

# Chemistry I

Science

Grade(s) 11th - 12th, Duration 1 Year, 1 Credit  
Elective Course

## Course Overview

**GENERAL DESCRIPTION:** Chemistry is a physical science college preparatory course. It is an excellent course to develop quantitative problem-solving skills and abstract reasoning abilities, and for this reason has benefits beyond learning the subject matter of chemistry.

**HOMEWORK OR READING NECESSARY:** Homework is necessary but at irregular intervals. Students must prepare properly for tests in order to be successful.

**FORMAT:** Lecture-demonstration, daily work, student recitation, student labs, and in-class problem working are important in the course.

**PROJECTS, REPORTS, PAPERS:** Students will complete hands-on lab exercises and projects as directed.

**TESTS:** Weekly homework quizzes in addition to regular chapter tests.

Timeframe	Unit	Scope And Sequence	
			Instructional Topics
2 Week(s)	Introduction to Chemistry		1. What is Chemistry? 2. Scientific Method
2 Week(s)	Matter and Change		1. Properties of Matter 2. Types of Matter
3 Week(s)	Scientific Measurement		1. Measurement 2. Significant Figures 3. The Metric System
5 Week(s)	Atomic Structure		1. Defining the Atom 2. Counting Atoms 3. Electrons
2 Week(s)	The Periodic Table		1. Organization and Classification 2. Periodic Trends
4 Week(s)	Chemical Bonding		1. Ionic Bonding 2. Metallic Bond 3. Covalent Bonding
4 Week(s)	Chemical Quantities		1. The Mole 2. Percent Composition and Chemical Formulas
3 Week(s)	Chemical Reactions		1. Chemical Reactions 2. Types of chemical reactions
3 Week(s)	Stoichiometry		1. Stoichiometry 2. Limiting Reagent 3. Percent Yield

## Materials and Resources

A scientific type of calculator is needed for the course. Students are responsible for any lab equipment they might break.

## Prerequisites

PREREQUISITE: One year of high school science and Algebra I, Geometry, & Algebra II

## Course Details

**Unit:** Introduction to Chemistry

**Duration:** 2 Week(s)

### Unit Overview

What is Chemistry?  
What is the Scientific Method?

### Materials and Resources

Text books  
Teacher notes  
Labs

### Academic Vocabulary

Chemistry  
Scientific Method (and its parts)

### Summative Assessment

Quiz over entire chapter

**Topic:** What is Chemistry?

**Duration:** Ongoing

### Topic Overview

What is the study of chemistry? How's does it affect my life? What is the history of chemistry?

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**Topic:** Scientific Method

**Duration:** Ongoing

## Topic Overview

What is the point of the scientific method? What are the parts of the scientific method? How is the scientific method applicable to everyday life?

## Learning Targets

Know how to use the scientific method.

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## Unit: Matter and Change

**Duration:** 2 Week(s)

### Unit Overview

Review: properties of matter, types of matter, and matter interactions

### Materials and Resources

Text book  
Teacher notes  
Lab materials

### Academic Vocabulary

Mixture  
Element  
Compound  
Law of Conservation of Mass

### Summative Assessment

Ch. 2 Test

**Topic:** Properties of Matter

**Duration:** Ongoing

## Topic Overview

What are physical and chemical properties? What are physical and chemical changes?

## Learning Targets

Properties of Matter

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**Topic:** Types of Matter

**Duration:** Ongoing

## Topic Overview

Being able to differentiate between mixtures, elements, and compounds.

## Unit: Scientific Measurement

**Duration:** 3 Week(s)

### Unit Overview

What is the correct procedure for measuring and recording data?  
How does the metric system work?

### Materials and Resources

Text book  
Teacher notes  
Lab materials

### Academic Vocabulary

Accuracy & Precision  
Significant Figures  
Percent Error  
International System of Units

### Summative Assessment

Chapter 3 test

**Topic:** Measurement

**Duration:** Ongoing

## Topic Overview

Understand the importance of proper measurement, precision, and accuracy. What is the correct way to use a tool to measure objects (ruler, graduated cylinder, balance, etc.)

**Topic:** Significant Figures

**Duration:** Ongoing

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## Topic Overview

What are significant figures?  
Understand how to use +, -, x, and / rules for significant figures.

## Topic: The Metric System

Duration: Ongoing

## Topic Overview

What is the International System of Units?  
How does the metric system work?  
What are the common metric system units?  
How do I move between units in the metric system?

## Unit: Atomic Structure

Duration: 5 Week(s)

### Unit Overview

What is an atom?  
Distinguishing between atoms?  
How are electrons arranged in atoms?

### Materials and Resources

Text book  
Teacher notes  
Lab materials

### Academic Vocabulary

Proton  
Neutron  
Electron  
Isotope  
Bohr Model  
Electron Configuration

### Summative Assessment

Ch. 4-5 test

## Topic: Defining the Atom

Duration: Ongoing

## Topic Overview

What makes up an atom?  
How is an atom arranged?  
What is the significance of all this?

