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NSES CURRICULUM

Middle School: Science Content List

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SUBJECT	TOTAL TOPIC	TOTAL DURATION
Physical Science	397	21.59.04
Life Science	187	10.05.49
Earth and Space Science	110	06.28.16
Science in Personal and Social Perspectives Standard	22	01.19.01
Add-On Categories	23	01.05.48
TOTAL	739	40.57.58

Science

Topic Name

Duration

Physical Science

- **Properties and changes of properties in matter**
- **A Substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.**

1.	Mixtures	00.02.57
2.	Distinguishing Between a Mixture and a Compound	00.00.00
3.	Distinguishing Between Solutions	00.00.00
4.	Separation of Solid-Liquid Mixtures	00.04.35
5.	Separation of Liquid-Liquid Mixtures	00.04.15
6.	Desalination of Water (Simple Distillation)	00.03.28
7.	Separation of a Liquid-Gas Mixture	00.01.59
8.	Separation of a Mixture	00.00.00
9.	Solvents and Solutes	00.02.00
10.	Physical Properties of Hydrogen	00.01.36
11.	Physical Properties of Metals	00.06.56
12.	Physical Properties of Sulphuric Acid	00.02.14
13.	Physical Properties of Sulphur Dioxide	00.01.30

Science

Topic Name	Duration
14. Physical Properties of Ammonia	00.02.32
15. Physical Properties of Acids	00.03.34
16. Chemical Properties of Bases	00.02.31
17. Physical Properties of Alkali Metals	00.03.53
18. Physical Properties of Aldehydes and Ketones	00.05.35
19. Physical Properties of Amines	00.03.32
20. Physical Properties of Alcohols	00.03.15
21. Physical Properties of Bases	00.02.24
22. Physical Properties of Water	00.01.50
23. Separation of Gaseous Mixtures	00.03.20
24. Melting and Boiling Point of Water	00.02.46
25. Physical and Chemical Changes	00.03.14
26. Determining Melting and Boiling Points	00.00.00
27. States of Matter	00.03.16
28. States of Matter (Part-II)	00.03.16
29. Properties of Different States of Matter	00.06.16
30. Effect of Temperature on the Solubility of Gases and Thermal Pollution	00.04.49
31. Factors Affecting Pressure of the Gas	00.04.01
32. Effect of Temperature on the Liquid State of Matter	00.03.36
33. Effect of Pressure on the Gaseous State of Matter	00.02.46
34. Physical Nature of Matter	00.02.27
35. Arrangement and Diffusion of Molecules in Solids,	00.02.55

Science

Topic Name	Duration
Liquids and Gases	
36. Crystallization	00.01.47
37. Properties of Materials	00.07.59
38. The Relative Reactivities of Metals	00.01.33
39. Simple Oxides of Metals and Non Metals	00.04.34
40. Alcohols and their Classification	00.01.50
41. Sublimation	00.01.51
42. Centrifugation	00.02.06
43. Distillation	00.01.38
44. Chromatography	00.03.57
45. Thin Layer Chromatography	00.00.00
46. Separation of Dyes in Black Ink Using Chromatography	00.02.15
47. Brittleness in Ionic Crystals	00.01.10
48. Evaporation (Mechanism)	00.02.06
49. Water as a Solvent	00.00.00
50. Deionization Process	00.00.00
51. Colloids and their Properties	00.05.34
52. Preparation of Colloidal Solution-II	00.03.34
53. Factors Affecting the Rate of Evaporation of Water	00.02.00
54. Rate of Evaporation : Surface Area and Air Movement	00.02.39
55. Properties of a Colloid	00.03.10
56. Suspensions and their Properties	00.02.54
57. Types of Solutions	00.00.56

Science

Topic Name	Duration
58. Solid Solution	00.01.05
59. Formation of a Solution	00.03.36
60. Solutions and their Properties	00.02.17
61. Properties of Sulphur	00.03.30
62. Ammonia and its Uses	00.01.52
63. Crystal Hydrate	00.04.09
64. Alloys and their Uses	00.04.14
65. Relative Density	00.01.25
66. Hydrometer	00.03.09
67. Density (Part-1)	00.05.09
68. Density (Part-2)	00.04.21
69. Melting and Boiling Point	00.03.31
<ul style="list-style-type: none">• Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals is an example of such a group.	
1. Does Mass Change in a Chemical Reaction?	00.01.26
2. Changes accompanying Chemical Reactions	00.02.50
3. Chemical Reactions and their Characteristics	00.02.50
4. Metallic and Non-metallic Properties in a Period	00.01.57

Science

Topic Name	Duration
5. Introduction to Modern Periodic Table	00.00.00
6. General Characteristics of Groups	00.01.23
7. General Characteristics of Periods	00.04.26
8. Modern Periodic Table	00.06.30
9. Chemical Reactions	00.03.05
10. Chemical Equations	00.06.09
11. The Law of Conservation of Mass	00.01.26
12. Chemical Properties of Carbon	00.02.18
13. Hydrogen	00.01.18
14. Uses of Hydrogen	00.02.39
15. Chemical Properties of Hydrogen	00.03.23
16. Chemical Properties of Metals (Part - 2)	00.05.41
17. Chemical Properties of Metals	00.01.34
18. Chemical Properties of Iron	00.03.01
19. Chemical Properties of Sulphur Dioxide - I	00.06.10
20. Chemical Properties of Sulphur Dioxide-II	00.06.31
21. Chemical Properties of Concentrated Sulphuric Acid	00.03.17
22. Chemical Properties of Dilute Sulphuric Acid	00.02.20
23. Chemical Properties of Carbon Dioxide	00.04.33
24. Chemical Properties of Phosphorus	00.03.34
25. Chemical Properties of Alkali Metal Elements and their Uses	00.03.53
26. Chemical Properties of Alkaline Earth Metals	00.03.15

