

Unit 1: Foundation Building- Matter, Measurements and Atoms

Content Area: **Science**
Course(s): **Chemistry Honors**
Time Period: **September**
Length: **4 weeks**
Status: **Published**

Transfer

A review and introduction to core concepts that are the foundational to the study of chemistry.

Enduring Understandings

Chemistry explains the natural world.

Properties can be used to classify, identify and separate matter, explain structure and function.

Solving problems requires an appreciation of the big picture.

Dimensional Analysis is a useful tool.

The modern model of the atom has evolved over a long period of time through the work of many scientists

Essential Questions

Are all laboratory activities approached in the same matter?

Why is Chemistry important?

Why is it necessary to use a common set of measurement units?

How do scientists express the degree of uncertainty in their measurements?

To what extent is data reliable?

How is dimensional analysis used to solve problems in Chemistry?

How are scientific models developed and used to understand structure and properties of systems?

Content

Vocabulary

Intensive and extensive property, Filtration, distillation, precipitate, accuracy, precision, accepted value, experimental value, significant figures, directly proportional, inversely proportional, Cathode ray, isotope, atomic number, mass number

Learning Objectives

Appropriately use measurement tools in the laboratory.

Record measurements to the correct number of sig figs, use rules for sig figs in calculations to correctly round off numbers.

Identify and use SI units in calculations.

Identify and describe physical properties like density.

Identify chemical properties.

Classify matter: solid, liquid, gas, plasma.

State the Law of Conservation of Energy and of Mass.

Distinguish between mixtures, compounds, and pure elements.

Classify matter as homogeneous or heterogeneous.

List observations that suggest a chemical change.

Solve problems by Dimensional Analysis.

Use Conversion Factors to solve problems.

Compare protons, neutrons, and electrons with regard to mass, charge, and location in the atom.

Trace the development of atomic theory.

Deduce and infer atomic structure data from the periodic table

Standards

SCI.9-12.5.1.12

All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that

students must acquire to be proficient in science.

SCI.9-12.5.1.12.A	Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.
SCI.9-12.5.1.12.A.1	Refine interrelationships among concepts and patterns of evidence found in different central scientific explanations.
SCI.9-12.5.1.12.B	Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.
SCI.9-12.5.1.12.B.1	Design investigations, collect evidence, analyze data, and evaluate evidence to determine measures of central tendencies, causal/correlational relationships, and anomalous data.
SCI.9-12.5.1.12.B.2	Build, refine, and represent evidence-based models using mathematical, physical, and computational tools.
SCI.9-12.5.1.12.B.3	Revise predictions and explanations using evidence, and connect explanations/arguments to established scientific knowledge, models, and theories.
SCI.9-12.5.1.12.B.4	Develop quality controls to examine data sets and to examine evidence as a means of generating and reviewing explanations.
SCI.9-12.5.1.12.C	Scientific knowledge builds on itself over time.
SCI.9-12.5.1.12.C.2	Use data representations and new models to revise predictions and explanations.
SCI.9-12.5.2.12	All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.
SCI.9-12.5.2.12.A	All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.
SCI.9-12.5.2.12.A.1	Use atomic models to predict the behaviors of atoms in interactions.
SCI.9-12.5.2.12.A.4	Explain how the properties of isotopes, including half-lives, decay modes, and nuclear resonances, lead to useful applications of isotopes.
TEC.9-12.8.1.12	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
TEC.9-12.8.1.12.A	Technology Operations and Concepts
TEC.9-12.8.1.12.A.1	Construct a spreadsheet, enter data, and use mathematical or logical functions to manipulate data, generate charts and graphs and interpret the results.
WORK.9-12.9.1.12	All students will demonstrate creative, critical thinking, collaboration and problem solving skills to function successfully as global citizens and workers in diverse ethnic and organizational cultures.
WORK.9-12.9.1.12.A	Critical Thinking & Problem Solving
WORK.9-12.9.1.12.A.1	Apply critical thinking and problem-solving strategies during structured learning experiences.