



Chemistry Content Integration Guide

Each Collisions game is designed to introduce students to key chemistry concepts and objectives through interactive gameplay and scaffolded leveling. To best align a specific Collisions game with a topic that you are teaching, please refer to the list below.

Atoms

- Atomic neutrality
- Atomic radii trends
- Electron configuration
- Aufbau Principle
- Hund's Rule
- Electronegativity

Covalent Bonding

- Octet rule
- Types of bonds: single, double, triple
- Bond polarity
- Electron domains
- Molecular shape/VSEPR Theory

Intermolecular Forces

- Types of IMFs: London Dispersion Forces, dipole-dipole, hydrogen bonds
- IMF strengths
- Polar and non-polar molecules
- Molecular geometry and bond polarity

Acids & Bases

- Brønsted-Lowry acids and bases
- Strong versus weak acids
- Neutralization reactions
- Amphoteric substances
- Conjugate acids and conjugate bases

Ions

- Cation formation
- Anion formation
- Octet rule
- Ionic radii
- Ionization energy trends
- Electron affinity

Ionic Bonding

- Attraction and repulsion
- Net compound neutrality
- Cation to anion ratios
- Polyatomic ions
- Ionic compounds contain one type of cation and one type of anion

Phase Change

- 6 phase changes: melt, boil, sublimate, freeze, condense, deposit
- Endothermic versus exothermic
- Potential versus kinetic energy
- IMF strengths and boiling points

Equilibrium

- Reversible reactions
- Relative reaction rates: forward versus reverse
- LeChâtelier's Principle: effects of changes in concentration, temperature, pressure