Science

Topic Name	Duration
27. Metals and Non Metals (Reaction with Oxygen)	00.03.42
28. Chemical Properties of Phenol - I	00.04.52
29. Chemical Properties of Phenol - II	00.03.56
30. Physical Properties of Metals	00.06.56
31. Physical Properties of Non-metals	00.04.21
32. Malleability in Metals	00.02.52
33. Natural Indicators	00.04.02
34. Functioning of Human Body and pH	00.03.18
35. Elements, Compounds and Mixtures	00.05.24
36. Compounds	00.01.00
37. Reaction Between Baking Soda and Vinegar	00.01.15
38. Reaction of Metals with Water	00.02.37
39. Reaction of Metals with Acids	00.04.05
40. Reaction of Metal Oxides with Acid	00.01.19
41. Reaction of Metal Carbonates with Acid	00.02.23
42. Properties of Ethanol	00.05.57
43. Industrial Production of Ethanol	00.01.02
44. Sulphur	00.02.22
45. Laboratory Preparation of Sulphur Dioxide	00.03.04
46. Laboratory Preparation of Hydrogen Gas	00.01.32
47. Laboratory Preparation of Ammonia	00.03.55
48. Laboratory Preparation of Oxygen	00.03.02
49. Law of Definite Proportions or Constant Composition	00.04.50

Science

Topic Name	Duration
50. Law of Multiple Proportions	00.05.00
51. Molecular Formula	00.02.22
52. What are Acids and Bases?	00.02.56
53. The Common Component of all Acids	00.03.21
54. Reaction of Alkali Metals with Liquid Ammonia	00.03.00
55. Oxides of Alkali Metals	00.04.42
56. Periodic Trends and Chemical Reactivity	00.05.36
57. Halides of Phosphorus	00.03.03
58. Law of Conservation of Mass	00.00.00
59. Action of Natural Indicators	00.04.06
60. Preparation of Hydrogen Peroxide	00.03.46
61. Preparation of Phosphine	00.04.41
62. Preparation of Ethers by Dehydration of Alcohols	00.04.37
63. Addition of Ammonia to Aldehydes and Ketones	00.05.22
64. Acidity of Alcohols and Phenols	00.06.05
65. Dehydration of Alcohols	00.04.32
66. Preparation of Phenol from Haloarenes	00.00.00
67. Preparation of Alcohols from Alkenes	00.00.00
68. Carboxylic Acid: Preparation From Grignard Reagents	00.00.00
69. Carboxylic Acid: Preparation From Nitrile and Amide-I	00.00.00
70. Preparation of Alcohols from Grignard Reagents	00.00.00
71. Carboxylic Acid: Preparation From Nitrile and Amide-II	00.00.00

Science

Topic Name	Duration
<ul style="list-style-type: none">• Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.	
1. Balancing of Equations	00.02.40
2. Preparation of Oxygen from Hydrogen Peroxide	00.01.27
3. Laboratory Preparation of Chlorine	00.02.03
4. Preparation of Carbon Dioxide	00.01.51
5. Haber Process (Manufacture of Ammonia)	00.02.26
6. Physical Nature of Matter	00.02.27
7. Elements, Compounds and Mixtures	00.05.24
8. Chemical Bonding	00.05.11
9. Atoms, Molecules and Ions	00.05.40
10. Reaction of Metals with Oxygen	00.04.46
11. Reaction of Metals with Hydrogen	00.01.08
12. Reaction of Metals with Chlorine	00.01.11
13. Reaction of Metals with Acids	00.04.05
14. Combination Reactions	00.02.36
15. Decomposition Reactions	00.01.55
16. Displacement Reactions	00.02.42

Science

Topic Name	Duration
17. Double Decomposition Reactions	00.02.40
18. Chemical Reactions and their Characteristics	00.02.50
19. Chemical Reactions	00.03.05
20. Reaction of Metals with Water	00.02.37
21. Reaction of Metal Oxides with Acid	00.01.19
22. Reaction of Metal Carbonates with Acid	00.02.23
23. The Relative Reactivities of Metals	00.01.33
24. Relative Reactivity of Metals	00.00.00
25. Reaction of metals with sodium hydroxide	00.00.00
26. Decomposition Reaction	00.00.00
27. Corrosion	00.04.23
28. Galvanization	00.07.20
29. Methods of Preventing Corrosion	00.04.25
30. Uses of Metals and Non Metals	00.02.39
31. Reaction of Sulphur with Metals	00.03.39
32. Hydrogen Peroxide: Storage and Physical Properties	00.03.59
33. Alkylation and Acetylation of Amines	00.02.35
34. Physical Properties of Ethers	00.05.00
35. Physical Properties of Carboxylic Acids	00.02.13
• Suggested Topics	
1. Application and Explanation of Henry's Law	00.06.08
2. Separating the Components of a Mixture	00.00.00

Science

Topic Name	Duration
3. Formation of a Solution	00.03.36
4. Uses of Oxides of Metals and Non Metals	00.03.56
5. Uses of Sulphuric Acid	00.00.38
6. Solubility and Saturation	00.03.12
7. Sulphur Dioxide and its Uses	00.01.05
8. Pressure Cooker	00.01.08
9. Specific Heat	00.06.10
10. Application of High Specific Heat of Water	00.01.45
11. Molar Specific Heat of Gases	00.06.20
12. Specific Heat Capacity of liquids	00.06.05
13. Types of Molar Specific Heat Capacities	00.00.00
14. Molar Specific Heat Capacities of Gases	00.08.42
15. Specific Latent Heat	00.07.02
16. Thermal Expansion in Solids	00.05.20
17. Volume Expansion of Solids	00.00.00
18. Anomalous Expansion of Water	00.04.44
19. Hope's Experiment	00.04.57
20. Thermal Expansion in Gases	00.03.14

