple Harmonic Motion	00.10.01
• Electromagnetic waves result when a charged object is accelerated or decelerated. Electromagnetic waves include radio waves (the longest wavelength), microwaves, infrared radiation (radiant heat), visible light, ultraviolet radiation, x-rays, and gamma rays. The energy of electromagnetic waves is carried in packets whose magnitude is inversely proportional to the wavelength.	
1. Electromagnetic Spectrum (Part - 1)	00.05.19
2. Electromagnetic Spectrum (Part - 2)	00.03.51
3. Production of electromagnetic waves	00.09.25
4. Accelerated Charge and Electromagnetic Waves	00.06.42
5. Spectrum	00.03.26

Science

Topic Name	Duration
6. Spectral Series	00.08.11
7. Properties of X-Rays	00.01.14
8. Quantum Numbers (Part -I)	00.06.11
9. Quantum Numbers (Part -II)	00.09.29
• Suggested Topics	
1. Propagation of Radio Waves : Sky waves	00.10.41
2. Displacement current	00.12.07
3. Light Sources And Photometry	00.08.22
• Each kind of atom or molecule can gain or lose energy only in particular discrete amounts and thus can absorb and emit light only at wavelengths corresponding to these amounts. These wavelengths can be used to identify the substance.	
1. Atomic Energy levels	00.06.03
2. Emission Spectra and the Flame Test	00.06.02
3. Hydrogen Spectrum and its Explanation by Bohr	00.07.10

Science

Topic Name

Duration

- **In some materials, such as metals, electrons flow easily, whereas in insulating materials such as glass they can hardly flow at all. Semiconducting materials have intermediate behavior. At low temperatures some materials become superconductors and offer no resistance to the flow of electrons.**

1.	Conduction of Electricity	00.02.38
2.	Conduction of Electricity in Water	00.00.50
3.	Acid solutions Conduct Electricity	00.01.12
4.	Electric Conductors and Insulators	00.03.20
5.	Conductors and Insulators	00.03.45
6.	Comparing Conductors and Electrolytes	00.04.21
7.	Ohm's Law	00.07.26
8.	Electric Resistance and Heating Effect	00.05.09
9.	Dependence of current on potential difference across a resistor	00.00.00
10.	Semiconductors (Introduction)	00.02.42
11.	Ohm's Law and Resistivity	00.01.57
12.	Types of Resistors	00.06.46
13.	Variable Resistors (Potentiometer & Rheostat)	00.06.30
14.	Series Connection of Resistors	00.01.32
15.	Parallel Connection of Resistors	00.04.38
16.	Metre Bridge	00.00.00
17.	Laws of Combination of Resistors using Metre Bridge	00.00.00

Science

Topic Name	Duration
18. Conductors	00.02.16
19. Semiconductors	00.07.05
20. Intrinsic Semiconductors	00.03.42
21. Silicon and Germanium Semiconductors	00.02.33
22. Extrinsic Semiconductor (Part-1)	00.04.02
23. Extrinsic Semiconductor (Part-2)	00.02.51
24. p-n Junction Diode (Part-1)	00.03.43
25. p-n Junction Diode (Part-2)	00.04.26
26. Characteristics of a P-N Junction	00.02.48
27. I- V Characteristics of a p-n Junction Diode	00.00.00
28. Working of a p-n Junction Diode (Forward Bias)	00.10.32
29. Working of a p-n Junction Diode (Reverse Bias)	00.08.58
30. Digital Electronics and Logic Gates	00.03.32
31. Primary Concept of IC (Integrated Circuit)	00.03.04
• Suggested Topics	
1. Basics of a Transistor	00.04.30
2. Characteristics of a Common Emitter Transistor	00.00.00
3. Transistor as a Switch	00.12.30
4. Optoelectronic Junction Devices	00.06.10
5. Regions of Operation of a Transistor	00.05.58
6. I-V characteristics of a Zener Diode	00.00.00
7. Resistance per unit length of a wire	00.00.00

Science

Topic Name	Duration
8. Internal resistance of a cell using potentiometer	00.00.00
9. Comparison of emf of two cells using potentiometer	00.00.00
10. Reflection of Sound	00.03.48
11. Infrasonics and Ultrasonics	00.05.13
12. Interference	00.03.15
13. Applications of Joule Heating	00.01.28
14. Applications of Thermoelectricity	00.02.28
15. Wheatstone Bridge	00.00.00
16. Wavefront	00.03.24
17. Wavefronts and Huygens' Principle	00.06.59
18. Young's Double-Slit Experiment (Introduction)	00.05.01
19. Young's Double-Slit Experiment (Intensity of Fringes)	00.07.08
20. Young's Double-Slit Experiment: Fringe Width	00.05.49
21. Linear Polarization of Light	00.00.00
22. Polarization of Light and Malus's Law	00.00.00

Science

Topic Name

Duration

Life Science

- **The Cell**
- **Cells have particular structures that underlie their functions. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules which form a variety of specialized structures that carry out such cell functions as energy production, transport of molecules, waste disposal, synthesis of new molecules, and the storage of genetic material.**

1.	Prokaryotes	00.03.37
2.	Eukaryotic cell	00.03.03
3.	Cell structure (Plant cell)	00.02.32
4.	Cell structure I	00.01.33
5.	Cell structure II	00.02.35
6.	Role of components of a cell membrane	00.02.33
7.	Physiology of cell membrane	00.05.06
8.	The partially permeable cell membrane	00.01.49
9.	Cell wall and vacuoles	00.01.36
10.	Secondary cell wall	00.01.45
11.	Nucleus and lysosomes	00.03.03
12.	Cell organelles (ER, Golgi body)	00.03.59

Science

Topic Name	Duration
13. Cell organelles (Ribosomes, centrioles)	00.04.06
14. Structure of Mitochondria	00.02.38
15. The role of ATP in active transport	00.02.19
16. Chemiosmosis (ATP synthesis)	00.04.44
<ul style="list-style-type: none">• Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by a large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell.	
1. Enzyme	00.01.03
2. Enzymes	00.02.20
3. Enzymes as biocatalysts	00.03.22
4. Properties of enzymes	00.02.05
5. Effect of pH on enzymes	00.01.42
6. Effect of temperature on enzymatic activity	00.01.32
7. Enzyme inhibition	00.03.33
8. Cofactors	00.03.51
9. ATP as energy currency	00.02.08

Science

Topic Name **Duration**

- **Cells store and use information to guide their functions. The genetic information stored in DNA is used to direct the synthesis of the thousands of proteins that each cell requires.**
 1. Cell and its DNA 00.03.43
 2. Chromosomes, genes and DNA 00.03.50
 3. DNA Replication (Prokaryotic) 00.00.00
 4. Transcription 00.00.00
 5. Protein synthesis (Translation) 00.05.53

