Chemistry 11 Course Outline

Material Covered:

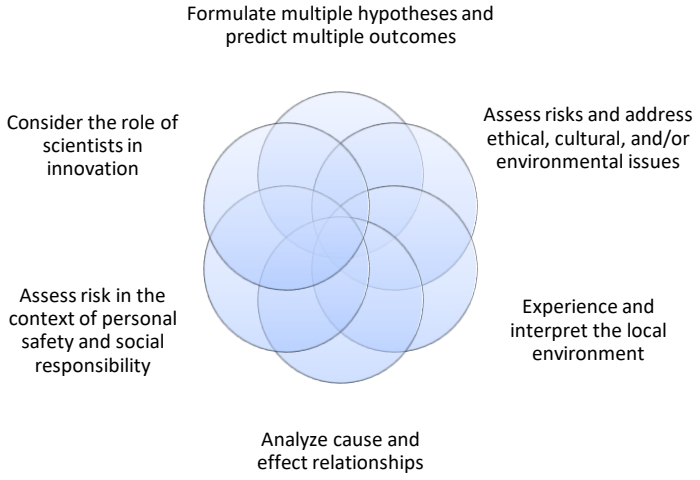
The course is comprised of the following main themes:

- **Safety & Measurement:** Mastering lab safety, using significant figures, and calculating density.
- **Naming Compounds (Nomenclature):** Learning the language of chemistry—naming all inorganic formulas and writing formulas from names.
- **The Quantitative Core (Stoichiometry):** The essential math of chemistry, focusing on the mole concept and calculating quantities in chemical reactions (limiting reactants, percent yield).
- **Atoms & Bonds:** Understanding atomic structure, periodic table trends, and how atoms form chemical bonds to create molecules.
- **Solutions (Molarity):** Defining solutions and performing molarity (*M*) and dilution calculations to express concentration.
- **Carbon Chemistry (Organic):** An introduction to carbon compounds, focusing on naming and drawing the basic hydrocarbons (alkanes, alkenes, alkynes).

Course Design:

This Chemistry 11 course explores the composition and change of matter while rapidly building foundational skills in lab safety, measurement math (significant figures, density), and the language of inorganic nomenclature. The primary focus of this course is mastering the mole concept and stoichiometry to accurately calculate reactants and products in chemical reactions. This is followed by studying atomic structure, chemical bonding, and practical applications in aqueous solutions (molarity) and basic organic chemistry.

These are some of the Curricular Competencies for the course:



Textbook:

There is no textbook needed for this course.

Safety and Planning

Goal:

The goal of this unit is to help you understand how to work safely in a chemistry lab. You will learn how to identify safety symbols, use lab equipment correctly, and follow important procedures that prevent accidents. By the end, you'll be able to demonstrate safe lab habits with confidence.

Objectives:

By the end of this unit, you should be able to:

- Understand and apply standard laboratory safety procedures.
- Identify and use safety symbols, equipment, and emergency protocols correctly.
- Complete a virtual or in-person lab safety activity.

What to Do in this Unit:

- Ask your teacher for the Unit 1 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 1 Worksheet to your teacher for marking.

Measurement and Matter

Goal:

In this unit, you will explore what chemistry is and how scientists measure and describe matter. You'll practice using significant figures, measuring density, and classifying substances as elements, compounds, or mixtures. The goal is to build strong foundational skills for all future chemistry work.

Objectives:

By the end of this unit, you should be able to:

- Differentiate between types of matter and physical versus chemical properties.
- Perform accurate measurements using significant figures and uncertainty.
- Calculate density and classify substances based on composition.

What to Do in this Unit:

- Ask your teacher for the Unit 2 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 2 Worksheet to your teacher for marking.
- Ask your teacher for the Lab #1: Density. Hand in when complete.

Nomenclature

Goal:

The goal of this unit is to learn the language of chemistry—how to name and write chemical compounds correctly. You'll master the naming rules for ionic, covalent, and acid compounds and practice writing their formulas. By the end, you'll be able to communicate chemical information clearly and accurately.

Objectives:

By the end of this unit, you should be able to:

- Name and write chemical formulas for ionic, covalent, and acid compounds.
- Recognize and apply rules for polyatomic ions.
- Translate between compound names and chemical symbols accurately.

