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ODYSSEY Molecular Explorer
— Release 7.0 —

Correlation with Oklahoma's
Priority Academic Student Skills
High School

Chemistry

Standard 1
Structure and Properties of Matter

All matter is made up of atoms. Its structure is made up of repeating patterns and has characteristic properties. The student will engage in investigations that integrate the process and inquiry standards and lead to the discovery of the following objectives:

1. Matter is made of atoms and atoms are composed of even smaller components (i.e., protons, neutrons and electrons).

   → **D2** *Atoms* "Distribution of Mass in Atoms"

   → **D4** *Atoms* "Hydrogen Atom"

   → **D5** *Atoms* "Electron Cloud of Argon"

2. Atoms interact with one another by transferring or sharing outer electrons that are farthest from the nucleus. These outer electrons govern the chemical properties of the element.

   → **F7** *Chemical Bonding* "Electron Sharing"

   → **F8** *Chemical Bonding* "Energetics of Covalent Bonding"

   → **F11** *Chemical Bonding* "Polar Bonds and Molecules"

   → **F13** *Chemical Bonding* "Classifying by Bond Polarity"

3. An element is composed of a single type of atom. When elements are listed in order according to the number of protons, repeating patterns of physical and chemical properties identify families of elements with similar properties.

   → **C3** *Chemical Matter* "Examples of Elements"

   → **P1** *Main Groups & Transition Metals* "Alkali Metals"

   → **P2** *Main Groups & Transition Metals* "Alkaline Earth Metals"

   → **P3** *Main Groups & Transition Metals* "Boron Group"

→ **P4** *Main Groups & Transition Metals* "Carbon Group"

→ **P6** *Main Groups & Transition Metals* "Nitrogen Group"

→ **P7** *Main Groups & Transition Metals* "Oxygen Group"

→ **P10** *Main Groups & Transition Metals* "Halogens"

→ **P11** *Main Groups & Transition Metals* "Noble Gases"

→ **P12** *Main Groups & Transition Metals* "Elements of the d- and f-Blocks"

4. A compound is formed when two or more kinds of atoms bind together chemically. Each compound has unique chemical and physical properties.

→ **C4** *Chemical Matter* "Types of Compounds"

→ **F1** *Chemical Bonding* "The Attraction Between Ions"

→ **F8** *Chemical Bonding* "Energetics of Covalent Bonding"

5. Solids, liquids, and gases differ in the energy that binds them together.

→ **C6** *Chemical Matter* "States of Matter"

→ **C7** *Chemical Matter* "Comparing States Side-by-Side"

Standard 2

Chemical Reactions

A chemical reaction is a reaction in which one or more substances are converted into different substances. A chemical change cannot be reversed by physical means. The student will engage in investigations that integrate the process and inquiry standards and lead to the discovery of the following objectives:

2. The rate of chemical reactions is affected by the concentration and temperature of the reacting materials. Catalysts accelerate chemical reactions.

→ **M2** *Kinetics* "Reactive Collisions"

4. Mass is conserved in chemical reactions (balancing of equations).

→ **M1** *Kinetics* "Observing a Reaction"

→ **M3** *Kinetics* "Mechanism of a Reaction"

Physics

Standard 2
Conservation of Energy

The total energy of the universe is constant. The student will engage in investigations that integrate the process and inquiry standards and lead to the discovery of the following objectives:

1. Energy can be transferred but never destroyed. As these transfers occur, the matter involved becomes steadily less ordered.

   → **M2** *Kinetics* "Reactive Collisions"

   → **O1** *Chemical Thermodynamics* "Gas Expansions"

   → **O3** *Chemical Thermodynamics* "Heat Conduction"

2. All energy can be considered to be kinetic energy, potential energy, or energy contained by a field.

   → **L4** *Thermochemistry* "Vibrating Diatomic Molecule"

3. Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.

   → **G10** *Gases* "The Meaning of Temperature"

   → **G12** *Gases* "Mean Speed and Temperature"

   → **L2** *Thermochemistry* "Thermal Energy"