Course Name	Ap chemistry	Video # and Name	11.1 Physical and Chemical Changes 11.2 Balanced Equations and Reactions in Solution

Questions/Keywords	Notes
Physical Changes Chemical Changes Intermolecular Forces Covalent Bonds Temperature Change Gas Formation Precipitate pH Change Color Change Dissolving Ionic Bonds Molecular Equation Complete Ionic Equation Net Ionic Equation Conservation of Mass Solubility Rules SNAP Spectator Ions Polyatomic Ions Reactants	**Physical Changes:** • Changes in physical properties, not chemical composition. • Examples: phase changes (solid to liquid to gas), dissolving sugar in lemonade, separating mixtures. • Involves disruption of intermolecular forces but not covalent bonds. **Chemical Changes:** • Substances transform into new substances with different compositions. • Evidence: change in temperature, formation of gas, formation of precipitate, change in pH, color change. • Involves breaking and forming of covalent bonds. **Indicators of Chemical Reactions:** • Change in temperature or light production (combustion as an example). • Formation of gas (bubbles) in solution. • Formation of a precipitate (cloudiness in solution). • Change in pH (e.g., formation of carbonic acid). • Unexpected color changes (rusting of iron). **Dissolving Salt Debate:** • Dissolving salt involves breaking ionic bonds and forming ion-dipole attractions. • Can cause temperature changes. • Considered both a physical and chemical change depending on the perspective.

Balanced Equations:

- Represent changes in matter using balanced chemical equations.
- Law of conservation of mass: matter is neither created nor destroyed.
- Example: Combustion of methane.
- Balance by adjusting coefficients to match the number of atoms on each side.

Types of Equations:

- **Molecular Equation**: Shows reactants and products as neutral compounds.
- **Complete Ionic Equation**: Shows all strong electrolytes as ions.
- **Net Ionic Equation**: Shows only the ions participating in the reaction.

Balancing Ionic Reactions:

- Use polyatomic ions as units.
- Example: Reaction between potassium hydroxide and iron(III) nitrate.

Solubility Rules:

- **SNAP**: Sodium, Nitrate, Ammonium, Potassium ions are soluble.
- Predict precipitates based on solubility.

Spectator Ions:

- Ions that do not participate in the reaction and remain in solution.

Summary

The two lessons explore fundamental concepts related to chemical reactions and balancing chemical equations. The first lesson distinguishes between physical and chemical changes, explaining that physical changes alter a substance's physical properties without changing its chemical composition, such as phase transitions and dissolving. In contrast, chemical changes transform substances into new ones with different compositions, often evidenced by changes in temperature, gas formation, precipitate formation, pH changes, or color shifts. The lesson also discusses the debate over whether dissolving salts constitutes a physical or chemical change. The second lesson focuses on balanced chemical equations, emphasizing the importance of balancing reactions to adhere to the law of conservation of mass. It involves adjusting coefficients to ensure equal numbers of atoms on both sides of the reaction. The lesson covers different types of equations, including molecular, complete ionic, and net ionic equations. It explains how to balance ionic reactions by considering dissociated ions and applying solubility rules to determine if a precipitate forms. The net ionic equation further simplifies the reaction by omitting spectator ions that do not participate in the actual reaction.