

# HONORS Physical Science

## Curriculum Map:

## Pacing Guide and Unit Plans

# 2023-2024



Science Curriculum Unit Plans (CUPs) were created collaboratively with teachers across *The School District of Osceola County* to ensure students receive rigorous, high quality science instructional materials.

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# Curriculum Pacing Guide

## Physical Science Honors Curriculum Pacing Guide 2023-2024

Unit & Timeframe	Standards & Depth of Knowledge	Dates
<b>Quarter 1</b>		<b>August 10 to October 12</b>
Unit 0: Building Life Skills, Classroom/School Procedures & INB Set-Up, lab safety (5 days)	<i>Use this time to review your school and classroom procedures, set up interactive notebooks and build relationships with your students</i>	Aug 10– Aug 16
Unit 1: Physical & Chemical Properties of Matter (14 Days- NWEA will be during this time)	912.P.8.2 (DOK 2), 8.P.8.4 (DOK 2), 8.P.8.2 (DOK 2), 8.P.8.3 (DOK 2), 912.N.1.1 (DOK 3), 912.N.1.3 (DOK 1)	Aug 17 - Sept 6
Unit 2: Atomic Theory & The Periodic Table (14 Days)	912.P.8.4 (DOK 3), 912.P.8.3 (DOK 3), 912.P.8.5 (DOK 2), 8.P.8.6 (DOK 1), 912.N.1.6 (DOK 2), 912.N.3.1 (DOK 3), 912.N.3.2 (DOK 2), 912.N.3.4 (DOK 2), 912.N.3.5 (DOK 2), 8.N.3.1 (DOK 3), 8.N.3.2 (DOK 3)	Sept 7 – Sept 26
Unit 3: Compounds & Bonding, Mixtures, Solutions, & Properties of Water (20 Days total ends in Q2)	912.P.8.7 (DOK 2), 8.P.8.5 (DOK 1), 912.P.8.11 (DOK 2), 912.L.18.12 (DOK 2), 8.P.8.8 (DOK 2), 8.P.8.9 (DOK 2), 912.N.1.1 (DOK 3), 912.N.1.3 (DOK 1), 8.N.3.1 (DOK 3), 912.N.3.5 (DOK 2)	Sept 27 – Oct 25
<b>End of Quarter 1 (Oct 13)</b>		
<b>Quarter 2</b>		<b>October 16 to Dec 15</b>
Unit 3: Compounds & Bonding, Mixtures, Solutions, & Properties of Water (20 Days total- began in Q1)	912.P.8.7 (DOK 2), 8.P.8.5 (DOK 1), 912.P.8.11 (DOK 2), 912.L.18.12 (DOK 2), 8.P.8.8 (DOK 2), 8.P.8.9 (DOK 2), 912.N.1.1 (DOK 3), 912.N.1.3 (DOK 1), 8.N.3.1 (DOK 3), 912.N.3.5 (DOK 2)	Sept 27 – Oct 25
Unit 4: Physical & Chemical Changes in Matter (16 Days)	912.P.8.2 (DOK 2), 912.P.8.1 (DOK 2), 912.P.12.11 (DOK 2), 912.P.10.4 (DOK 3), 912.P.10.5 (DOK 2), 912.P.12.10 (DOK 3), 7.P.11.1 (DOK 1), 8.P.9.1 (DOK 3), 912.N.1.1 (DOK 3), 912.N.1.3 (DOK 1)	Oct 26 - Nov 17
<b>Thanksgiving Break (Nov 21-24)</b>		