Science

Topic Name

Duration

- **Motions and forces**

- **The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph.**

1.	Motion	00.02.33
2.	Types of Motion	00.04.02
3.	Distance-Time Graph	00.00.00
4.	Position, Distance, and Displacement	00.00.00
5.	Graph (Introduction)	00.02.25
6.	Speed	00.02.18
7.	Velocity	00.06.40
8.	Graphs and their Uses	00.01.41
9.	Graph (Uses)	00.04.23
10.	Constant Velocity	00.01.14
11.	Relative velocity	00.06.22
12.	Relative velocity in two dimension	00.05.10
13.	Uniform Circular Motion (Introduction)	00.02.23

- **An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.**

Science

Topic Name	Duration
1. Velocity	00.06.40
2. Constant Velocity	00.01.14
3. Acceleration	00.08.49
4. Inertia	00.03.48
5. Newton's First Law of Motion	00.03.11
6. Momentum and Newton's Second Law of Motion	00.07.07
7. Galileo's Experiments and the Law of Inertia	00.02.46
8. Galileo's Experiments	00.01.42
• If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in the speed or direction of an object's motion.	
1. Effects of Force	00.03.01
2. Balanced Forces	00.04.24
3. Interacting Forces	00.02.27
4. Newton's First Law of Motion	00.03.11
5. Momentum and Newton's Second Law of Motion	00.07.07
6. Newton's Third Law of Motion	00.04.09
7. To Investigate the relationship between the force exerted on an object and its change of momentum	00.00.00
8. Third Law of Motion using Two Spring Balances	00.00.00

Science

Topic Name	Duration
• Transfer of energy	
• Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.	
1. Heat Change During Chemical Reactions	00.01.30
2. Changes Around Us - I	00.04.58
3. Changes Around Us - II	00.03.23
4. Desirable and Undesirable Changes	00.02.03
5. Electrolysis of Water	00.03.54
6. Solar Cooker	00.06.25
7. Wind Energy	00.03.41
8. Work and Energy	00.02.14
9. Energy	00.01.41
10. Renewable Resources of Energy	00.04.35
11. Heat and Temperature: The Concept	00.06.57
12. Heat and Temperature	00.01.57
13. Sound	00.03.52
14. Sound Propagation in Air	00.02.40
15. Sound Produced from a Tuning Fork	00.02.24
16. Kinetic Energy	00.05.16
17. Potential Energy	00.05.44

Science

Topic Name	Duration
18. Elasticity and Potential Energy	00.01.52
19. Elastic Potential Energy	00.03.52
20. Transformation of Energy	00.08.02
21. Hydroelectric Power	00.04.11
22. Nuclear Force	00.02.04
23. Nuclear Fission	00.04.45
24. Energy Released in Nuclear Fission	00.04.29
25. Nuclear Fusion	00.04.06
26. Solar Energy (Passive Solar Heating and Photovoltaic Devices)	00.05.55
<ul style="list-style-type: none">• Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.	
1. Conduction of Heat	00.02.24
2. Heat and Temperature: The Concept	00.06.57
3. Heat and Thermal Equilibrium	00.03.40
4. Transfer of Heat (Conduction)	00.04.12
5. Heat Conduction and Steady State	00.04.38
6. Thermal Conductivity	00.06.31
7. Convection	00.02.30
8. Room Coolers	00.01.23
9. Refrigerator	00.02.54
10. Transfer of Heat (Radiation)	00.04.13

Science

Topic Name	Duration
11. Thermos Flask	00.01.32
12. Kinetic Theory of Matter-1 (SOLID)	00.05.27
<ul style="list-style-type: none">• Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object— emitted by or scattered from it— must enter the eye.	
1. Emission Spectra and the Flame Test	00.06.02
2. The Colour of Transition Metal Ion Complexes - I	00.04.33
3. Light	00.04.33
4. Transparent, Translucent, and Opaque Objects	00.02.39
5. Pinhole Camera (An Introduction)	00.01.50
6. Pinhole Camera	00.01.23
7. Mirror and Reflection	00.02.43
8. Reflection of Light	00.02.36
9. Reflection of Light and its Laws	00.04.08
10. Image Formation in a Plane Mirror	00.03.55
11. Effects of Rotation of a Plane Mirror	00.03.40
12. Two Plane Mirrors Parallel to Each Other	00.01.52
13. Ray Diagrams	00.04.06
14. Real and Virtual Images	00.07.20
15. New Cartesian Sign Convention (Spherical Mirrors and	00.06.10

Science

Topic Name	Duration
Lenses)	
16. The Mirror Equation	00.07.32
17. Curved Mirrors (Construction)	00.01.52
18. Curved Mirrors	00.03.24
19. Images Formed by a Convex Mirror	00.04.42
20. Images Formed by a Concave Mirror	00.05.38
21. Focal Length of a Concave Mirror	00.00.00
22. Refraction of Light	00.01.50
23. Refraction through Glass Slab	00.02.39
24. Refraction through a Prism	00.01.35
25. Refraction of Light through a Prism	00.04.56
26. Refractive Index	00.02.28
27. Refractive Index of a Glass Slab	00.00.00
28. Refractive Index of Water Using a Concave Mirror	00.00.00
29. Refractive Index of Water Using a Convex Lens and a Plane Mirror	00.00.00
30. Total Internal Reflection (Part-1)	00.06.09
31. Total Internal Reflection (Part-2)	00.04.01
32. Angle of Minimum Deviation	00.00.00
33. Snell's law	00.08.05
34. Total Internal Reflection in a Prism	00.02.43
35. Applications of Total Internal Reflection	00.02.53
36. Uses of Total Internal Reflection	00.01.24

