Key –

| Big Ideas (BI) | |
|---|---|
| SPQ | Scale Proportion Quantity |
| TRA | Transformations |
| SAP | Structure and Properties |
| ENE | Energy |

| Science Practices (SP) | |
|---|---|
| 1 | Models and Representations |
| 2 | Question and Method |
| 3 | Representing Data and Phenomena |
| 4 | Model Analysis |
| 5 | Mathematical Routines |
| 6 | Argumentation |

| Unit 1 - Atomic Structure and Properties | | | |
|---|---|---|---|
| | | BI | SP |
| 1.1 | Moles and Molar Mass | SPQ | 5 |
| 1.2 | Mass Spectroscopy of Elements | SPQ | 5 |
| 1.3 | Elemental Composition of Pure Substances | SPQ | 2 |
| 1.4 | Composition of Mixtures | SPQ | 5 |
| 1.5 | Atomic Structure and Electron Configuration | SAP | 1 |
| 1.6 | Photoelectron Spectroscopy | SAP | 4 |
| 1.7 | Periodic Trends | SAP | 4 |
| 1.8 | Valence Electrons and Ionic Compounds | SAP | 4 |

| Unit 2 - Molecular and Ionic Compound Structure and Properties | | | |
|---|---|---|---|
| 2.1 | Types of Chemical Bonds | SAP | 6 |
| 2.2 | Intramolecular Force and Potential Energy | SAP | 3 |
| 2.3 | Structure of Ionic Solids | SAP | 4 |
| 2.4 | Structure of Metals and Alloys | SAP | 4 |
| 2.5 | Lewis Diagrams | SAP | 3 |
| 2.6 | Resonance and Formal Charge | SAP | 6 |
| 2.7 | VSEPR and Bond Hybridization | SAP | 6 |

| Unit 3 - Intermolecular Forces and Properties | | | |
|---|---|---|---|
| 3.1 | Intermolecular Forces | SAP | 4 |
| 3.2 | Properties of Solids | SAP | 4 |
| 3.3 | Solids, Liquids, and Gases | SAP | 3 |
| 3.4 | Ideal Gas Law | SAP | 5 |
| 3.5 | Kinetic Molecular Theory | SAP | 4 |
| 3.6 | Deviation from Ideal Gas Law | SAP | 6 |
| 3.7 | Solutions and Mixtures | SPQ | 5 |
| 3.8 | Representations of Solutions | SPQ | 3 |
| 3.9 | Separation of Solutions and Mixtures Chromatography | SPQ | 2 |
| 3.10 | Solubility | SPQ | 4 |
| 3.11 | Spectroscopy and the Electromagnetic Spectrum | SAP | 4 |
| 3.12 | Photoelectric Effect | SAP | 5 |
| 3.13 | Beer-Lambert Law | SAP | 2 |

| Unit 4 - Chemical Reactions | | | |
|---|---|---|---|
| 4.1 | Introduction for Reactions | TRA | 2 |
| 4.2 | Net Ionic Equations | TRA | 5 |
| 4.3 | Representations of Reactions | TRA | 3 |
| 4.4 | Physical and Chemical Changes | TRA | 6 |
| 4.5 | Stoichiometry | SPQ | 5 |
| 4.6 | Introduction to Titration | SPQ | 3 |
| 4.7 | Types of Chemical Reactions | TRA | 1 |
| 4.8 | Introduction to Acid-Base Reactions | TRA | 1 |
| 4.9 | Oxidation-Reduction (redox) Reactions | TRA | 5 |

| Unit 5 – Kinetics | | | |
|---|---|---|---|
| 5.1 | Reaction Rates | TRA | 6 |
| 5.2 | Introduction to Rate Law | TRA | 5 |
| 5.3 | Concentration Changes Over Time | TRA | 5 |
| 5.4 | Elementary Reactions | TRA | 5 |
| 5.5 | Collision Model | TRA | 6 |
| 5.6 | Reaction Energy Profile | TRA | 3 |
| 5.7 | Introduction to Reaction Mechanisms | TRA | 1 |
| 5.8 | Reaction Mechanism and Rate Law | TRA | 5 |
| 5.9 | Steady-State Approximation | TRA | 5 |
| 5.10 | Multistep Reaction Energy Profile | TRA | 3 |
| 5.11 | Catalysis | ENE | 6 |