- **Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through the selective expression of individual genes. This regulation allows cells to respond to their environment and to control and coordinate cell growth and division.**
 1. Cell division (Mitosis) 00.04.15
 2. Protein synthesis (Translation) 00.05.53

Science

Topic Name

Duration

- **Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms use solar energy to combine molecules of carbon dioxide and water into complex, energy rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital connection between the sun and the energy needs of living systems.**
 1. Photosynthesis in plants 00.03.49
 2. Site of photosynthesis 00.01.24
 3. Adaptation of leaves for photosynthesis 00.02.30
 4. Raw materials for photosynthesis 00.02.58
 5. Light is necessary for photosynthesis 00.00.00
 6. Photosynthesis (Light reaction) 00.07.17
 7. Dark reaction (Calvin cycle) 00.06.19
 8. Euglena 00.04.33

- **Cells can differentiate, and complex multicellular organisms are formed as a highly organized arrangement of differentiated cells. In the development of these multicellular organisms, the progeny from a single cell form an embryo in which the cells multiply and differentiate to form the many specialized cells, tissues and organs that comprise the final organism. This differentiation is regulated through the expression of different genes.**
 1. Embryonic development 00.04.21

Science

Topic Name	Duration
2. Stem cells	00.03.44
3. Darkfield microscopy	00.02.00
4. Transmission electron microscope	00.01.41
5. Scanning electron microscope	00.01.50
6. Microscope and Cells	00.02.28
7. Structure of Onion peel and Cork cells	00.01.34
8. Preparation of temporary mount of an onion peel	00.00.00
9. Preparation of temporary mount of cheek cells	00.00.00
10. Temporary Mount of Leaf Peel	00.00.00
11. Shape of cells	00.04.37
12. Blood cells	00.04.51
13. Structure of Cilia in Paramecium	00.01.15
14. Transport across membranes	00.03.55
15. Bulk transport	00.02.50
16. Plasmolysis	00.03.00
17. Mitosis	00.03.10
18. Enzymes (The biological catalysts)	00.02.20
19. Chemosynthesis and photosynthesis	00.03.10
20. Extracellular and intracellular enzymes	00.02.56
21. Principle of limiting factors	00.06.39
22. Chromatographic isolation of photosynthetic pigments	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">• The Molecular Basis of Heredity	
<ul style="list-style-type: none">• In all organisms, the instructions for specifying the characteristics of the organism are carried in DNA, a large polymer formed from subunits of four kinds (A, G, C, and T). The chemical and structural properties of DNA explain how the genetic information that underlies heredity is both encoded in genes (as a string of molecular “letters”) and replicated (by a templating mechanism). Each DNA molecule in a cell forms a single chromosome.	
1. Complex structure of DNA	00.06.15
2. Importance of nucleic acids	00.03.06
3. Cell and its DNA	00.03.43
4. Chromatin structure	00.01.40
5. Nitrogen Bases	00.02.02
6. Chromosomes, genes and DNA	00.03.50
7. DNA Replication (Prokaryotic)	00.00.00
8. Genetic code	00.00.00

Science

Topic Name

Duration

- **Most of the cells in a human contain two copies of each of 22 different chromosomes. In addition , there is a pair of chromosomes that determines sex: a female contains two X chromosomes and a male contains one X and one Y chromosome. Transmission of genetic information to offspring occurs through egg and sperm cells that contain only one representative from each chromosome pair. An egg and a sperm unite to form a new individual. The fact that the human body is formed from cells that contain two copies of each chromosome—and therefore two copies of each gene—explains many features of human heredity, such as how variations that are hidden in one generation can be expressed in the next.**

1. Human sex determination

00.04.05

- **Changes in DNA (mutations) occur spontaneously at low rates. Some of these changes make no difference to the organism, whereas others can change cells and organisms. Only mutations in germ cells can create the variation that changes an organism's offspring.**

1. Mutation

00.02.56

2. Gene Mutation

00.04.30

3. Damage caused by UV radiation

00.01.37

4. Genes, homologous chromosomes and cystic fibrosis

00.03.06

Science

Topic Name **Duration**

- **Suggested Topics**

1.	DNA Structure	00.02.54
2.	Principle of dominance	00.00.00
3.	Law of dominance	00.00.00
4.	Test cross	00.00.00
5.	Incomplete dominance	00.00.00
6.	Dihybrid cross	00.00.00
7.	Law of Independent Assortment	00.00.00
8.	Sex-linked Inheritance: Haemophilia	00.00.00
9.	Colour blindness	00.00.00
10.	Lac Operon	00.00.00
11.	Tryptophan operon	00.00.00
12.	Sex determination	00.03.40
13.	Sex determination (Drosophila melanogaster)	00.04.55

- **Biological Evolution**

- **The great diversity of organisms is the result of more than 3.5 billion years of evolution that has filled every available niche with life forms.**

1.	Origin of the earth	00.03.35
2.	Chemical origin of life	00.05.15
3.	Origin of life (Biological)	00.03.28

Science

Topic Name	Duration
4. Urey Miller's Experiment	00.03.54
5. Evolution of mitochondria and chloroplast	00.03.51
<ul style="list-style-type: none">• Biological classifications are based on how organisms are related. Organisms are classified into a hierarchy of groups and subgroups based on similarities which reflect their evolutionary relationships. Species is the most fundamental unit of classification.	
1. Classification of living things	00.02.33
2. The hierarchy of classification	00.02.21
3. Types of Viruses	00.03.42
4. Prokaryota and eukaryota	00.04.41
5. Classification of eukaryota	00.02.45
6. Protozoans	00.02.39
7. Algae and diatoms	00.02.59
8. Spirogyra	00.00.00
9. Alternation of generation - spirogyra	00.02.05
10. Red and Brown Algae	00.01.52
11. Types of Fungi	00.03.53
12. Fungi II	00.01.54
13. Agaricus (Mushroom)	00.00.00
14. Structure of fungi	00.01.42
15. Funaria (Moss)	00.00.00

Science

Topic Name	Duration
16. Liverworts and lichens	00.04.02
17. Alternation of generations in bryophytes	00.02.58
18. Pteridophytes	00.02.45
19. Fern	00.00.00
20. Gymnosperms	00.02.27
21. Angiosperms	00.00.00
22. Alternation of generation in angiosperms	00.02.49
23. Hydra and sponges	00.02.34
24. Worms	00.02.49
25. General characteristics of insects	00.05.05
26. Starfish and snail	00.02.57
27. Difference between vertebrates and invertebrates	00.02.58
28. Hemichordata and chordates	00.02.11
29. Chordates and mammals	00.03.52
30. Fish	00.04.11
31. Fish and amphibia	00.03.31
32. Osteichthyes and chondrichthyes	00.05.23
33. Reptiles and birds	00.02.26
• Suggested Topics	
1. Viruses	00.03.27
2. Lytic and lysogenic cycle in virus	00.03.55
3. Binary Fission in Amoeba	00.00.00