Unit 5: Chemical Reactions (15 days- NWEA will be during this time)	912.P.8.8 (DOK 2), 912.P.12.12 (DOK 3), 912.P.10.6 (DOK 3), 912.P.10.7 (DOK 2), 912.N.1.1 (DOK 3), 912.N.1.3 (DOK 1), 912.N.3.5 (DOK 2)	Nov 27 – Dec 15
<b>End of Quarter 2 (Dec 15)</b>		
<b>Winter Break (Dec 18 – Jan 2)</b>		
<b>Quarter 3</b>		<b>January 3 to March 7</b>
Unit 6: Forces (11 days total)	912.P.10.10 (DOK 2), 912.P.12.4 (DOK 2), 6.P.13.1 (DOK 2), 8.P.8.2 (DOK 2), 6.P.13.3 (DOK 2), 912.N.1.1 (DOK 3), 912.N.3.3 (DOK 2), 912.N.3.4 (DOK 2)	Jan 3 – Jan 18
Unit 7: Motion & Momentum (14 Days)	912.P.12.2 (DOK 3), 912.P.12.3 (DOK 3), 912.P.12.1 (DOK 3), 912.P.12.5 (DOK 3), 912.P.12.6 (DOK 3), 6.P.13.3 (DOK 2), 6.P.12.1 (DOK 3), 912.N.1.1 (DOK 3), 912.N.1.2 (DOK 2), 912.N.3.3 (DOK 2), 912.N.3.4 (DOK 2)	Jan 19 – Feb 7
Unit 8: Energy, Systems, & Transformations (15 Days- with 2 days for Mock 2/19- 2/23)	912.P.10.1 (DOK 2), 912.P.10.2 (DOK 3), 912.P.10.6 (DOK 3), 912.P.10.4 (DOK 2), 6.P.11.1 (DOK 2), 7.P.11.3 (DOK 3), 7.P.11.2 (DOK 2), 7.P.11.4 (DOK 2), 912.N.1.1 (DOK 3), 912.N.1.2 (DOK 2), 912.N.3.3 (DOK 2), 912.N.3.4 (DOK 2)	Feb 8 – Feb 28
Unit 9: Behavior of Waves (10 Days – Ends in Q4)	912.P.10.21 (DOK 2), 912.P.12.7 (DOK 1), 7.P.10.2 (DOK 2), 7.P.10.3 (DOK 2), 912.N.1.1 (DOK 3), 912.N.2.4 (DOK 3), 912.N.3.1 (DOK 3)	Feb 29 – March 21
<b>End of Quarter 3 (Mar 7)</b>		
<b>Spring Break (Mar 11-15)</b>		
<b>Quarter 4</b>		<b>March 18 - May 29</b>
Unit 9: Behavior of Waves (10 Days)	912.P.10.21 (DOK 2), 912.P.12.7 (DOK 1), 7.P.10.2 (DOK 2), 7.P.10.3 (DOK 2), 912.N.1.1 (DOK 3), 912.N.2.4 (DOK 3), 912.N.3.1 (DOK 3)	Feb 29 – March 21
Unit 10: The Electromagnetic Spectrum (5 Days)	912.P.10.18 (DOK 3), 7.P.10.1 (DOK 2), 912.N.3.5 (DOK 2), 8.N.3.1 (DOK 3)	Mar 22- March 28
Unit 11: FSSA Final Review (26 Days)	<b>***FSSA review should have been allocated to each unit as bellwork before this time period***</b>	<b>March 29 - May 3</b>
<b>The Florida Statewide Science Assessment (FSSA) is May 7th</b>		
Unit 12: Work, Power & Electricity (7 Days)	912.P.10.3 (DOK 2), 912.P.10.15 (DOK 3), 912.P.10.14 (DOK 2), 912.N.1.3 (DOK 1), 912.N.1.6 (DOK 2)	May 8 – May 17
Unit 13: Nuclear Reactions (7 Days)	912.P.10.12 (DOK 2), 912.P.10.10 (DOK 2), 912.P.10.11 (DOK 3), 912.N.4.1 (DOK 2), 912.N.4.2 (DOK 3)	May 20 – May 29
<b>End of Quarter 4 (May 29)</b>		