| Unit 6 – Thermodynamics | | | |
|---|---|---|---|
| 6.1 | Endothermic and Exothermic Processes | ENE | 6 |
| 6.2 | Energy Diagrams | ENE | 3 |
| 6.3 | Heat Transfer and Thermal Equilibrium | ENE | 6 |
| 6.4 | Heat Capacity and Calorimetry | ENE | 2 |
| 6.5 | Energy of Phase Changes | ENE | 1 |
| 6.6 | Introduction to Enthalpy of Reaction | ENE | 4 |
| 6.7 | Bond Enthalpies | ENE | 5 |
| 6.8 | Enthalpy of Formation | ENE | 5 |
| 6.9 | Hess's Law | ENE | 5 |

| Unit 7 – Equilibrium | | | |
|---|---|---|---|
| 7.1 | Introduction to Equilibrium | TRA | 6 |
| 7.2 | Direction of Reversible Reactions | TRA | 4 |
| 7.3 | Reaction Quotient and Equilibrium Constant | TRA | 3 |
| 7.4 | Calculating the Equilibrium Constant | TRA | 5 |
| 7.5 | Magnitude of the Equilibrium Constant | TRA | 6 |
| 7.6 | Properties of the Equilibrium Constant | TRA | 6 |
| 7.7 | Calculating Equilibrium Concentrations | TRA | 5 |
| 7.8 | Representations of Equilibrium | TRA | 5 |
| 7.9 | Introduction to Le Châtelier's Principle | TRA | 7 |
| 7.10 | Reaction Quotient and Le Châtelier's Principle | SPQ | 6 |
| 7.11 | Introduction to Solubility Equilibria | SPQ | 6 |
| 7.12 | Common-Ion Effect | SPQ | 2 |
| 7.13 | pH and Solubility | SPQ | 2 |
| 7.14 | Free Energy of Dissolution | SPQ | 4 |

| Unit 8 – Acids and Bases | | | |
|---|---|---|---|
| 8.1 | Introduction to Acids and Bases | SAP | 5 |
| 8.2 | pH and pOH of Strong Acids and Bases | SAP | 5 |
| 8.3 | Weak Acid and Base Equilibria | SAP | 5 |
| 8.4 | Acid-Base Reactions and Buffers | SAP | 5 |
| 8.5 | Acid-Base Titrations | SAP | 5 |
| 8.6 | Molecular Structure of Acids and Bases | SAP | 6 |
| 8.7 | pH and pKa | SAP | 2 |
| 8.8 | Properties of Buffers | SAP | 6 |
| 8.9 | Henderson-Hasselbalch Equation | SAP | 5 |
| 8.10 | Buffer Capacity | SAP | 6 |

| Unit 9 – Applications of Thermodynamics | | | |
|---|---|---|---|
| 9.1 | Introduction to Entropy | ENE | 6 |
| 9.2 | Absolute Entropy and Entropy Change | ENE | 5 |
| 9.3 | Favorability | ENE | 6 |
| 9.4 | Thermodynamic and Kinetic Control | ENE | 6 |
| 9.5 | Free Energy and Equilibrium | ENE | 6 |
| 9.6 | Coupled Reactions | ENE | 4 |
| 9.7 | Galvanic (Voltaic) and Electrolytic Cells | ENE | 2 |
| 9.8 | Cell Potential and Free Energy | ENE | 5 |
| 9.9 | Cell Potential Under Nonstandard Conditions | ENE | 6 |
| 9.10 | Electrolysis and Faraday's Law | ENE | 5 |