



# Express Science Middle School Science Chemistry

## Curriculum Features

*The Express Science Middle School curriculum is designed as a survey of science topics in order to provide a solid foundation in all of the Sciences. Important concepts are developed in a sequential and stepwise manner that is understandable by all students. The modules are written to increase student interaction by providing a readable, engaging, and informative instructional curriculum that is ready for use in the classroom.*

### **Chemistry**

Chemistry is composed of units that explain the composition, structure, and interactions that support the predictability of matter and energy transformations. The Chemistry modules develop advanced chemistry concepts beginning with the atom and continuing through chemical reactions. Upon completion of this unit, the students will understand how the structure of the atom, temperature, and pressure influences chemical changes, how the properties of elements are predictable, and how matter and energy are conserved in all chemical reactions.

Formative assessments are included with each module as a valuable instructional strategy. Summative assessments are included with each unit as a confirmation of student success.

## **A. States Of Matter**

This unit describes how the motion of atoms and molecules that compose solids, liquids, and gases vary as heat energy or pressure is changed. The modules contain information on specific characteristics of each state of matter, factors that influence the states of matter, and the kinetic theory. Students will learn the states of matter at the atomic level and understand how various factors affect their behavior.

1. Kinetic Theory and States of Matter
2. Temperature Change and States of Matter
3. Pressure Changes and States of Matter
4. Gases
5. Liquids
6. Solids

## **B. Structure of Matter**

This unit addresses the history of the atomic theory, how the properties of elements are predictable, and how the mole as a unit of measure assures the conservation of matter. Individual modules describe the atom as a functional unit, explain the identifiable and periodic nature of the elements, and distinguish compounds and molecules. The students will understand how the structure of the atom affects its reactivity, how the Periodic Table of Elements is organized, and how the mole relates mathematics and chemistry. Students will recognize the relationship between atomic structure, periodicity and reactivity, as well as the conservation of matter.

1. Development of the Atomic Theory
2. Atoms
3. Electron Arrangement and Activity
4. Ions
5. Elements
6. Periodicity
7. Periodic Table
8. Compounds and Molecules
9. Conservation of Matter
10. Mole Concepts

## **C. Chemical and Physical Changes**

This unit covers the concepts that characterize chemical and physical changes. The modules provide evidence to recognize physical and chemical changes, a comparison of compounds and mixtures, and the knowledge that common substances can change into new substances. Students will learn topics such as pH, classifying and separating mixtures, and chemical properties.

1. Chemical Change
2. Physical Change
3. Classifying Mixtures
4. Separating Mixtures
5. Chemical Properties of Common Substances
6. pH
7. Acids
8. Bases

## **D. Chemical Reactions**

This unit expresses the chemical interactions that are central to an enduring understanding of chemistry. The modules connect bonding types, chemical reactions, chemical formulas, and chemical reactions. The students will learn to identify the various types of reactions, predict the products given the reactants, and explain reaction rates.

1. Chemical Formulas
2. Evidence of a Chemical Reaction
3. Ionic Chemical Bonds
4. Covalent Chemical Bonds
5. Neutralization Reactions
6. Combustion Reactions
7. Single Replacement Reactions
8. Double Replacement Reactions
9. Oxidation Reduction (Redox) Reactions
10. Acid Reactions
11. Base Reactions
12. Chemical Formulas
13. Balancing Chemical Reactions
14. Energy and Reaction Rates