# Bellwork

- [August 2023- Weather and Climate, Currents, Human Impact](#)
- [September 2023- Weather and Climate, Currents, Human Impact, Earth, sun and moon relationship, The solar system, Sun and other stars, Galaxies and universe](#)
- [October 2023- Weather and Climate, Currents, Human Impact, Earth, sun and moon relationship, The solar system, Sun and other stars, Galaxies and universe, landforms](#)
- [November 2023- Properties, Atomic Theory, and SLG Particles, Density](#)
- [December 2022- Properties, Atomic theory and SLG Particles, Density](#)
- [January 2024](#) – FSSA review
- [February 2024](#) – FSSA review
- [March 2024](#) – FSSA review
- [April 2024](#)– FSSA review

	<b>6<sup>th</sup> Grade</b>	<b>7<sup>th</sup> Grade</b>	<b>8<sup>th</sup> Grade</b>
<b>1<sup>st</sup> Quarter</b>	NOS	Earth Space content 3 <sup>rd</sup> and 4 <sup>th</sup> Quarter	Physical Science content 3 <sup>rd</sup> and 4 <sup>th</sup> Quarter
<b>2<sup>nd</sup> Quarter</b>	NOS, Earth Space content Q1		
<b>3<sup>rd</sup> Quarter</b>	Earth Space content Q2	Physical Science content 1 <sup>st</sup> and 2 <sup>nd</sup> Quarter	FSSA Review
<b>4<sup>th</sup> Quarter</b>	Earth Space content Q3		

# Resource Toolbox

## Focus Strategies:

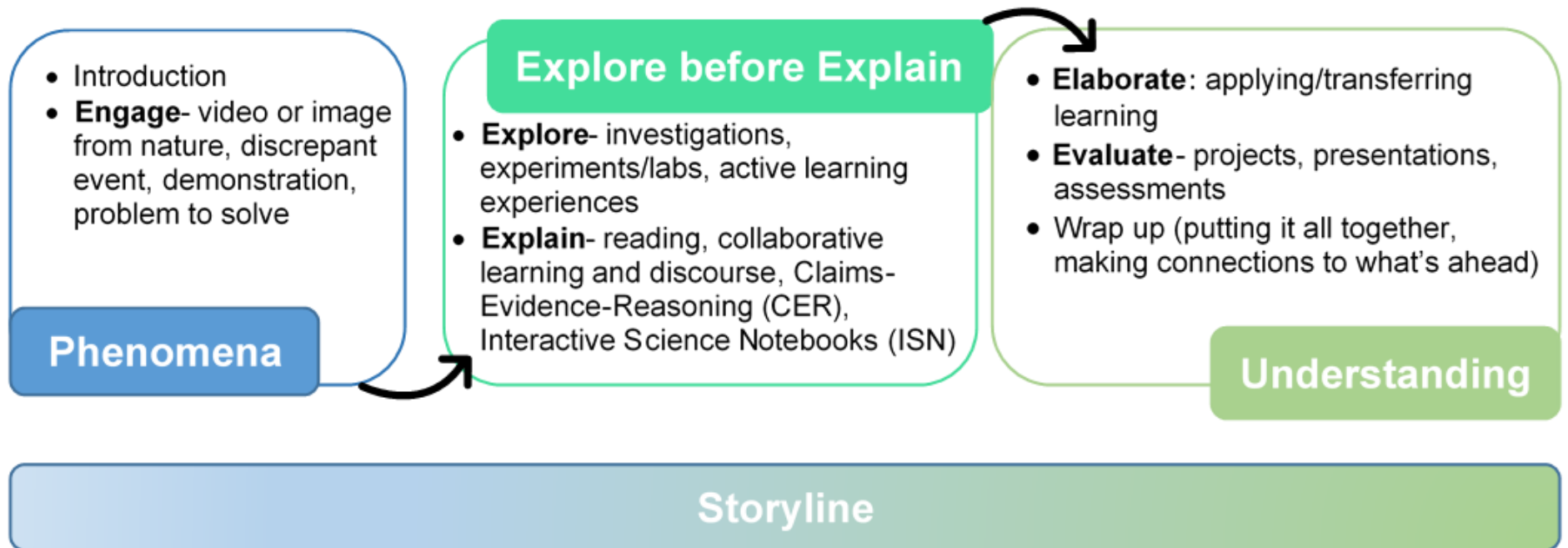
- [Think, Pair, Share or Write, Pair, Share](#)
- [Quiz, Quiz, Trade](#)
- [Stand, Share, Sit](#)
- [Sage and Scribe](#)
- [Showdown](#)
- [Rally Robin](#)
- [Placemat Consensus](#)
- [4 Corners/ Carousel/ World Café](#)