Science

Topic Name	Duration
37. Lenses	00.05.20
38. Converging Lenses	00.07.36
39. Diverging Lenses	00.06.27
40. Lenses in Contact	00.00.00
41. Images Formed by a Convex Lens (Part-1)	00.03.59
42. Images Formed by a Convex Lens (Part-2)	00.04.49
43. Images Formed by a Concave Lens	00.01.49
44. Focal length of Convex Lens	00.00.00
45. Focal Point of a Thin Lens	00.02.37
46. Focal Length of a Concave Lens using a Convex Lens	00.00.00
47. Focal Length of a Convex Lens by Removing Parallax	00.00.00
48. Focal length of a Concave Mirror Removing Parallax	00.00.00
49. Focal Length of a Convex Mirror using a Convex Lens	00.00.00
50. Persistence of Vision	00.01.34
51. Accommodation of the Eye	00.02.34
52. Defects of Vision and their Correction	00.07.44
53. Magnification of a Lens	00.00.00
54. Power of a Lens	00.02.31
55. Simple Microscope	00.04.39
56. Compound Microscope	00.04.40
57. Magnifying Power of a Compound Microscope	00.03.07
58. Camera (Part-1)	00.05.40
59. Camera (Part-2)	00.05.12

Science

Topic Name	Duration
60. Projector	00.06.37
61. Fresnel lens and Overhead Projector	00.05.51
62. Prism Binoculars	00.02.57
63. Telescope	00.06.14
64. Terrestrial Telescope	00.01.56
65. Reflecting Telescope	00.04.28
66. Resolving Power of a Telescope	00.02.33
67. Bicycle Reflector	00.00.47
68. Atmospheric Refraction	00.07.03
69. Twinkling of Stars	00.01.13
70. Examples of Refraction	00.02.58
71. Colour of Objects	00.05.21
72. Primary Colours of Light	00.03.16
73. Dispersion of White Light	00.02.47
74. Scattering of Light	00.05.12
75. Diffraction of Light	00.06.51
• Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.	
1. Electrolysis	00.05.16
2. Electrolysis of Water	00.03.54
3. Applications of Electrolysis (Part-I)	00.03.55

Science

Topic Name	Duration
4. Applications of Electrolysis (Part-II)	00.06.01
5. Redox Reaction-II	00.00.56
6. Electroplating Activity	00.00.00
7. Electrolytes	00.01.28
8. Electrical Energy	00.01.52
9. Conductors and Insulators	00.03.45
10. Electric Bulb	00.00.53
11. Bulb Connected to a Cell	00.03.52
12. Electric Fuse	00.03.19
13. Fuse and Earthing	00.08.42
14. Simple Electric Circuit	00.01.26
15. Connections in a Simple Electric Circuit	00.00.00
16. Circuit Diagram	00.01.55
17. Assembling Basic Electric Circuit	00.00.00
18. Domestic Electric Circuits	00.05.10
19. Electric Power	00.08.40
20. Series and Parallel Connection	00.02.50
21. Heating Effect of Electric Current	00.03.08
22. Thermal Effect of an Electric Current	00.03.49
23. Electric Bell	00.03.30
24. Galvanometer	00.09.05
25. Moving Coil Loudspeaker	00.02.50
26. Electroplating	00.02.56

Science

Topic Name	Duration
27. Chemical Effect of an Electric Current	00.01.51
28. Thomson Effect	00.01.38
<ul style="list-style-type: none">In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.	
1. Heat Change During Chemical Reactions	00.01.30
2. Heat of Combustion	00.02.43
3. Radioactivity and Group Displacement Law	00.00.00
4. Heat of Solution	00.03.57
5. Electric Cell	00.01.49
6. Cells in Series	00.01.18
7. Bulb Connected to a Cell	00.03.52
8. Transformation of Energy	00.08.02
9. Hydroelectric Power	00.04.11
10. Fundamentals of a DC Motor	00.07.31
11. DC Motor	00.03.52
12. AC Motor	00.04.43
13. DC Generator	00.04.35
14. AC Generator	00.06.05
15. Chemical Effect of an Electric Current	00.01.51
16. Daniel Cell	00.02.05

Science

Topic Name	Duration
17. Leclanche Cell	00.02.51
18. Nuclear Fission	00.04.45
19. Nuclear Fusion	00.04.06
20. Nuclear Chain Reaction	00.06.37
<ul style="list-style-type: none">The sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.	
1. Transfer of Heat (Radiation)	00.04.13
2. Electromagnetic Spectrum (Part - 1)	00.05.19
3. Electromagnetic Spectrum (Part - 2)	00.03.51
4. Spectrum	00.03.26
5. Temperature of the Earth	00.04.22
6. The Sun (Part-1)	00.05.15
7. The Sun (Part-2)	00.05.25
8. Solar Energy (Active Solar Systems)	00.04.48
9. Solar Energy (Passive Solar Heating and Photovoltaic Devices)	00.05.55
10. Radiation	00.02.47
11. Thermal Radiation	00.03.15
12. Solar Constant	00.02.16