Science

Topic Name	Duration
4. Fungi I	00.02.08
5. Yeast and fungi	00.03.29
6. Budding in Yeast	00.00.00
7. Filter feeding	00.02.27
8. Gaseous exchange in animals	00.02.47
9. Bony Fish	00.00.00
10. Aphids	00.01.27
11. Bird flight	00.04.23
12. Difference between dicots and monocots	00.02.17
13. Evidences of evolution (Vestigial organs)	00.03.23
14. Hominid evolution	00.00.00

- **The Interdependence of Organisms**

- **The atoms and molecules on the earth cycle among the living and nonliving components of the biosphere.**

1. Factors affecting ecosystem 00.04.13

- **Energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores to carnivores and decomposers.**

1. Food chain 00.02.52

2. Energy flow in an ecosystem 00.03.48

Science

Topic Name	Duration
<ul style="list-style-type: none">• Organisms both cooperate and compete in ecosystems. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years .	
1. Food chain	00.02.52
2. Food Web	00.00.00
3. Ecological pyramids	00.05.07
4. Forest ecosystem	00.02.12
5. Aquatic ecosystem	00.02.30
6. Ecological succession in ponds	00.02.56
7. Relationships due to interdependence	00.03.37
<ul style="list-style-type: none">• Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption . Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected.	
1. Air pollution	00.02.59
2. Global warming	00.02.25
3. Water pollution and its effect (Eutrophication)	00.03.14
4. Photochemical smog	00.03.51

Science

Topic Name **Duration**

- **Suggested Topics**

- | | |
|------------------------|----------|
| 1. Ponds and lakes | 00.02.07 |
| 2. World biomes-Desert | 00.05.17 |

- **Matter, Energy, and Organization in Living Systems**

- **The energy for life primarily derives from the sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon- containing (organic) molecules. These molecules can be used to assemble larger molecules with biological activity (including proteins, DNA, sugars, and fats). In addition, the energy stored in bonds between the atoms (chemical energy) can be used as sources of energy for life processes.**

- | | |
|--|----------|
| 1. The amazing process of Photosynthesis | 00.04.53 |
| 2. Monosaccharide and Disaccharide | 00.02.56 |
| 3. Carbohydrates | 00.02.07 |
| 4. Amino Acids | 00.06.11 |
| 5. Organic molecules of life - Nucleic acids | 00.03.25 |
| 6. Proteins and Fats | 00.02.40 |
| 7. Fats | 00.00.00 |
| 8. Cholesterol | 00.04.02 |
| 9. Structure of DNA | 00.02.55 |

Science

Topic Name	Duration
<ul style="list-style-type: none">The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store this energy temporarily in phosphate bonds of a small high - energy compound called ATP.	
1. ATP as energy currency	00.02.08
2. Structure of Monosaccharides	00.00.00
<ul style="list-style-type: none">As matter and energy flows through different levels of organization of living systems— cells, organs, organisms, communities— and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change.	
1. Energy flow in an ecosystem	00.03.48
2. Ecological pyramids	00.05.07
<ul style="list-style-type: none">Suggested Topics	
1. Simple tests for carbohydrates, fats and proteins	00.02.18

Science

Topic Name	Duration
<ul style="list-style-type: none">• The Behavior of Organisms	
<ul style="list-style-type: none">• Multicellular animals have nervous systems that generate behavior. Nervous systems are formed from specialized cells that conduct signals rapidly through the long cell extensions that make up nerves. The nerve cells communicate with each other by secreting specific excitatory and inhibitory molecules. In sense organs, specialized cells detect light, sound, and specific chemicals and enable animals to monitor what is going on in the world around them.	
1. Structure of neuron	00.03.45
2. Human nervous system (Neuron)	00.02.47
3. Types of neurons	00.05.28
4. Neuroglial cells	00.02.41
5. Nervous system	00.03.13
6. Nerve	00.00.00
7. Brain (Anatomy and function)	00.04.37
8. Spinal cord (Myelon)	00.03.31
9. Sub systems of the nervous system (CNS, PNS)	00.01.47
10. Cranial Nerves	00.01.56
11. Impulse transmission	00.02.57
12. Impulse transmission (Action potential)	00.03.45
13. Synaptic transmission	00.07.23
14. Sensory reception and processing	00.03.23

Science

Topic Name	Duration
15. Reflex action	00.02.07
16. Reflex arc	00.03.03
17. Eye (Anatomy and physiology)	00.05.05
18. Mechanism of hearing	00.05.13
19. Tongue (Organ of taste)	00.04.17
20. Olfactory system of human beings	00.02.52
<ul style="list-style-type: none">• Organisms have behavioral responses to internal changes and to external stimuli. Responses to external stimuli can result from interactions with the organism's own species and others, as well as environmental changes; these responses either can be innate or learned. The broad patterns of behavior exhibited by animals have evolved to ensure reproductive success. Animals often live in unpredictable environments, and so their behavior must be flexible enough to deal with uncertainty and change. Plants also respond to stimuli.	
1. Stimulus response	00.02.08
2. Thermoregulation by the skin	00.03.51
3. Plant movements	00.02.08
4. Plant movements (Tropism)	00.04.29
<ul style="list-style-type: none">• Suggested Topics	
1. Human nervous system I	00.02.03
2. Human nervous system II	00.03.43

Science

Topic Name	Duration
3. Meninges of the brain	00.02.56
4. Structure of the brain: Forebrain	00.05.15
5. Midbrain and Hindbrain	00.06.01
6. Acetylcholine as neurotransmitter	00.02.54
7. Disorders of the brain (Multiple sclerosis)	00.03.41
8. Neuromuscular junction	00.02.52

Earth and Space Science

- **Energy in the Earth System**

- **Earth systems have internal and external sources of energy, both of which create heat. The sun is the major external source of energy. Two primary sources of internal energy are the decay of radioactive isotopes and the gravitational energy from the earth's original formation.**

