

# High School: Chemistry (Enrichment)

Adopted 2018

## High School - Chemistry (Enrichment)

### 9. Acids and Bases (Enrichment) CHE.9

9A. Enrichment: Students will understand the nature and properties of acids, bases, and salt solutions. CHE.9A

1. Enrichment: Analyze and interpret data to describe the properties of acids, bases, and salts. CHE.9A.1
2. Enrichment: Analyze and interpret data to identify differences between strong and weak acids and bases (i.e., dissociation). CHE.9A.2
3. Enrichment: Plan and conduct investigations using the pH scale to classify acid and base solutions. CHE.9A.3
4. Enrichment: Analyze and evaluate the Arrhenius, Bronsted-Lowry, and Lewis acid-base definitions. CHE.9A.4
5. Enrichment: Use mathematical and computational thinking to calculate pH from the hydrogen-ion concentration. CHE.9A.5
6. Enrichment: Obtain, evaluate, and communicate information about how buffers stabilize pH in acid-base reactions. CHE.9A.6

---

### 10. Thermochemistry (Enrichment) CHE.10

10A. Enrichment: Students will understand that energy is exchanged or transformed in all chemical reactions. CHE.10A

1. Enrichment: Construct explanations to explain how temperature and heat flow in terms of the motion of molecules (or atoms). CHE.10A.1
2. Enrichment: Classify chemical reactions and phase changes as exothermic or endothermic based on enthalpy values. Use a graphical representation to illustrate the energy changes involved. CHE.10A.2
3. Enrichment: Analyze and interpret data from energy diagrams and investigations to support claims that the amount of energy released or absorbed during a chemical reaction depends on changes in total bond energy. CHE.10A.3
4. Enrichment: Use mathematical and computational thinking to solve problems involving heat flow and temperature changes, using known values of specific heat and latent heat of phase change. CHE.10A.4

---

## 11. Equilibrium (Enrichment) CHE.11

- 11A. Enrichment: Students will understand that chemical equilibrium is a dynamic process at the molecular level. CHE.11A
1. Enrichment: Construct explanations to explain how to use Le Chatelier's principle to predict the effect of changes in concentration, temperature, and pressure. CHE.11A.1
  2. Enrichment: Predict when equilibrium is established in a chemical reaction. CHE.11A.2
  3. Enrichment: Use mathematical and computational thinking to calculate an equilibrium constant expression for a reaction. CHE.11A.3

---

## 12. Organic Nomenclature (Enrichment) CHE.12

- 12A. Enrichment: Students will understand that the bonding characteristics of carbon allow the formation of many different organic molecules with various sizes, shapes, and chemical properties. CHE.12A
1. Enrichment: Construct explanations to explain the bonding characteristics of carbon that result in the formation of basic organic molecules. CHE.12A.1
  2. Enrichment: Obtain information to communicate the system used for naming the basic linear hydrocarbons and isomers that contain single bonds, simple hydrocarbons with double and triple bonds, and simple molecules that contain a benzene ring. CHE.12A.2
  3. Enrichment: Develop and use models to identify the functional groups that form the basis of alcohols, ketones, ethers, amines, esters, aldehydes, and organic acids. CHE.12A.3