Science

Topic Name

Duration

Life Science

- **Structure and function in living systems**

- **Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems.**
 1. Levels of Organization (Anatomy) 00.03.17
 2. Cells to organism 00.02.52
 3. Solar Cooker 00.06.25
 4. Protists in Water 00.00.00
 5. Bones and Muscles 00.03.13
 6. Limbs 00.04.20

- **All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms, including humans, are multicellular.**
 1. Compound Microscope 00.02.02
 2. Light Microscope 00.00.00
 3. Prokaryota and eukaryota 00.04.41

Science

Topic Name	Duration
4. Structure of the prokaryotic cell	00.04.25
5. Eukaryotic cell	00.03.03
6. Amoeba	00.01.16
7. Animal cell	00.05.25
8. Plant Cell	00.06.37
9. Cell structure (Plant cell)	00.02.32
10. Cell structure in plants	00.03.40
11. Plant cell and animal cell	00.02.15
12. Cell structure I	00.01.33
13. Number and size of cells	00.03.38
14. Cell (shapes and functions)	00.04.05
15. Vertebrates and invertebrates	00.07.52
<ul style="list-style-type: none">• Cells carry on the many functions needed to sustain life. They grow and divide, there by producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.	
1. Nucleus and lysosomes	00.03.03
2. Functions of ER, Golgi and Ribosomes	00.03.42
3. Ribosomes and centrioles	00.03.11
4. Structure of Mitochondria	00.02.38
5. ATP as energy currency	00.02.08

Science

Topic Name	Duration
6. Cell structure specialization	00.02.09
7. Diffusion is important to organisms	00.02.35
8. Osmosis	00.03.15
9. Behaviour of plant cell (In water)	00.02.57
10. Endocytosis and exocytosis	00.03.19
11. Cell cycle-Interphase stage	00.00.00
12. Cell division (Mitosis)	00.04.15
13. Meiosis	00.06.12
<ul style="list-style-type: none">• Specialized cells perform specialized functions in multicellular organisms. Groups of specialized cells cooperate to form a tissue, such as a muscle. Different tissues are in turn grouped together to form larger functional units, called organs. Each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.	
1. Epithelial tissue	00.04.31
2. Connective tissues	00.02.08
3. Areolar connective tissues	00.03.27
4. Adipose tissue	00.02.57
5. Muscle tissues and nervous tissues	00.02.24
6. Structure of the bone	00.03.26
7. Ligaments	00.02.20
8. Plant tissue system	00.04.11

Science

Topic Name	Duration
9. Simple tissues	00.02.56
10. Plant tissues (Meristematic tissues)	00.01.58
11. Plant tissues (Permanent tissues I)	00.02.50
12. Plant tissues (Permanent tissues II)	00.04.34
13. Complex tissues (Xylem and phloem)	00.04.18
14. Support system in herbaceous and woody plants	00.03.23
15. Support in aquatic plants	00.01.17
16. Support system in aquatic and terrestrial plants	00.02.30
17. Plant and animal tissue	00.02.02
• The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection, from disease. These systems interact with one another.	
1. Human digestive system	00.02.42
2. Human teeth and tooth decay	00.02.37
3. Detailed digestive system I	00.05.04
4. Egestion	00.02.31
5. Digestive and excretory system	00.03.02
6. Respiration	00.02.06
7. Respiratory system	00.05.58
8. Mechanism of breathing in man	00.02.20
9. Respiratory and circulatory systems	00.03.16

Science

Topic Name	Duration
10. Exchange surfaces	00.02.19
11. High altitude	00.02.36
12. Tidal volume	00.01.44
13. Pulmonary air volumes and lung capacities	00.03.22
14. Structure of the lungs	00.02.07
15. Anaerobic respiration	00.03.10
16. Muscular system	00.02.41
17. Muscles	00.02.56
18. Muscles (Voluntary and Involuntary)	00.03.46
19. Role of Muscles in Bone Movement	00.04.09
20. Role of muscles and bones in movement	00.02.21
21. The skeletal system	00.02.25
22. Fixed joints and muscles	00.05.17
23. Joints as a lever system	00.02.15
24. Types of joints	00.05.13
25. Axial skeleton (Ribs and sternum)	00.02.28
26. Excretory system	00.03.50
27. Excretion in human beings	00.02.30
28. Structure of kidney	00.04.00
29. Urine formation	00.06.13
30. Filtration rate (Kidney)	00.04.16
31. Nervous system	00.03.13
32. Sensory, nervous and skeletal system	00.02.58

Science

Topic Name	Duration
33. The eye	00.03.42
34. Vision	00.02.23
35. Accommodation of the eye	00.01.51
36. Organs of hearing and balance	00.02.40
37. Chemical coordination in animals	00.03.23
38. Animal hormones I	00.04.05
39. Animal hormones II	00.05.17
40. Properties of Hormones	00.02.00
41. Hormones of hypothalamus	00.03.59
42. Exocrine glands and Endocrine glands	00.05.04
43. Male reproductive system (Anatomy and physiology)	00.03.56
44. Female reproductive anatomy	00.03.29
45. Menstrual Cycle	00.05.02
46. Embryonic development	00.04.21
47. Skin	00.03.08
• Suggested topics	
1. Bones and Muscles	00.03.13
2. Limbs	00.04.20
3. The Human Digestive System	00.03.30

