

**Science Standards**

**Introduction to Chemistry**

**Course Overview:** This course is meant to show students a broad overview of the major topics of chemistry. Major topics students will learn about include the nature of matter, the periodic table, types of molecules, and stoichiometry.

**Bold standards are essential standards that all students will learn as they complete the course.**

**Unit 1: Introduction**

**Description:** In this unit, students will learn the basic skills required for success in this class.

**Standards**

1. Students can use lab equipment correctly and safely use common lab equipment
2. Students understand the importance of safety precautions in science labs
3. Students understand and can use the steps of the scientific method in order to solve problems.
4. Students understand that the scientific method is a repeating process.
5. Students can convert between metric and imperial units using conversion factors

**NGS Standards:** Science and Engineering Practices

**Unit 2: The Nature of Matter**

**Description:** Students will learn the structure of matter and how atoms and molecules behave on the subatomic scale.

**Standards**

1. Students understand the orbital and electron cloud models of the atom
2. Students can identify the three major subatomic particles
3. Students can relate the quantities of the three major subatomic particles to each other using information found on the periodic table.
4. Students can describe how atoms move in relation to each other in the three main phases of matter
5. Students can use the KMT to predict how atoms behave in common conditions
6. **Students can describe the KMT**
7. Students can relate the KMT to phase changes
8. Students can draw energy curves for phase changes

**NGS Standards:** PS1-5

**Unit 3: The Periodic Table**

**Description:** In this unit, students will learn how to use the periodic table to answer questions.

**Standards**

1. Students can describe why the periodic table is structured the way it is.
2. Students can identify major periodic table trends
3. Students can calculate the likely ion for an atom to form using the periodic table.
4. Students can identify the major shapes of electron clouds in orbitals.
5. Students can relate the orbital electrons are found into their location on the periodic table.
6. Students can calculate the valence electrons an atom will have using the periodic table.

**NGS Standards:** PS1-1, PS1-2

**Unit 4: Chemical Bonding**

**Description:** In this unit, students will learn the types of chemical bonds and how chemical bonds store energy and contribute to chemical behavior.

**Standards**

1. Students can predict the likely chemical bond to be formed by two elements.
2. Students understand that chemical bonds store energy.
3. Students can identify the intermolecular forces between molecules given information about its polarity.
4. Students can relate melting and boiling points to the strength of intermolecular bonds.

**NGS Standards:** PS1-3, PS1-4

**Unit 5: Chemical Reactions**

**Description:** In this unit, students will learn how to predict the type of chemical reactions that will happen, and how changing the starting conditions for the reaction will change the end results.

**Standards**

1. Students can explain what changes as the result of a chemical reaction.
2. Students can balance chemical reactions.
3. Students can identify which of the major types of chemical reactions a given reaction is.
4. **Students can predict how a reaction will change if conditions change using LeChat Lier.**
5. Students understand that chemical reactions must be balanced because of conservation of mass.

**NGS Standards:** PS1-6, PS1-8

**Unit 6: Stoichiometry**

**Description:** In this unit, students will learn how to use math to predict that amount of product that will be made in a chemical reaction.

**Standards**

1. Students can calculate the molar mass of a chemical.
2. Students can explain how and why the mole is used in chemistry.
3. **Students can predict the product mass of a chemical using stoichiometry given starting conditions.**
4. Students understand why no reaction has a 100% yield.
5. Students can apply %yield to chemical processes.

**NGS Standards:** PS1-7