Unit 1: Foundations—Matter, Changes & Measurement

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Unit 1: Foundations—Matter, Changes & Measurement

Standards

SCI.9-12.HS-PS1-4	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
SCI.9-12.HS-PS1-8	Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
SCI.9-12.HS-PS1-7	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
SCI.9-12.HS-PS1-2	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
SCI.9-12.HS-PS1-3	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
SCI.9-12.HS-PS1-6	Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
SCI.HS-PS1-8	Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
SCI.HS-PS1-3	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
9-12.HS-PS1-1	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Learning Objectives

- Analyze measurement precision and accuracy in lab data.

- Apply SI units, significant figures, and unit conversions in problem solving.
- Calculate density and interpret its significance.
- Classify substances as elements, compounds, or mixtures.
- determine the difference and provide examples of physical and chemical changes
- determine whether changes of matters are chemical or physical
- determine whether physical properties are intensive or extensive
- Distinguish physical vs. chemical properties and changes.
- draw conclusions based on observations and recorded data
- Form hypotheses and form a plan to launch water bottle rockets to reach a high height
- Plan and conduct an investigation to compare the structure of substances at the bulk scale to infer the strength of the electrical force between particles.
- Represent matter quantitatively using the mole concept (introductory level).

Essential Questions

- How can you determine if a change is physical or chemical?
- How does density help identify substances?
- In what ways do measurement uncertainties affect experimental conclusions?
- What criteria distinguish an element, compound, and mixture?
- Why are standard units and significant figures critical in chemistry?
- Why is the mole a useful unit for quantifying particles?

Instructional Tasks/Activities

- “Matter Sorting” Lab Stations
- “Mole in a Bag” Particle Modeling
- Accuracy, Precision, Percent Error
- Concept Map Construction: Measurement & Matter
- Density Determination Lab
- Dollar Flame Demonstration/Inquiry Questions
- Error Analysis Data Workshop
- Isotope Abundance Calculation Exercise
- Physical Intensive vs Extensive Activity
- Physical vs Chemical Video Identification
- Physical vs. Chemical Change Intro
- Physical/Chemical Changes Lab Activity
- Review Activities
- Science/Personal Introductions
- Scientific Principles Introduction

- Sig-Fig Precision Challenge
- Unit 1 Test
- Unit 1 Test Review
- Unit Conversion Relay Race
- What are Atoms and Elements?

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Flashcards and/or drill and practice
- Inquiry based activities with reflective discussion
- Journal / Student Reflection
- Kahoot
- Laboratory groups
- Lecture with note taking or guided notes
- Online models and simulators
- Other named in lesson
- Peer Review
- Performance
- Power Point Presentations
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Whole and small group discussions
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here

- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print

- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5