1. Temperature of the Earth	00.04.22
2. Our Universe	00.05.40
3. The Sun (Part-1)	00.05.15
4. The Sun (Part-2)	00.05.25

- **Suggested Topics**

1. Convection and Convection Currents	00.08.00
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Science

Topic Name	Duration
<ul style="list-style-type: none">The outward transfer of earth's internal heat drives convection circulation in the mantle that propels the plates comprising earth's surface across the face of the globe.	
1. Temperature of the Earth	00.04.22
2. Convection and Convection Currents	00.08.00
<ul style="list-style-type: none">Heating of earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents.	
1. Convection	00.02.30
2. Convection and Convection Currents	00.08.00
3. Temperature of the Earth	00.04.22
<ul style="list-style-type: none">Global climate is determined by energy transfer from the sun at and near the earth's surface. This energy transfer is influenced by dynamic processes such as cloud cover and the earth's rotation, and static conditions such as the position of mountain ranges and oceans.	
1. Convection and Convection Currents	00.08.00

Science

Topic Name	Duration
<ul style="list-style-type: none">• Geochemical Cycles	
<ul style="list-style-type: none">• The earth is a system containing essentially a fixed amount of each stable chemical atom or element. Each element can exist in several different chemical reservoirs. Each element on earth moves among reservoirs in the solid earth, oceans, atmosphere, and organisms as part of geochemical cycles.	
1. Water cycle	00.02.36
2. Carbon cycle	00.02.03
3. Oxygen cycle	00.02.46
4. Nitrogen cycle	00.04.08
5. Nitrogen fixation	00.03.34
6. Phosphorus cycle	00.03.57
7. Atom Economy	00.00.00
8. Layers of the Earth's Atmosphere	00.00.00

Science

Topic Name

Duration

- **Movement of matter between reservoirs is driven by the earth's internal and external sources of energy. These movements are often accompanied by a change in the physical and chemical properties of the matter. Carbon, for example, occurs in carbonate rocks such as limestone, in the atmosphere as carbondioxide gas, in water as dissolved carbon dioxide , and in all organisms as complex molecules that control the chemistry of life .**

1.	Carbon cycle	00.02.03
2.	Properties of Different States of Matter	00.06.16
3.	Physical Nature of Matter	00.02.27
4.	Real Gases: Deviations from Ideal Behavior	00.05.02

- **Origin and Evolution of the Earth System**

- **The sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago. The early earth was very different from the planet we live on today**

1.	The Sun (Part-1)	00.05.15
2.	The Sun (Part-2)	00.05.25
3.	Evolution of Solar System	00.01.57
4.	Solar System (The Inner Planets)	00.06.22

Science

Topic Name **Duration**

- **Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.**

1. Isotopes	00.01.49
2. Radioactivity and Group Displacement Law	00.00.00

- **Suggested Topics**

1. The Blackbody	00.02.22
2. Kirchhoff's Law of Radiation	00.03.57
3. Blackbody Radiation and Planck's Law	00.00.00
4. Blackbody Radiation: Stefan-Boltzmann Law	00.04.39
5. Light Sources And Photometry	00.08.22
6. Wien's Displacement Law	00.02.00
7. Hertzprung-Russell Diagram	00.00.00

- **The Origin and Evolution of the Universe**

- **Stars produce energy from nuclear reactions, primarily the fusion of hydrogen to form helium. These and other processes in stars have led to the formation of all the other elements.**

1. Nuclear Fusion	00.04.06
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Science

Topic Name	Duration
2. Stars (A)	00.04.46
3. Stars (B)	00.03.54
4. Stars (C)	00.03.58
5. Energy Generation in stars	00.04.41

Science in Personal and Social Perspectives Standard

- **Personal and Community Health**

- **The severity of disease symptoms is dependent on many factors, such as human resistance and the virulence of the disease-producing organism. Many diseases can be prevented, controlled, or cured. Some diseases, such as cancer, result from specific body dysfunctions and cannot be transmitted.**

1. Bacteria and Virus	00.03.38
2. Diarrhoea	00.03.12
3. Cholera (Cellular damage)	00.02.29
4. Viral diseases (Influenza and polio)	00.04.42
5. Chickenpox	00.03.36
6. Malaria	00.04.22
7. Filariasis	00.02.45
8. AIDS	00.05.41
9. Cancer	00.03.33

Science

Topic Name	Duration
10. Nanomedicine	00.06.07
11. Drug resistance	00.03.44
12. First line of Defense	00.03.16
13. Role of neutrophils in the immune system	00.02.06
14. Vaccination	00.03.28
15. Types of vaccines	00.02.11
16. Study of common disease-causing organisms (Entamoeba histolytica)	00.00.00
17. Disease causing organism-Microsporium	00.00.00
<ul style="list-style-type: none">• Selection of foods and eating patterns determine nutritional balance. Nutritional balance has a direct effect on growth and development and personal well-being. Personal and social factors— such as habits, family income, ethnic heritage, body size, advertising, and peer pressure—influence nutritional choices.	
1. Deficiency diseases (Vitamin A, B ₁ , C)	00.02.12
2. High calorie diet and obesity	00.03.09

Science

Topic Name	Duration
<ul style="list-style-type: none">Sexuality is basic to the physical, mental, and social development of humans. Students should understand that human sexuality involves biological functions, psychological motives, and cultural, ethnic, religious, and technological influences. Sex is a basic and powerful force that has consequences to individuals' health and to society. Students should understand various methods of controlling the reproduction process and that each method has a different type of effectiveness and different health and social consequences.	
1. Reproductive Health	00.00.00
<ul style="list-style-type: none">Suggested Topics	
1. Glucose metabolism disorder (Diabetes)	00.03.03
2. Types of Diabetes	00.03.55
3. Complications of diabetes	00.03.45
4. Disorders of the heart	00.02.13
5. Atherosclerosis (Heart disease)	00.02.04
6. Arteriosclerosis	00.04.58
7. Passive smoking and bronchitis	00.03.20
8. Bone disorder (Osteoporosis)	00.03.06
9. Scoliosis	00.04.27
10. Dialysis	00.06.20

Science

Topic Name	Duration
<ul style="list-style-type: none">• Natural Resources	
<ul style="list-style-type: none">• Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations.	
1. Renewable Resources of Energy	00.04.35
<ul style="list-style-type: none">• Environmental Quality	
<ul style="list-style-type: none">• Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients. Humans are changing many of these basic processes, and the changes may be detrimental to humans.	
1. Air pollution	00.02.59
2. Global warming	00.02.25
3. Ozone layer	00.03.37
4. Composter	00.01.28
5. Waste disposal (Vermicomposting)	00.02.53
6. Wastewater Treatment	00.05.10