## Additional Instructional Strategies with AVID Components:

- [SOS Strategies](#) from Discovery Education
- [Fan N' Pick](#) (Inquiry and Collaboration)
- [Dueling Flipcharts](#) (Inquiry and Collaboration)
- [Inside Outside Circle](#) (Inquiry and Collaboration)
- [Snowball Fight](#): (Write/ Collaboration)
- [Rotating Role Reading](#) (Reading/ Collaboration/ Organization/ Writing)
- [3 Truths and 1 Lie](#) (Writing/ Collaboration)
- [Building Life Skills through Science Phenomena Handout](#)

## ELL Science Glossaries

- [Spanish](#)
- [Haitian-Creole](#)
- [Other Languages](#)



# Quarter 1

## Unit 0 – Introduction to Science

**Dates:** August 10 – August 16, 2023

**Time Allotted:** 5 days

### Essential Standards:

- **Self-Awareness:** The abilities to understand one’s own emotions, thoughts, and values and how they influence behavior across contexts.
- **Social Awareness:** The abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, and contexts.
- **Responsible Decision Making:** The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.
- **Self-Management:** The abilities to manage one’s emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.
- **Relationship Skills:** The abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.

### Storyline:

**Following guidelines from school site administration**, this unit is intended to be a quick overview of the most important and basic lab safety precautions that should be observed in your classroom. It should specifically address the major points of “be careful,” “ask the teacher if you’re confused,” and “tell the teacher if there is breakage or injury.” The emphasis in this unit should also be on how to be safe in the lab environment as it pertains to lab safety equipment (goggles, aprons, etc.) and how to behave appropriately in the lab. This is a chance to build relationships with your students and get them excited about science. Students should get the [lab safety contract](#) signed and return to you.

Sample ideas to build relationships between you and your students and your students with each other. Please feel free to use others.

#### [Birthday calendar](#)

- [Read all directions first](#)
- [Getting to know you puzzle](#)
- [Getting to know you cards](#)
- [Ice Breaker- Picking Stickies](#)
- [We like](#)
- [Find someone who](#)
- [Student info sheet #1](#)

#### [Student info sheet #2](#)

- [Working together](#)
- [Building a statue](#)
- [Science team crest](#)
- [Building Life Skills tree](#)
- [Table tent](#)

#### [Building Life Skills Tool kit](#)

Lab safety resources below- lab safety should be quick and not drawn out for all 5 days. It should be taught throughout the year when incorporating labs and activities. **Students do not need to be tested on lab safety.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Building Life Skills, Safety, and Equipment in Science (6 Days)</b>	<ul style="list-style-type: none"> <li>• <a href="#">Flinn Lab Safety Challenge Video:</a> Flinn Scientific Laboratory Safety Challenge allows students to witness lab procedures gone</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Gallery Walk:</a> Students can create and share safety posters</li> <li>• <a href="#">Quiz Quiz Trade: Lab Safety Concepts and Symbols Cards</a></li> </ul>	<b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• <a href="#">Lab Safety &amp; Equipment Graphic Organizers</a></li> <li>• <a href="#">Lab Safety Procedures Foldables</a></li> <li>• <a href="#">Safety Hazards of the Classroom Graphic</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Lab Safety Reading Passage:</a> A narrative story about “Ryan” and “Mr. Jones” and their day in the lab. Students identify the things that are done</li> </ul>	<b>Building Life Skills, Safety, and Equipment in Science (6 Days)</b>

