Chapter 1:

1. Properties of Solids/Liquids/Gases
2. Pure substance (Elements/Compounds) vs. Mixture (Homogeneous/Heterogeneous)

Chapter 2:

1. Significant Figures (Add/Sub and Mult/Div)
2. Dimensional Analysis and Conversions
3. Scientific Notation
4. Density - Concept and use as a CF

Chapter 3:

1. Diatomics
2. Metals, Nonmetals, and Metalloids
3. States of elements (solids/liquids/gases)
4. Ionic vs. Molecular Compounds

Chapter 4:

1. Conservation of mass/energy
2. Heat: q=(mass)(ΔT)(specific heat)
3. Exothermic/Endothermic reactions

Chapter 5:

1. General structure of atom and molecules (anions and cations) (Rutherford Model)
2. Charge and relative mass of electrons, protons, neutrons
3. History (Empedocles $\longrightarrow$ Dalton $\longrightarrow$ Thomson $\longrightarrow$ Rutherford

Chapter 6:

1. Naming compounds (ionic, polyatomics, variable charges, covalent, hydrates)
2. Balancing compounds (charges on atoms)

Chapter 7:

1. Calculating molecular weights
2. Conversions using MW (g/mol) and Avagadro's Number (6.02×10^{23} items/mol)
3. Difference between atoms, moles, molecules.

Chapter 8:

1. Types of reactions (Combination, Decomposition, Single Displacement, Double Displacement, Combustion, Acid/Base)
2. Balance molecules
3. Balance reactions
4. Predict products of a reaction
5. Use of solubility tables, activity series, diatomics, formation of gasses, precipitates for predicting/completing reactions.

Chapter 9:

1. Use of mol/mol ratio and molecular weight (g/mol)
2. Calculating limiting and excess reagent
3. Calculating grams or mols of a product/reactant needed/produced in a reaction
4. Use of Molarity

Chapter 10:

1. Rutherford $\longrightarrow$ Bohr model of the atom $\longrightarrow$ de Broglie $\longrightarrow$ Schrodinger
2. Classical vs. Quantum Mechanics
3. Number of electrons in an orbital (s=2, p=6, d=10, f=14)
4. Order of filling electron shells and electron configurations
5. Valence electrons

Chapter 11:

1. Difference between ionic and covalent bonds (Electronegativity)
2. Lewis structures
3. Predicting shape/geometry and bond angles
4. Predicting dipolar/nonpolar
5. Periodic Trends (Ionization energy, atomic radius)

Chapter 12:

1. PV=nRT (3 types of problems)
    i. Ratio
    ii. Single missing variable
    iii. PV=nRT + Ch 9 (mol/mol ratio)
2. Predicting increase/decrease in pistons or fixed volumes

Chapter 13:

1. Phase diagram of water (Figure 13.7)
2. Phase changes (s-l, l-g, s-g)
3. Intermolecular Forces
4. Relationship between Vapor pressure/Boiling/IMF

Chapter 14:

1. Solvation/How things dissolve
2. H-bonding, effect on properties of compounds
3. Solubility and Rate of Dissolving
4. Molarity and calculations involving it
5. $M_1V_1=M_2V_2$

Chapter 15:

1. Definitions of Acid/Base
2. Acid + Base $\longrightarrow$ Salt + H_2O + Energy
3. Calculating pH, pOH, $[H^+]$, $[OH^-]$
4. Electrolytes (SE, WE, NE)
5. Common strong acids/weak acids, strong bases/weak bases.
6. Writing Molecular, Total Ionic and Net Ionic reactions.

Chapter 16:

1. Le Chatelier's principle - effect of concentration, pressure, temperature on chemical equilibrium.