Science

Topic Name	Duration
<ul style="list-style-type: none">• Suggested Topics	
1. Plastic recycling	00.02.31
<ul style="list-style-type: none">• Natural and Human Induced Hazards	
<ul style="list-style-type: none">• Some hazards, such as earthquakes, volcanic eruptions, and severe weather, are rapid and spectacular. But there are slow and progressive changes that also result in problems for individuals and societies. For example, change in stream channel position, erosion of bridge foundations, sedimentation in lakes and harbors, coastal erosions, and continuing erosion and wasting of soil and landscapes can all negatively affect society.	
1. Soil erosion	00.03.11
<ul style="list-style-type: none">• Science and Technology in Local, National and Global Challenges	
<ul style="list-style-type: none">• Humans have a major effect on other species. For example, the influence of humans on other organisms occurs through land use—which decreases space available to other species—and pollution — which changes the chemical composition of air, soil , and water.	
1. Air pollution	00.02.59
2. Water pollution and its effect (Eutrophication)	00.03.14

Science

Topic Name	Duration
3. Biomagnification	00.03.47
4. Photochemical smog	00.03.51

Add-On Categories

- **Diversity of Life**

1. Identification of Bacteria	00.00.00
2. Oscillatoria	00.00.00
3. Riccia (Liverworts)	00.00.00
4. Identification of Hydra	00.00.00
5. Fasciola hepatica (Common liver fluke)	00.00.00
6. Pheretima posthuma (Earthworm)	00.00.00
7. Hirudinaria granulosa (Leech)	00.00.00
8. Apis indica (Honey bee)	00.00.00
9. Bombyx mori (Silk moth)	00.00.00
10. Identification of Palaemon (Prawn)	00.00.00
11. Asterias (Starfish)	00.00.00
12. Scoliodon (Shark)	00.00.00
13. Identification of Frog	00.00.00
14. Identification of frog eggs	00.00.00
15. Bird (Vertebrata)	00.00.00
16. Oryctolagus cuniculus (rabbit)	00.00.00

Science

Topic Name	Duration
17. Useful microbes	00.04.23
18. Wool production	00.00.00
• Plant Kingdom	
1. The plant	00.03.05
2. Types of Plants	00.03.01
3. Function of the parts of the plants	00.02.52
4. Branching	00.03.52
5. Leaf	00.03.02
6. Structure of the leaf	00.06.12
7. Types of leaves I	00.03.02
8. Phyllotaxy	00.04.47
9. Types of venation	00.01.48
10. Importance of root	00.01.58
11. Root systems	00.03.26
12. Anatomy of root	00.02.17
13. Flower	00.02.57
14. Parts of a flower	00.02.52
15. Morphology of flower	00.04.00
16. Typical flower	00.03.59
17. Types of flowers	00.02.46
18. Gynoecium: apocarpous and syncarpous	00.00.59
19. Position of floral whorls on the thalamus	00.01.49

Science

Topic Name	Duration
20. Aestivation	00.01.19
21. Inflorescence - I	00.04.17
22. Inflorescence - II	00.03.18
23. Floral formula	00.05.11
24. Floral arrangement	00.05.16
25. Position of the ovary	00.03.16
26. Fabaceae	00.02.41
27. Solanaceae	00.02.52
28. Liliaceae	00.02.22
29. Malvaceae	00.02.57
30. Asteraceae	00.04.49
31. Brassicaceae (Mustard plant)	00.03.34
32. Maize seed	00.02.33
33. Fruits	00.04.45
34. Dispersal of seeds	00.03.07
35. Dispersal of fruits and seeds	00.02.38
36. Parts of dicot embryo	00.00.00
37. Seed to seedling	00.02.06
38. Seed germination	00.03.58
39. Monocot seed germination	00.03.40
40. Conditions required for seed germination	00.01.36
41. Pollen Development	00.03.27
42. Development of female gametophyte	00.02.22

Science

Topic Name	Duration
43. Adaptation for self and cross pollination	00.03.36
44. Different methods of pollination	00.00.00
45. Vascular bundles in dicots	00.03.41
46. Anatomy of dicot stem	00.04.26
47. Internal structure of a monocot stem	00.05.49
48. Internal structure of dicot root	00.03.11
49. Monocot root anatomy	00.03.06
50. Internal structure of dicotyledonous leaf	00.03.39
51. Leaf of maize	00.03.54
52. Heartwood and sapwood	00.01.37
53. Photosynthesis	00.02.11
54. Photosynthesis - Trapping light energy	00.02.22
55. Respiration in plants	00.02.26
56. Measurement of respiratory quotient	00.00.00
57. Photorespiration	00.04.35
58. Water potential	00.02.47
59. Transpiration	00.03.10
60. Transpiration and Guttation	00.02.58
61. Guttation	00.02.24
62. Experiment on transpiration	00.01.15
63. Lenticel	00.00.51
64. Transport of water	00.02.33
65. Transport of water through the casparian strip	00.02.22

Science

Topic Name	Duration
66. Ascent of sap	00.01.31
67. Ascent of sap - Activity	00.02.22
68. Theories for ascent of sap	00.04.20
69. Pressure flow hypothesis	00.05.51
70. Growth regulators in plants (Phytohormones)	00.03.01
71. Plant Hormones	00.04.12
72. Abscission	00.01.25
73. Plant development	00.03.04
74. Differentiation, dedifferentiation and redifferentiation	00.04.16
75. Measurement of growth	00.01.53
76. Physiology of photoperiodism	00.02.56
77. Mineral nutrition in plants	00.04.55
78. Identification of deficiency diseases in plants	00.00.00
79. Xerophytes, halophytes and mesophytes	00.03.20
80. Effect of water scarcity on plants	00.03.02
81. Experiment to show O_2 is used in respiration	00.03.21
82. Development of pollen	00.02.20
83. Insectivory	00.03.58
• Animal Kingdom	
1. Regeneration among animals	00.01.46
2. Support in land vertebrates and aquatic vertebrates	00.03.01
3. Digestive system (Earthworm)	00.02.02

Science

Topic Name	Duration
4. Circulatory system (Earthworm)	00.01.40
5. Excretory system (Earthworm)	00.02.26
6. Nervous system (Earthworm)	00.00.55
7. Reproductive system (Earthworm)	00.02.27
8. Locomotion in an earthworm	00.01.40
9. Cockroach	00.03.01
10. Digestive system of cockroach	00.02.39
11. Respiration in animals (Hydra and Grasshopper)	00.05.39
12. Circulatory system in cockroach	00.04.17
13. Excretory system (Cockroach)	00.02.38
14. Nervous system of cockroach	00.01.47
15. Compound eye - Cockroach	00.01.53
16. Reproductive system (Cockroach)	00.02.39
17. Grasshopper (Digestive system)	00.00.54
18. Respiratory system of grasshopper	00.03.23
19. External anatomy of frog (Head)	00.02.12
20. External anatomy of frog (Trunk)	00.02.29
21. Frog (Skin)	00.03.34
22. Respiratory organs of frog	00.04.00
23. Blood vascular system - Frog	00.03.37
24. Excretory organs of frog	00.03.55
25. Brain of frog (Structure and functions)	00.04.01
26. Reproductive system (Frog)	00.04.25