Science

Topic Name	Duration
<ul style="list-style-type: none">Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system. Others are the result of damage by infection by other organisms.	
1. Bacteria and Virus	00.03.38
2. Cholera (Cellular damage)	00.02.29
3. Diarrhoea	00.03.12
4. Viral diseases (Influenza and polio)	00.04.42
5. Chickenpox	00.03.36
6. Malaria	00.04.22
7. Cellular damage in malaria	00.01.18
8. Filariasis	00.02.45
9. How Germs enter the Human Body	00.06.41
10. Microorganisms – Friends or Foe?	00.06.00
11. Germs and Diseases	00.04.27
<ul style="list-style-type: none">Suggested topics	
1. Levels of organization	00.02.48
2. Detailed digestive system II	00.02.43
3. Teeth	00.04.00
4. Physiology of digestion	00.04.31
5. Protein digestion	00.05.04
6. Accessory digestive organs	00.03.16

Science

Topic Name	Duration
7. Gallbladder	00.03.03
8. Liver	00.05.02
9. Mobility of human gut	00.03.25
10. Gaseous transport	00.06.33
11. Exhalation of CO ₂ During Respiration	00.00.00
12. Blood Composition	00.06.13
13. Blood - The RBC Story	00.03.42
14. Blood corpuscles (Human blood)	00.03.24
15. Study of WBCs	00.03.22
16. Functions of leucocytes	00.02.28
17. Blood clotting	00.01.37
18. Arteries and veins	00.05.19
19. Blood Vessel Networking	00.05.19
20. Heart	00.02.07
21. Anatomy of heart	00.04.32
22. Heart and blood circulation	00.03.35
23. Cardiac Pacemaker	00.04.03
24. Types of muscle fibers	00.04.37
25. Bones	00.03.45
26. The skull	00.01.20
27. Girdle bones	00.02.46
28. Vertebral column	00.01.36
29. Appendicular skeleton (Forelimbs and Hind limbs)	00.04.38

Science

Topic Name	Duration
30. Joints	00.03.14
31. Fracture	00.02.46
32. Types of fractures	00.01.46
33. Organs of excretory system	00.03.41
34. Harmful micro-organisms	00.00.00
35. Mycoplasma	00.02.10
36. Haemoglobin and Sickle cell anaemia	00.04.19
• Reproduction and heredity	
• Reproduction is a characteristic of all living systems; because no individual organism lives forever, reproduction is essential to the continuation of every species. Some organisms reproduce asexually. Other organisms reproduce sexually.	
1. Types of reproduction (Asexual reproduction)	00.03.40
2. Sexual and asexual reproduction	00.03.35
3. Reproduction in fungi (Sexual)	00.02.28
4. Plant reproduction	00.05.05

Science

Topic Name	Duration
<ul style="list-style-type: none">In many species, including humans, females produce eggs and males produce sperm. Plants also reproduce sexually—the egg and sperm are produced in the flowers of flowering plants. An egg and sperm unite to begin development of a new individual. That new individual receives genetic information from its mother (via the egg) and its father (via the sperm). Sexually produced offspring never are identical to either of their parents.	
1. Male reproductive system	00.02.56
2. Female reproductive system	00.02.48
3. Fertilization	00.03.16
4. Sexual reproduction in flowering plants	00.02.10
<ul style="list-style-type: none">Every organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another.	
1. Variation	00.01.44
2. Bacterial transformation and conjugation	00.02.47
3. Genetic recombination in bacteria (Transduction)	00.01.35

Science

Topic Name	Duration
<ul style="list-style-type: none">• Hereditary information is contained in genes, located in the chromosomes of each cell. Each gene carries a single unit of information. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes.	
1. Chromosomes, genes and DNA	00.03.50
2. Karyotype	00.02.21
3. Quantitative inheritance	00.01.59
<ul style="list-style-type: none">• Suggested Topics	
1. Menstrual cycle in females	00.02.02
2. Fertilization and implantation in humans	00.03.44
3. Twins	00.04.15
4. Prokaryotic chromosome	00.01.48
5. Dominant and recessive alleles	00.03.26
6. Alleles and genotype	00.03.27
7. Mendel's Dihybrid experiment	00.00.00
8. Hershey Chase experiment	00.04.12

Science

Topic Name	Duration
<ul style="list-style-type: none">• Regulation and behavior	
<ul style="list-style-type: none">• All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.	
1. Forest ecosystem	00.02.12
2. Plants adapted to a desert habitat	00.02.46
3. Adaptation in Animals	00.00.00
<ul style="list-style-type: none">• Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive.	
1. Thermoregulation by the skin	00.03.51
<ul style="list-style-type: none">• Behavior is one kind of response an organism can make to an internal or environmental stimulus. A behavioral response requires coordination and communication at many levels, including cells, organ systems, and whole organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.	
1. Reflex action	00.02.07
2. Stimulus response	00.02.08

Science

Topic Name

Duration

- **An organism's behavior evolves through adaptation to its environment. How a species moves, obtains food, reproduces, and responds to danger are based in the species' evolutionary history.**
 1. Plants adapted to a desert habitat 00.02.46
 2. Mangrove 00.03.06
 3. Adaptation in Animals 00.00.00

- **Populations and ecosystems**

- **A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.**
 1. Forest ecosystem 00.02.12
 2. Aquatic ecosystem 00.02.30

Science

Topic Name

Duration

- **Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers—they make their own food. All animals, including humans, are consumers, which obtain food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.**

1. Food chain

00.02.52

- **For ecosystems, the major source of energy is sunlight. Energy entering eco systems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.**

1. Food Web

00.00.00

2. Energy flow in an ecosystem

00.03.48

Science

Topic Name

Duration

- **The number of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.**
 1. Pond - The Underwater Ecosystem 00.04.13
 2. Factors affecting ecosystem 00.04.13