	<p>awry and may make them think twice about some of their own safety shortcomings.</p>	<ul style="list-style-type: none"> <li>• <a href="#">Fan N Pick: Lab Safety Concepts and Symbols Cards</a></li> <li>• <a href="#">Rally Robin or Round Robin</a>: Teacher can propose a question or topic for students to discuss with a partner (rally) or in their group (round).</li> </ul>	<p><u>Organizer</u></p> <p><b>Videos:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Lab Safety Rap</a>: Rap song about lab safety.</li> <li>• <a href="#">Ultimate Lab Safety Video</a> (1st Half-stop after viewing the scientist in the safety shower) In the video students will observe several lab safety “mistakes.”</li> <li>• <a href="#">General Rules of Lab Safety</a> (1:48): Being safe in the lab means many things. Safe science should be practiced by wearing safety gear, following appropriate procedures, and expecting the unexpected.</li> </ul>	<p>incorrectly in the lab and decide on lab safety rules.</p>	<p>-</p>
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# Unit 1 – Physical and Chemical Properties

Dates: August 17 – September 6, 2023

Medium Priority

Time Allotted: 14 days (NWEA may be during unit)

## Essential Standards:

- **SC.912.P.8.2 (DOK 2):** Differentiate between physical and chemical *properties* of matter
- **SC.8.P.8.4 (DOK 2):** Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured: for example, density; thermal or electrical conductivity; solubility; magnetic properties; melting and boiling points; and know that these properties are independent of the amount of sample.
- **SC.8.P.8.2 (DOK 2):** Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass. (**Teach weight and mass as properties of matter only.**)
- **SC.8.P.8.3 (DOK 2):** Explore and describe the densities of various materials through measurement of their masses and volumes.
- **SC.912.N.1.1 (DOK 3):** Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.1.3 (DOK 1):** Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

## Storyline:

To begin this unit, focus on the various physical properties of matter such as mass, weight, volume, density, thermal conductivity, electrical conductivity, solubility, magnetism, melting point, and boiling point. These are the only properties you need to focus on. A deeper dive into density is needed in this unit. Students are required to be able to measure both mass and volume of objects as well as be able to USE the density formula to calculate an object's density. They should have both a conceptual and procedural understanding of density. Next, you will teach the various chemical properties such as reactivity, flammability, pH, and combustibility. These are the only properties you need to focus on. Lastly, differentiation between physical and chemical properties is needed to fully attain mastery of the standard.

Resources with a ★ are suggested.

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Physical and Chemical Properties</b> <b>SC.912.P.8.2</b> <b>SC.8.P.8.4</b> <b>Density</b> <b>SC.8.P.8.3</b> <b>(12 Days)</b>	<b>Probes:</b> ★ <b>Comparing Cubes:</b> Elicit students' ideas about intensive and extensive properties of matter. ★ <b>Boiling Time and Temperature:</b> Elicit students' ideas about the characteristic property of boiling point. ★ <b>Density – Floating Logs:</b> Elicit students' ideas	<b>Active Learning Experiences:</b> ★ <b>5E Lesson: Comparing Physical Properties:</b> <b>ADD PSH UPDATES</b> <b>File (NOS) PSH 2324</b> <b>5E Properties of Matter</b> Students will conduct an investigation in which they will discover what physical properties	<b>Interactive Notebook:</b> • <b>Graphic Organizers (general)</b> • <b>Density Interactive Notebook</b>  <b>Discovery Textbook:</b> • <b>Unit 5.1: Material Properties:</b> • ENGAGE: all except videos "Matter and Mass (1:34), "The	<b>Active Learning Experience:</b> ★ <b>Mystery Powder Investigation:</b> Students will use their skills as scientists to identify a mystery white powder. ★ <b>Crime Scene Density Lab:</b> Crime Scene Density Lab Students will learn about the practical application of	<b>Formative:</b> • <b>Graphic Organizers (general)</b> • <b>ADD file- (formative) ConceptMap PhysChemProp + NOS</b> • <b>Properties of Matter Vocabulary &amp; Concepts Cards</b> • <b>Quizizz Quiz: Properties of Matter</b>