Science

Topic Name	Duration
27. Circulatory system (Rat)	00.01.56
28. Nervous system (Rat)	00.01.35
29. Circulatory system in amphibians	00.01.38
30. Developmental stages (Embryonic development)	00.02.48
• Human Body	
1. Action of major enzymes in humans	00.06.13
2. Liver and its functions	00.03.31
3. Function and characteristics of leucocytes	00.01.41
4. Haemolysis and crenation of RBCs	00.04.02
5. Arteries	00.04.28
6. Capillaries	00.03.04
7. Valves of the heart	00.02.05
8. Double circulation	00.02.20
9. Blood groups	00.03.26
10. Lymphatic system	00.03.08
11. Sphygmomanometer	00.02.38
12. Respiratory system (Larynx)	00.06.09
13. Complex tubular excretory system	00.04.10
14. Ultrastructure of kidney	00.02.37
15. Nephron (Structure and functions)	00.04.22
16. Juxtaglomerular apparatus (JGA) and pancreas	00.02.51
17. Types of human muscles	00.02.04

Science

Topic Name	Duration
18. Ultrastructure of skeletal muscles	00.03.18
19. Actin and myosin filament	00.01.48
20. Mechanism of muscle fibre contraction	00.04.07
21. Myoglobin	00.01.37
22. Endoskeleton and hydrostatic skeleton	00.03.56
23. Anatomy of the bone	00.03.00
24. Axial skeleton (Rib cage)	00.02.39
25. Sternum and ribs	00.01.51
26. Structure of antibody	00.03.02
27. Monoclonal antibodies	00.03.33
28. Allergy	00.05.04
29. Pituitary and pineal glands	00.05.18
30. Thyroid gland	00.03.43
31. Parathyroid glands	00.04.53
32. The thymus gland	00.01.00
33. Adrenal glands	00.03.19
34. Mechanism of hormone action (Adrenaline)	00.03.50
35. Mechanism of hormone action (Insulin)	00.05.31
36. Role of insulin in cell metabolism	00.02.14
37. Sex hormones	00.02.45
38. Placenta and foetal haemoglobin	00.04.09
39. Effect of Antibiotics	00.02.44
40. ECG and EEG	00.04.41

Science

Topic Name	Duration
• Biotechnology	
1. Sterilization	00.01.41
2. Tissue culture	00.04.19
3. Somatic hybridization	00.02.47
4. Recombinant DNA replication and transfer	00.03.12
5. Application of genetic engineering	00.03.16
6. Agarose gel electrophoresis	00.00.00
7. Gene amplification using PCR	00.03.00
8. DNA fingerprinting	00.00.00
9. Gene Therapy (SCID)	00.05.25
10. Plant breeding	00.00.00
11. Application of Antisense Technology	00.04.39
12. Hydroponics	00.03.33
13. Industrial production of enzymes	00.04.09
14. Mycoprotein	00.03.40
15. In vitro fertilization	00.04.34
• Virtual Lab	
1. Detection of Glucose by Fehling's test	00.00.00
2. Benedict's test for Glucose	00.00.00
3. Detection of sucrose	00.00.00
4. Detection of starch	00.00.00
5. Biuret test for protein detection	00.00.00

Science

Topic Name	Duration
6. Detection of protein by Xanthoproteic test	00.00.00
7. Sudan III test for fat	00.00.00
8. Emulsification Test for Fats	00.00.00
9. Detection of Urea in Urine	00.00.00
10. To detect the presence of glucose in urine	00.00.00
11. Detection of albumin in urine	00.00.00
12. Detection of bile pigments in urine	00.00.00
13. Imbibition by raisins	00.00.00
14. Chemical analysis of Adulterants	00.00.00
15. Activity of salivary amylase on starch	00.00.00
16. Effect of temperature on the activity of salivary amylase	00.00.00
17. Effect of temperature on the activity of lipase	00.00.00
18. Study of different water samples for pH	00.00.00
19. Study of clarity of water from different sources	00.00.00
20. To study the pH of different types of soil	00.00.00
21. Demonstration of water holding capacity of soils	00.00.00
22. Identification from permanent slides (4 tissues)	00.00.00
23. Observing protocista in water using the hanging drop technique	00.00.00
24. Study of mitosis in an onion root tip	00.00.00
25. Study of pollen germination	00.00.00
26. Study of pollen germination and growth of pollen tube	00.00.00

Science

Topic Name	Duration
• Coordination Chemistry	
1. Relation between Geometry and Magnetic Properties of Transition Metal Complexes	00.03.30
2. Introduction to Coordination Compounds	00.04.32
3. Geometry of $K_4[Fe(CN)_6]$ based on its Magnetic Property	00.03.02
4. Classification of Ligands	00.06.05
5. Geometry of $[Fe(H_2O)_6]^{3+}$	00.01.43
6. Geometry of $[Co(NH_3)_6]^{2+}$	00.00.00
7. Geometry of $K_4[Fe(CN)_6]$	00.03.38
8. IUPAC Nomenclature of Coordination Compounds	00.00.00
9. Homoleptic and Heteroleptic Complexes	00.03.24
10. Werner's Theory	00.03.33
11. Linkage Isomerism	00.00.00
• Electrochemistry	
1. Faraday's First Law of Electrolysis	00.07.17
2. Faraday's Second Law of Electrolysis	00.02.41
3. Standard Hydrogen Electrode	00.01.47
4. Use of Standard Hydrogen Electrode as an Anode	00.05.59
5. Use of Standard Hydrogen Electrode as a Cathode	00.05.00
6. Electrode Potential and Standard Electrode Potential	00.04.41
7. Electroplating Activity	00.00.00

Science

Topic Name	Duration
8. Daniell Cell	00.00.00
9. Calculating Emf of a Concentration Cell	00.00.00
10. Difference Between Electrochemical Cell and Electrolytic Cell	00.01.58
11. Factors Affecting the Products of Electrolysis (Part-I)	00.04.29
12. Factors Affecting the Products of Electrolysis (Part-II)	00.06.11
13. The Dry Cell	00.00.00
14. Concentration Cell	00.02.15
15. Osmosis and Osmotic Pressure	00.04.50
16. Electrolysis of Aqueous Cupric Chloride (CuCl_2)	00.01.38
17. Electrolytic or Ionic Conductance	00.02.50
18. EMF of a Galvanic Cell	00.03.02
19. Galvanic Cell And Salt Bridge	00.03.20
20. Fuel Cell	00.04.17
• Colligative Properties	
1. Colligative Properties of a Solution	00.02.09
2. Factors Affecting Vapour Pressure of a Solvent	00.02.56
3. Vapour Pressure of a Solvent	00.01.57
4. The Degree of Dissociation	00.02.51
5. Depression in Freezing Point	00.00.00
6. Volatile Liquids	00.00.00
7. Raoult's Law	00.00.00

