

Springdale Public Schools

Adv. Physical Science–Integrated Unit 5



Title of Unit	Matter & Its Interactions	Grade Level	8
Subject	Physical Science (accelerated)	Time Frame	
Developed By	SPS Science	Date Modified	06/23/2021

Identify Desired Results

Standards Covered in this Unit

(Evidence statements are LINKED from the standard number. Evidence statements assist in clarifying outcomes)

APSI-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. [AR Clarification Statement: This PE is partially addressed in this course. Examples of properties that could be predicted from patterns could include types of bonds (ionic & covalent) formed, numbers of bonds formed, and hydrogen bonds in water.] [Assessment Boundary: Assessment is limited to main group elements.]

APSI-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. [AR Clarification Statement: This PE is partially addressed in this course. Examples could include recognizing patterns to identify types of chemical reactions, such as combustion, single replacement, double replacement, decomposition and synthesis.] [Assessment Boundary: Assessment does not include predicting chemical products.]

APSI-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. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on understanding of the strengths of forces between particles including hydrogen bonding in water. Examples of particles could include ions, atoms, molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [AR Assessment Boundary: Assessment limited to materials of same states of matter.]

APSI-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the change in total bond energy. [Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.] [Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.]

APSI-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [AR Clarification Statement: This PE is partially addressed in this course. Emphasis is on demonstrating conservation of atoms through

balancing chemical equations and assessing students' use of mathematical thinking, not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include the mole concept or complex chemical reactions.]

APSI-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the function of designed materials. [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.]

Learning Outcomes for the Unit

What relevant goals will this unit address? These must come from the standards.

- Students will be able to use basic atomic structure and a periodic table to predict behavior of basic atoms and ions.
- Students will be able to demonstrate the Conservation of Mass and conservation of energy through balancing various equations and graphical analysis of energy diagrams
- Students will be able to communicate and defend research of molecular behavior in designed materials based on trends, structures, energy, and function of atoms and ions.

Key Vocabulary for the Unit

valence	atomic number	atomic radii	internuclear distance	endothermic
exothermic	endoergic	exoergic	inter	intra

Enduring Understandings for the Unit (for discussion within science and across content areas)

- Bonding occurs in order to achieve a lower total potential energy.
- Everything occurs in nature to move towards lower potential energy.

Essential Questions for the Unit

- How can patterns be used to make accurate predictions in science?
- What role does potential energy play in the transfer of matter?
- How does molecular attraction and repulsion in states of matter control the usefulness of man-made materials?

Misunderstandings That Will Be Addressed

- Changing the number of protons in an element only changes the mass of the element.
- Atoms and molecules bond because they are positive and negative.
- All reactions occur spontaneously.

Content Literacy Skills for the Unit (Interpretation of data, experimental design, SEPs, CCs) [minimum list]

- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex data presentation or piece of information in text.
- Understands the methods, tools, and functions of tools used in a moderately complex experiment.
- Predicts the results of an additional trial or measurement in a moderately complex experiment.
- Determines how the value of a variable changes as the value of another variable changes in a moderately complex data presentation.
- Identifies features of a complex table, graph, or diagram.

Assessment Evidence

What type(s) of Common Formative Assessment (CFA) will be given?

Ticket out the door, quick write, graphic organizer, golden line, three question quiz, hot/cold sticky note,

What type of District Formative Assessment will be given?

TBD

Overview of All Choices of Lessons for Unit

This is not a lesson plan!.

Shaded Activity/Activities are COPYRIGHT PROTECTED and cannot be shared outside of Springdale Schools. Sorry for any inconvenience.

Standard(s) #	Formative Assessment(s) (Indicate which is the CFA)	Main Instructional Strategy	Activity/Activities
HS-PS1-1			

HS-PS1-2			
HS-PS1-3			
HS-PS1-4	teacher designated	guided inquiry	<ul style="list-style-type: none"> • Biolite (includes HS-PS3-1, PS3-3)
HS-PS1-7	teacher designated	guided inquiry	<ul style="list-style-type: none"> • Disappearing Bodies (includes HS-PS1-1, PS1-2)
HS-PS2-6	writing	lab	<ul style="list-style-type: none"> • Surface Tension Overview (includes HS-PS1-3) <ul style="list-style-type: none"> ○ Surface Tension Basics ○ Capillarity - Measuring Surface Tension ○ Wetting and Contact Angle ○ Superhydrophobicity - The Lotus Effect

Common Resources

Title and Description of Usage	Location
This is an option for a lab notebook that is virtual.	Blank Digital Lab Notebook
A FREE video analysis and modeling tool that is open source!!	Tracker