

# North Carolina Essential Standards: Chemistry

## Matter: Properties and Change

### 1.1 Analyze the structure of atoms and ions.

- 1.1.1: Analyze the structure of atoms, isotopes, and ions.
- 1.1.2: Analyze an atom in terms of the location of electrons.
- 1.1.3: Explain the emission of electromagnetic radiation in spectral form in terms of the Bohr model.
- 1.1.4: Explain the process of radioactive decay by the use of nuclear equations and half-life.

### 1.2 Understand the bonding that occurs in simple compounds in terms of bond type, strength, and properties.

- 1.2.1: Compare the relative strengths of ionic, covalent, and metallic bonds
- 1.2.2: Infer the type of bond and chemical formula formed between atoms.
- 1.2.3: Compare inter- and intra-particle forces.
- 1.2.4: Interpret the name and formula of compounds using IUPAC convention.
- 1.2.5: Compare the properties of ionic, covalent, metallic, and network compounds.

### 1.3 Understand the physical and chemical properties of atoms based on their position in the Periodic Table.

- 1.3.1: Classify the components of a periodic table of an element based on its position on the Periodic Table.
- 1.3.2: Infer the physical properties of an element from its position in the Periodic Table.
- 1.3.3: Infer the atomic size, reactivity, electronegativity, and ionization energy of an element from its position in the Periodic Table.

## Energy: Conservation and Transfer

### 2.1 Understand the relationship among pressure, temperature, volume, and phase.

- 2.1.1: Explain the energetic nature of phase changes.
- 2.1.2: Explain heating and cooling curves.
- 2.1.3: Interpret the data presented in phase diagrams.
- 2.1.4: Infer simple calorimetric calculations based on the concepts of heat lost equals heat gained and specific heat.
- 2.1.5: Explain the relationships between pressure, temperature, volume, and quantity of gas both qualitative and quantitative.

### 2.2 Analyze chemical reactions in terms of quantities, product formation, and energy.

- 2.2.1: Explain the energy content of a chemical reaction.
- 2.2.2: Analyze the evidence of chemical change.
- 2.2.3: Analyze the law of conservation of matter and how it applies to various types of chemical equations.
- 2.2.4: Analyze stoichiometric relationships inherent in a chemical reaction.
- 2.2.5: Analyze quantitatively the composition of a substance.

## Interactions of Energy and Matter

### 3.1 Understand the factors affecting rate of reaction and chemical equilibrium.

- 3.1.1: Explain the factors that affect the rate of a reaction.
- 3.1.2: Explain the conditions of a system at equilibrium.
- 3.1.3: Infer the shift in equilibrium when a stress is applied to a chemical system.

### 3.2 Understand solutions and the solution process.

- 3.2.1: Classify substances using the hydronium and hydroxide ion concentrations.
- 3.2.2: Summarize the properties of acids and bases.
- 3.2.3: Infer the quantitative nature of a solution.
- 3.2.4: Summarize the properties of solutions.
- 3.2.5: Interpret solubility diagrams.
- 3.2.6: Explain the solution process.