Science

Topic Name	Duration
8. Lowering in Vapour Pressure	00.00.00
9. Elevation in Boiling Point	00.00.00
10. Abnormal Molar Masses	00.06.40
11. Van't Hoff Factor (i)	00.03.11
12. Measuring Depression in Freezing Point Using Beckmann's Method	00.02.03
13. Numericals: Lowering In Vapour Pressure	00.02.57
14. Numericals: Elevation In Boiling Point	00.04.47
• Equilibrium	
1. Equilibrium Processes (Physical Equilibrium)	00.06.11
2. Dynamic Nature of Equilibrium	00.04.38
3. Law of Mass Action	00.00.00
4. Percentage Ionization of Weak Acids	00.00.00
5. Introduction to Chemical Equilibrium	00.02.38
6. Solubility Product	00.03.45
7. Henry's Law	00.02.28
8. Reversible Decomposition of Calcium Carbonate	00.03.53
9. Shifting of Equilibrium by Changing Temperature	00.02.51
10. Acid Dissociation Equilibrium Constant (K_a)	00.02.32
11. Base Dissociation Equilibrium Constant (K_b)	00.02.15
12. Characteristics of Equilibrium Constant	00.05.43
13. Effect of Pressure on Equilibrium	00.02.17

Science

Topic Name	Duration
14. Dissociation and Association	00.03.37
15. Effect of Addition of Inert Gas on Equilibrium	00.00.00
• Surface Chemistry	
1. Adsorption and the Nature of Adsorbent	00.04.27
2. Adsorption	00.07.26
• Applied Chemistry	
1. The Chemistry of Fire	00.05.36
2. Coriolis Effect and the Trade Winds	00.04.52
3. Fire Extinguisher	00.00.00
4. Colorimetry	00.02.00
5. EDTA Titration Method	00.03.17
6. Cleansing Capacity of Soap	00.00.00
7. The Dry Cell	00.00.00
8. Rancidity	00.02.52
9. The Process of Thermoelectric Production	00.00.00
10. Temperature of Air	00.00.00
• Study of Some Compounds	
1. Compounds of Phosphorus	00.01.01
2. Silver Nitrate (AgNO_3)	00.01.07
3. Silver Halides (AgX)	00.03.05

Science

Topic Name	Duration
4. Hydrogen Halides	00.02.27
5. Potassium Dichromate ($K_2Cr_2O_7$)	00.02.04
6. Derivatives of Carboxylic Acids (Amides)	00.03.39
7. Derivatives of Carboxylic Acids (Acid Chlorides)	00.02.25
8. Organic Acids	00.01.59
9. Sucrose	00.02.35
10. Proteins	00.03.26
11. Cellulose	00.01.30
12. Potassium Dichromate as an Oxidizing Agent	00.03.51
13. Classification of Hydrides	00.02.09
14. Classification of Organic Halides	00.04.48
15. Bleaching Powder	00.01.59
16. Washing Soda	00.02.47
17. Diborane	00.03.50
18. Preparation of Hydrogen Peroxide	00.03.46
19. Oxidizing Nature of Hydrogen Peroxide	00.04.57
20. Plaster of Paris	00.03.17
21. Borax	00.04.25
22. Quick Lime (Calcium Oxide)	00.03.29
23. Calcium Carbonate	00.04.00
24. Xenon Fluorine Compounds	00.06.45
25. Xenon Oxides (Structure and Hybridization)	00.05.01
26. Inter-Halogen Compounds	00.05.56

Science

Topic Name	Duration
• f-block elements	
1. Oxidation States of Actinides	00.00.00
2. Electronic Configurations of Lanthanides	00.00.00
3. Oxidation States of Lanthanides	00.00.00
4. Electronic Configurations of Actinides	00.00.00
5. The f-block Elements	00.00.00
• Electronics and Communication	
1. OR Gate	00.04.50
2. NOR Gate	00.01.11
3. Coaxial Cables	00.02.03
4. Need for Modulation	00.03.58
5. Light Emitting Diode	00.04.19
6. AND Gate	00.03.57
7. NOT Gate	00.03.10
8. NAND Gate	00.00.57
9. NAND as a Universal Gate	00.00.00
10. Line Communication	00.01.12
11. Optical Fibre Communication Technology	00.01.49
12. Amplitude Modulation	00.01.28
13. Satellite Communication	00.03.19
14. Bandwidth of Signals	00.09.34
15. Remote Sensing	00.02.19

Science

Topic Name	Duration
16. Boolean Expression and Truth Table	00.00.00
17. Frequency Modulation	00.00.00
18. Logic Gates	00.06.52
• Heat and Thermodynamics	
1. Thermodynamic Systems and Zeroth Law of Thermodynamics	00.06.15
2. The First Law of Thermodynamics	00.06.19
3. The Second Law of Thermodynamics	00.07.54
4. Absolute zero and third law of thermodynamics	00.08.27
5. Newton's Law of Cooling	00.00.00
6. Adiabatic Process	00.06.21
7. To Study the Effect of Heating on a Bimetallic Strip	00.00.00
8. Ideal Gas Equations	00.00.00
9. Internal Combustion Engine	00.06.07
• Light and Optics	
1. Structure of Optical Fibres	00.03.00
2. Optical Fibre	00.02.01
3. Prism Spectrometer	00.03.55
4. Working of a Prism Spectrometer	00.07.06
5. Newton's Corpuscular Theory	00.01.01
6. Doppler Effect in Electromagnetic Waves	00.07.29

Science

Topic Name	Duration
• Modern Physics	
1. X - ray Spectrum	00.06.43
2. Applications of Laser (Part-1) (CD Player)	00.02.43
3. Applications of Laser (Part-2) (Barcode Reader)	00.02.19
4. Quantum Mechanical Tunnelling of Alpha Particles	00.04.00
5. Discharge of Electricity through Gases	00.02.34
6. Photoelectric Effect: The concept	00.07.31
7. Crystalline and Amorphous Solids	00.05.49
8. Wave-Particle Duality	00.07.56
9. Radioactive decay law	00.06.49
10. de Broglies Explanation of Bohr's Postulate of Quantisation	00.07.09
11. Experiments of Photoelectric Effect	00.08.26
12. Cathode Ray Tube (CRT)	00.03.26
13. Maltese Cross Tube	00.06.14
14. Kinescope	00.02.47
15. Iconoscope	00.01.29
16. Lasers and their Uses	00.06.35
17. Ruby Laser	00.00.00
• Oscillations and Waves	
1. Damped Oscillations	00.07.53