What to Do in this Unit:

- Ask your teacher for the Unit 3 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 3 Worksheet to your teacher for marking.
- Review your work from Units 1-3. When ready, ask your teacher for Cumulative Exam #1. Hand in when complete.

The Mole

Goal:

This unit introduces one of the most important ideas in chemistry: the mole. You will learn how to connect the microscopic world of atoms and molecules to measurable quantities like mass and volume. By the end, you'll be able to calculate and compare chemical amounts confidently.

Objectives:

By the end of this unit, you should be able to:

- Define the mole and relate it to Avogadro's number.
- Convert between mass, moles, and number of particles.
- Perform calculations involving molar volume at STP.
- Determine empirical and molecular formulas.

What to Do in this Unit:

- Ask your teacher for the Unit 4 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 4 Worksheet to your teacher for marking.

Reactions and Energy

Goal:

The goal of this unit is to understand how and why substances react. You will learn to write and balance chemical equations, recognize common reaction types, and distinguish between endothermic and exothermic processes. By the end, you'll be able to describe how energy and matter change during reactions.

Objectives:

By the end of this unit, you should be able to:

- Write and balance chemical equations.
- Classify reaction types and predict products.
- Identify exothermic and endothermic processes.

What to Do in this Unit:

- Ask your teacher for the Unit 5 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 5 Worksheet to your teacher for marking.

Stoichiometry

Goal:

In this unit, you'll apply your knowledge of moles and chemical equations to solve real-world quantitative problems. You'll learn how to determine limiting reactants, calculate percent yield, and predict the outcomes of reactions. The goal is to develop strong problem-solving skills in chemical math.

Objectives:

By the end of this unit, you should be able to:

- Apply the mole concept to quantitative chemical reactions.
- Determine limiting and excess reactants.
- Calculate percent yield from experimental or theoretical data.

What to Do in this Unit:

- Ask your teacher for the Unit 6 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 6 Worksheet to your teacher for marking.
- Ask your teacher for the Lab #2: Stoichiometry Lab Outline and Lab #2: Stoichiometry Lab Student Template. Hand in when complete.
- Review your work from Units 4-6. When ready, ask your teacher for Cumulative Exam #2. Hand in when complete.

Atomic Structure and Bonding

Goal:

The goal of this unit is to explore the structure of the atom and how it explains the patterns in the periodic table. You'll learn about subatomic particles, electron arrangements, and bonding types. By the end, you'll understand how atomic structure shapes chemical behavior.

Objectives:

By the end of this unit, you should be able to:

- Describe the structure of the atom, including protons, neutrons, and electrons.
- Determine electron configurations and periodic trends.
- Draw Lewis structures for simple molecules.
- Identify and compare types of chemical bonding.

What to Do in this Unit:

- Ask your teacher for the Unit 7 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 7 Worksheet to your teacher for marking.

Solubility and Aqueous Solutions

Goal:

In this unit, you'll learn how substances dissolve and interact in solution. You'll practice writing dissociation equations, calculating molarity, and performing dilutions. The goal is to understand how chemistry happens in aqueous (water-based) environments.

Objectives:

By the end of this unit, you should be able to:

- Define solutions and identify solutes and solvents.
- Write dissociation equations for ionic compounds.
- Calculate molarity and perform dilution calculations.

What to Do in this Unit:

- Ask your teacher for the Unit 8 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 8 Worksheet to your teacher for marking.
- Ask your teacher for the Lab #3: Titration Lab Outline and Lab #3: Titration Lab Student Template. Hand in when complete.

Organic Chemistry

Goal:

The goal of this unit is to introduce you to the study of carbon-based compounds. You'll learn how to name and draw the structures of alkanes, alkenes, and alkynes. By the end, you'll understand the basics of organic chemistry and its importance in everyday life.

Objectives:

By the end of this unit, you should be able to:

- Recognize and name alkanes, alkenes, and alkynes.
- Draw structural and condensed formulas for basic hydrocarbons.
- Understand the differences between single, double, and triple bonds.

What to Do in this Unit:

- Ask your teacher for the Unit 9 Worksheet and complete all the work as directed there.
- When you are ready, submit your work for Unit 9 Worksheet to your teacher for marking.
- Review Units 7-9. When ready, ask your teacher for Cumulative Exam #3. Hand in when complete.

Congratulations! You have completed Chemistry 11!