## Topic: Counting Atoms

Duration: Ongoing

## Topic Overview

How can you distinguish between different atoms?  
What is the significance of this?

## Topic: Electrons

Duration: Ongoing

## Topic Overview

How are electrons arranged in an atom?  
What is the importance of the arrangement of electrons in an atom?

## Unit: The Periodic Table

Duration: 2 Week(s)

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## Unit Overview

- What is the periodic table?
- How is the periodic table used?
- What are some periodic table trends?

## Materials and Resources

- Text book
- Teacher notes
- Lab materials

## Academic Vocabulary

- Periodic Table
- Period
- Group/Family

## Summative Assessment

- Ch. 6 Test

**Topic:** Organization and Classification

**Duration:** Ongoing

## Topic Overview

- How are the elements organized?
- How are the elements classified?
- What is the significance of all this?

**Topic:** Periodic Trends

**Duration:** Ongoing

## Topic Overview

- What are electronegativity, atomic radii, ionization energy?
- What are the trends associated with these across the periodic table?

**Unit:** Chemical Bonding

**Duration:** 4 Week(s)

## Unit Overview

- How do ionic, covalent, and metallic bonds work?
- What are the differences ionic, covalent, and metallic bonds?

## Materials and Resources

- Textbook
- Teacher Notes
- Lab Materials

## Academic Vocabulary

- Ionic Bond
- Covalent Bond
- Metallic Bond
- Polyatomic Ion
- Octet Rule
- Molecule
- Diatomic Molecule

## Summative Assessment

- Ch. 7-9 Test

**Topic:** Ionic Bonding

**Duration:** 9 Day(s)

## Topic Overview

- What is the octet rule?
- What is an ionic bond and how does it work?
- How is an ionic compound correctly named?
- What are polyatomic ions?

**Topic:** Metallic Bond

**Duration:** 1 Day(s)

## Topic Overview

- What is a metallic bond and how do they work?

**Topic:** Covalent Bonding

**Duration:** 10 Day(s)

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## Topic Overview

What is a covalent bond and how does it work?  
How is a covalent (molecular) compound correctly named?

## Unit: Chemical Quantities

Duration: 4 Week(s)

### Unit Overview

What is a mole?  
What is the significance of Avagadro's Number?  
What are relationships between mole, mass, and number of particles in any given sample?

### Materials and Resources

Textbook  
Teacher Notes  
Lab Materials

### Academic Vocabulary

Avagadro's number  
Mole  
Molar Mass  
Percent Composition

### Summative Assessment

Ch. 10 Test

## Topic: The Mole

Duration: 4 Week(s)

### Topic Overview

What is the significance of Avagadro's Number?  
What is a Mole?  
What is the relationship between mass and moles?

## Topic: Percent Composition and Chemical Formulas

Duration: 5 Day(s)

### Topic Overview

How is the percent composition of a compound calculated?  
How can the chemical formula be calculated?

## Unit: Chemical Reactions

Duration: 3 Week(s)

### Unit Overview

What is a chemical reaction?  
What is the correct process for writing and balancing chemical equations?  
What are the five types of chemical reactions?

### Materials and Resources

Textbook  
Teacher Notes  
Lab Materials

### Academic Vocabulary

Chemical Reaction  
Chemical Equation  
Synthesis Reaction  
Decomposition Reaction  
Single-Replacement Reaction  
Double-Replacement Reaction  
Combustion

### Summative Assessment

Ch. 11 Test

## Topic: Chemical Reactions

Duration: 15 Day(s)

### Topic Overview

What is a chemical reaction?  
How is a chemical equation correctly written?  
How is a chemical equation correctly balanced?

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**Topic:** Types of chemical reactions

**Duration:** 10 Day(s)

## Topic Overview

What are the five types of chemical reactions?  
How can the reaction type be correctly identified?

**Unit:** Stoichiometry

**Duration:** 3 Week(s)

## Unit Overview

What is stoichiometry?  
What are limiting reagents?  
What is percent yield and how is it calculated?

## Materials and Resources

Textbook  
Teacher Notes  
Lab Materials

## Academic Vocabulary

Stoichiometry  
Limiting Reagent  
Excess Reagent  
Theoretical Yield  
Actual Yield  
Percent Yield

## Summative Assessment

Ch.12 Test

**Topic:** Stoichiometry

**Duration:** 3 Week(s)

## Topic Overview

What is stoichiometry?  
What is the importance of stoichiometry?  
How is stoichiometry figured?

**Topic:** Limiting Reagent

**Duration:** 10 Day(s)

## Topic Overview

What is the concept of a limiting reagent?  
How is limiting reagent calculated?

**Topic:** Percent Yield

**Duration:** 5 Day(s)

## Topic Overview

What is percent yield and how is it calculated?

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