Science

Topic Name	Duration
2. Sonometer: Relation between frequency and length of a given wire under constant tension	00.00.00
3. Sonometer: Relation between the length of a given wire and tension for a constant frequency	00.00.00
4. Standing Waves	00.06.38
5. Force Constant of a Helical Spring	00.00.00
6. Damped Oscillations of a Pendulum	00.00.00
7. Modes of Vibration of a String	00.07.00
• Mechanics	
1. Scalars and Vectors (Introduction)	00.06.39
2. Introduction to Vectors	00.00.00
3. Components of Vectors	00.00.00
4. Moment of Inertia	00.06.40
5. Angular Momentum	00.05.10
6. Conservation of Angular Momentum	00.04.11
7. Conservation of Angular Momentum (Examples)	00.06.05
8. Centre of Mass of a System of Particles	00.00.00
9. Motion of Centre of Mass	00.05.32
10. Elastic Collision	00.00.00
11. Inelastic collision	00.00.00
12. Collisions: Elastic and Inelastic	00.06.29
13. Elastic collision in two Dimensions	00.07.01

Science

Topic Name	Duration
14. Collision in lab between two spheres	00.00.00
15. Impulse and Crumple Zone	00.06.02
16. Moment of Inertia (Mathematical expressions)	00.04.11
17. Angular Momentum of a System of Particles	00.00.00
18. Couple	00.07.21
19. Rolling Friction and Sliding Friction	00.04.10
20. Thrust and Pressure	00.03.18
21. Applications of Thrust and Pressure	00.03.00
22. Moment of a Force and the Law of Moments	00.07.39
23. Limiting Friction	00.01.00
24. Relation Between Force of Limiting Friction and Normal Reaction	00.00.00
25. Increasing and Reducing Friction	00.04.54
26. Fluid Friction	00.07.01
27. Rolling Friction	00.02.58
28. Banking of Curved Roads (Introduction)	00.01.36
29. Banking of Curved Roads (Mathematical Treatment)	00.05.40
30. Simple Harmonic motion : Simple Pendulum	00.08.21
31. Period of a Simple Pendulum	00.00.00
32. Pressure Exerted by a Solid	00.00.00
33. Conservation of Linear Momentum	00.07.27
34. Factors Affecting Friction	00.04.20
35. Buoyant Force and Archimedes' Principle	00.07.14

Science

Topic Name	Duration
36. Applications of Bernoulli's Principle	00.04.38
37. Drag Force and Terminal Velocity	00.05.32
38. Applications of the Principle of Floatation (Submarine and Fish)	00.02.58
39. Applications of the Principle of Floatation (Ships)	00.03.53
40. Fluids	00.03.00
41. Demonstration of Pascal's Law	00.01.10
42. Proof of Archimedes' Principle	00.03.47
43. Fluids in Motion: Equation of Continuity	00.09.34
44. Bernoulli's Principle	00.06.24
45. Aerofoil	00.07.46
46. Pressure in Fluids	00.05.52
47. Pressure due to a Fluid Column	00.04.07
48. Aneroid Barometer	00.02.35
49. Laws of Liquid Pressure	00.06.23
50. Buoyancy	00.05.22
51. Applications of the Principle of Floatation (Balloons and Airships)	00.02.48
52. Law of Floatation	00.04.23
53. Pressure Exerted by Liquids	00.02.14
54. Applications of the Principle of Floatation (Iceberg)	00.02.32
55. Equation of Continuity (Applications)	00.03.16
56. Viscosity	00.02.33

Science

Topic Name	Duration
57. Measurement of Coefficient of Viscosity	00.00.00
58. Stokes' Law	00.00.00
59. Torricelli's law: Speed of Efflux	00.05.03
60. Venturimeter	00.05.36
61. Reynolds Number	00.02.36
62. Capillarity	00.08.49
63. Dynamic Lift and Swing Bowling	00.02.35
64. Principle of Flootation	00.07.45
65. Archimedes' Principle	00.06.38
66. Archimedes' Principle: The Experiment	00.00.00
67. Applications of Pascal's Law	00.02.09
68. Elastic Behaviour of Solids	00.07.06
69. Hooke's Law and Young's Modulus	00.02.55
70. Young's Modulus	00.00.00
71. Hooke's Law	00.00.00
72. Elastic Modulus	00.07.29
73. Stress and strain	00.07.55
74. Stress-Strain Curve	00.07.58
75. Strain Energy	00.08.54
76. Stress, Pressure and Volume Elastic Constant	00.01.36
77. Parallax	00.03.27
78. Stellar Parallax	00.04.03
79. Work (Activity-1)	00.01.26

Science

Topic Name	Duration
80. Work (Activity-2)	00.01.57
81. Work Done by a Constant Force	00.06.43
82. Work Done by a Variable Force	00.07.00
83. Work-Energy Theorem	00.05.53
84. Work- energy theorem for a variable force	00.04.06
85. Theorem of perpendicular axes	00.05.22
86. Theorem of parallel axes	00.04.14
87. Kinetic Energy of Rolling Motion	00.07.14
• Electromagnetism	
1. Kirchhoff's First Law	00.02.48
2. Kirchhoff's Second Law	00.03.00
3. Current Density	00.04.20
4. Electric Field due to Infinite Plane Sheet of Charge	00.06.04
5. Permeability and Permittivity	00.09.22
6. Drift velocity	00.07.21
7. Dependence of current on potential difference across a resistor	00.00.00
8. Drift velocity and Origin of Resistivity	00.07.23
9. Capacitors in parallel	00.00.00
10. Alternating Voltage applied to an Inductor	00.00.00
11. Alternating Voltage applied to a Capacitor	00.00.00

Science

Topic Name	Duration
12. Power and Energy in AC circuits	00.00.00
13. Series RLC Circuit and Series Resonance	00.00.00
• Units, Physical quantities and Vectors	
1. Measurement of Time	00.09.04
2. Absolute Error, Relative Error and Percentage Error	00.07.13
3. Combination of Errors	00.10.51
4. Understanding the Significant Figures	00.07.50
5. Uncertainty in measurement	00.07.29
6. Determination of Volume of a Given Irregular Lamina Using a Screw Gauge	00.00.00
7. Dimensions of Physical Quantities	00.06.17
8. Dimensional analysis	00.07.07
9. Measurement of Mass	00.00.00
10. Determination of the Radius of Curvature of a given Spherical Surface by a Spherometer	00.00.00
11. Determination of Surface Tension by Capillary Rise Method	00.00.00
TOTAL TOPIC IN HIGH SCHOOL SCIENCE – 1508	82.08.37