- **Diversity and adaptations of organisms**

- **Biological evolution accounts for the diversity of species developed through gradual processes over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.**
 1. Origin of life (Biological) 00.03.28

Science

Topic Name

Duration

Earth and Space Science

- **Structure of the earth system**

- **Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.**
 1. Hotspot Volcanism (Formation of the Hawaiian Islands) 00.03.40
 2. Fold and Fault-Block Mountains 00.03.41
 3. Earthquake 00.04.13
 4. Life on Earth 00.03.45
 5. Structure of the Earth 00.01.49

- **Land forms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion**
 1. Hotspot Volcanism (Formation of the Hawaiian Islands) 00.03.40
 2. Chemical Weathering 00.03.14
 3. Physical Weathering 00.03.14

Science

Topic Name	Duration
4. Biological Weathering	00.03.11
5. Erosion	00.03.00
<ul style="list-style-type: none">• Some changes in the solid earth can be described as the “rock cycle.” Old rocks at the earth’s surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues	
1. Rock Cycle	00.03.57
2. What are Rocks ?	00.03.27
<ul style="list-style-type: none">• Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition and texture.	
1. Importance of Soil and its Formation	00.04.44
2. Properties of Soil and its Uses	00.05.41
3. Composition of Soil	00.04.38
4. Soil Horizons	00.05.16
5. Soil constituents	00.02.35
6. Experiment to study various soil particles	00.01.08
7. Experiment to check water holding capacity of soil	00.01.22
8. What does the Soil Contain?	00.04.02

Science

Topic Name	Duration
9. The pH of Soil	00.03.46
10. Soil Testing (Water Holding Capacity)	00.00.00
• Water is a solvent. As it passes through the water cycle it dissolves minerals and gases and carries them to the oceans	
1. Magic of Water	00.02.44
2. Water cycle	00.02.36
3. Interconversion of the states of matter (water)	00.03.19
4. Physical Properties of Water	00.01.50
• The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations	
1. Layers of the Earth's Atmosphere	00.06.00
2. Composition and Importance of Air	00.04.26
3. Polarity and Surface Tension of Water	00.03.52
4. Temperature and Surface Tension	00.00.00
5. Layers of the Earth's Atmosphere	00.00.00
6. Air	00.02.02
7. Composition of Air	00.03.23
• Clouds, formed by the condensation of water vapor, affect weather and climate	

Science

Topic Name	Duration
1. Formation and Types of Clouds	00.04.12
2. Water Vapour	00.01.19
<ul style="list-style-type: none">Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.	
1. What is Weather?	00.05.56
2. Fronts and Weather Conditions	00.05.11
3. Air Masses	00.04.27
4. What is Climate?	00.05.41
5. Climate Change	00.05.20
6. What Influences Climate?	00.04.47
7. Oxygen	00.01.36
8. Carbon Dioxide	00.02.24
<ul style="list-style-type: none">Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks	
1. Chemical and Organic Sedimentary Rocks	00.06.09
2. Clastic Sedimentary Rocks	00.04.44
3. Igneous Rocks	00.04.05
4. Metamorphic Rocks	00.03.08
5. Chemical Weathering	00.03.14

Science

Topic Name	Duration
6. Physical Weathering	00.03.14
7. Biological Weathering	00.03.11
• Suggested Topics	
1. Hard and Soft Water	00.04.30
2. Effects of Hard Water	00.01.17
3. Self Ionization of Water	00.02.57
4. Atmospheric Pressure (Part-1)	00.03.51
5. Atmospheric Pressure (Part-2)	00.03.35
• Earth's History	
• The earth processes we see today, including erosion, movement of lithospheric plates, and changes in atmospheric composition, are similar to those that occurred in the past. Earth history is also influenced by occasional catastrophes, such as the impact of an asteroid or comet	
1. Fold and Fault-Block Mountains	00.03.41
2. Erosion	00.03.00
• Fossils provide important evidence of how life and environmental conditions have changed	
1. Fossils	00.06.34

Science

Topic Name

Duration

- **Earth in the solar system**

 - **The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.**
- | | | |
|-----|--|----------|
| 1. | Evolution of Solar System | 00.01.57 |
| 2. | Planets in Our Solar System | 00.05.59 |
| 3. | Solar System (The Inner Planets) | 00.06.22 |
| 4. | Solar System (The Outer Planets) | 00.04.42 |
| 5. | The Sun (Part-1) | 00.05.15 |
| 6. | The Sun (Part-2) | 00.05.25 |
| 7. | Stars (A) | 00.04.46 |
| 8. | Stars (B) | 00.03.54 |
| 9. | Stars (C) | 00.03.58 |
| 10. | Planetary orbits | 00.00.00 |
| 11. | Orbital Period of Satellite | 00.00.00 |
| 12. | Artificial satellites around different planets | 00.00.00 |
| 13. | Satellites | 00.03.32 |

Science

Topic Name

Duration

- **Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.**
- | | | |
|-----|---|----------|
| 1. | Day and Night | 00.02.30 |
| 2. | Diurnal Motion | 00.01.50 |
| 3. | Eclipse | 00.00.00 |
| 4. | Solar Eclipse | 00.06.05 |
| 5. | Lunar Eclipse | 00.05.26 |
| 6. | Phases of the Moon | 00.03.35 |
| 7. | Planetary orbits | 00.00.00 |
| 8. | Satellites in Orbits | 00.05.12 |
| 9. | Solar Constant | 00.02.16 |
| 10. | Kepler's Laws | 00.06.00 |
| 11. | Kepler's First Law of Planetary Motion | 00.03.47 |
| 12. | Kepler's Second Law of Planetary Motion | 00.06.00 |
| 13. | Kepler's Third Law of Planetary Motion | 00.00.00 |
- **Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the earth's surface and explains the phenomena of the**

Science

Topic Name	Duration
tides.	
1. Solar System (The Inner Planets)	00.06.22
2. Solar System (The Outer Planets)	00.04.42
3. Centripetal Force	00.05.21
4. Factors Affecting Centripetal Force	00.03.22
5. Gravitation	00.02.35
6. Mass and Weight	00.05.05
7. Planetary orbits	00.00.00
8. Satellites in Orbits	00.05.12
9. Artificial Satellites	00.03.14
10. Orbital Period of Satellite	00.00.00
11. Energy of an orbiting satellite	00.00.00
12. Artificial satellites around different planets	00.00.00
13. Polar Satellite	00.02.17
• The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.	
1. Seasons	00.04.15
2. Transfer of Heat (Radiation)	00.04.13
3. Latitude and Longitude	00.07.17

Science

Topic Name	Duration
4. Application of Latitude and Longitude	00.00.00
5. The Sun (Part-1)	00.05.15
6. The Sun (Part-2)	00.05.25
7. Radio telescope	00.05.15
8. Time Zones	00.07.10
9. Solar Energy (Active Solar Systems)	00.04.48
10. Solar Energy (Passive Solar Heating and Photovoltaic Devices)	00.05.55
11. Radiation	00.02.47
12. Solar Constant	00.02.16
13. Energy Generation in stars	00.04.41

Science in Personal and Social Perspectives Standard

- **Personal Health**

- **The use of tobacco increases the risk of illness .Students should understand the influence of short- term social and psychological factors that lead to tobacco use, and the possible long- term detrimental effects of smoking and chewing tobacco.**

1. Smoking and Emphysema	00.04.21
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- **Alcohol and other drugs are often abused**

Science

Topic Name	Duration
substances. Such drugs change how the body functions and can lead to addiction.	
1. Drug abuse and its adverse effects	00.00.00
• Food provides energy and nutrients for growth and development. Nutrition requirements vary with body weight, age, sex, activity, and body functioning.	
1. Components of food	00.03.14
2. Importance of roughage	00.02.29
• Sex drive is a natural human function that requires understanding. Sex is also a prominent means of transmitting diseases. The diseases can be prevented through a variety of precautions.	
1. AIDS	00.05.41
• Natural environments may contain substances (for example, radon and lead) that are harmful to human beings. Maintaining environmental health involves establishing or monitoring quality standards related to use of soil, water, and air.	
1. Air pollution	00.02.59

Science

Topic Name

Duration

- **Natural Hazards**

- **Internal and external processes of the earth system cause natural hazards, events that change or destroy human and wildlife habitats, damage property, and harm or kill humans. Natural hazards include earthquakes, landslides, wildfires, volcanic eruptions, floods, storms, and even possible impacts of asteroids.**

1. Earthquake 00.04.13
2. Thunderstorm 00.05.38
3. Hotspot Volcanism (Formation of the Hawaiian Islands) 00.03.40

- **Risks and Benefits**

- **Students should understand the risks associated with natural hazards (fires, floods, tornadoes, hurricanes, earthquakes, and volcanic eruptions), with chemical hazards (pollutants in air, water, soil, and food), with biological hazards (pollen, viruses, bacterial, and parasites), social hazards (occupational safety and transportation), and with personal hazards (smoking, dieting, and drinking).**

1. Thunderstorm 00.05.38

Science

Topic Name	Duration
2. Earthquake	00.04.13
3. Environmental pollution	00.02.06
4. Air pollution	00.02.59
5. Photochemical smog	00.03.51
6. Acid rain and its harmful effects	00.02.04
7. Land pollution	00.02.16
8. Soil erosion	00.03.11
9. The Global warming	00.02.02
10. Eutrophication	00.02.55
11. Smoking - A dangerous habit	00.05.30
12. Effect of drug and alcohol on the nervous system	00.06.21

- **Science and Technology in Society**

- **Technology influences society through its products and processes. Technology influences the quality of life and the ways people act and interact. Technological changes are often accompanied by social, political, and economic changes that can be beneficial or detrimental to individuals and to society. Social needs, attitudes, and values influence the direction of technological development.**

1. Genomics and cloning	00.03.40
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Science

Topic Name

Duration

Add-On Categories

- **Basics of Life**

1.	Comparison of plant and animal cells	00.02.04
2.	Nutrition	00.02.39
3.	Modes of nutrition	00.04.35
4.	Saprophytic nutrition in fungus	00.02.59
5.	Parasitic nutrition in fungus	00.03.16
6.	Phases of growth	00.01.38
7.	Patterns of growth	00.05.10

- **Human Body**

1.	Composition and functions of blood	00.04.13
2.	Blood vessels	00.02.09
3.	Human heart	00.03.02
4.	Transport of oxygen	00.01.45
5.	The oxygen-haemoglobin dissociation curve	00.03.39
6.	Haldane effect	00.02.26
7.	Axial skeleton	00.03.46
8.	The appendicular skeleton	00.03.58

Science

Topic Name	Duration
9. Kidney ultrastructure	00.01.18
10. Reproductive system	00.02.35
11. Organ of taste	00.01.48
12. Nails	00.02.15
• Heat and Thermodynamics	
1. Riveting	00.02.44
2. Bimetallic Strip	00.01.11
3. Balance Wheel	00.02.20
4. Thermostat Switch	00.04.18
TOTAL TOPIC IN MIDDLE SCHOOL SCIENCE – 739	40.57.58