	<p>about density and if students think changing the size of an object affects its density.</p> <ul style="list-style-type: none"> <li>• <a href="#">Density – Floating High or Low</a>: Elicit students' ideas about density and buoyancy.</li> </ul> <p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Phenomena for Physical Properties of Matter (4:07)</a> This video explains how different materials give properties different physical properties, such as color, texture, and weight.</li> <li>• <a href="#">Magnetic Slime</a>: (1:22) Magnetism-Physical Property of Matter</li> </ul>	<p>various material possess and be able to describe those different properties.</p> <ul style="list-style-type: none"> <li>★ <a href="#">ADI Lab 3 Physical Properties of Matter: What Are the Identities of the Unknown Substances</a>: <b>ADD PSH UPDATES File (NOS) PSH 2324 ADI Lab 3: Physical Properties</b> The purpose of this lab is for students to apply what they have learned about physical properties of matter to identify a set of unknown substances. <a href="#">CER Chart</a></li> <li>★ <a href="#">Solubility Lab</a>: Can you identify the unknown crystal by the amount that dissolves in water?</li> </ul> <p><b>A.C.E.S</b> <a href="#">Properties of Matter</a> <a href="#">Density</a></p> <p><b>Discovery Techbook:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Classifying with Physical Properties</a>: hands on activity to determine if materials are metals, non metals or metalloids</li> </ul>	<p>science of materials: paper ” (5:41), and “BioPlastic” (2:22)</p> <ul style="list-style-type: none"> <li>• EXPLORE: Pg 1- all except “Exploring physical char. Of minerals” activity and “Chemical Properties of Matter” reading passage (used later)</li> <li>• EXPLAIN: ALL</li> <li>• ELABORATE: ALL</li> <li>• EVALUATE: Practice quiz listed below, except #1, 2, and 4</li> <li>★ <a href="#">Unit 5.3:Density</a>: - ENGAGE: all can be used except videos “Mass and Density: Lead Balloon” (1:01), “Lead Balloon takes Flight ” (4:52), “Thermohaline Circulation” (3:56) and “Build Your Own Lava Lamp” (4:06). - EXPLORE: Pg 1- all can be used except “Osmium vs. Lithium” (:27) video segment pg 2- all can be used- focuses on size doesn't change density - EXPLAIN: ALL - ELABORATE: STEM Project Starters #2 and 3- good enrichment EVALUATE: Practice quiz listed below, except #3</li> <li>• <a href="#">Understanding Physical Properties of Matter</a>: Reading passage that identifies several physical properties of matter.</li> </ul>	<p>density measurement in the context of conducting a crime scene investigation of a break-in at the school.</p> <ul style="list-style-type: none"> <li>★ <a href="#">Density Escape Game</a></li> <li>★ <a href="#">Ocean layers lab</a>: Students investigate how salinity and temperature affect density layers in the ocean.</li> <li>★ <a href="#">Electromagnet</a>: Students will be challenged to increase the strength of an electromagnet.</li> </ul> <p><b>Discovery Techbook:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">Measurements and Materials</a></li> <li>★ <a href="#">Examining the Materials of Bridges</a></li> <li>★ <a href="#">Sustainable Materials</a></li> </ul>	<p><a href="#">and Density</a></p> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• Will be tested with mass, weight and density</li> </ul>
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Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<p><b>Mass vs Weight</b>  <b>SC.8.P.8.2</b>  <b>(2 days)</b></p>		<p><b>Active Learning Experiences:</b></p> <p><b>A.C.E.S. Mass vs Weight</b></p>	<p><b>Interactive Notebook:</b></p> <ul style="list-style-type: none"> <li>Graphic Organizers</li> </ul> <p><b>Discovery Textbook:</b></p> <p>★ <b>Unit 5.2: Mass</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL except videos “Mass: (:36) use later, “Mass” used later (4:03), “Volume and Mass” (1:23) used later and “Matter and Mass” (1:34) used later</li> <li>- EXPLORE: Pg 1- ALL pg 2- ALL pg 4- ALL</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: STEM # 2- good for enrichment</li> <li>- EVALUATE: Practice quiz listed below, except # 5</li> <li>• <b>Mass</b> (STOP at 2:00):. The segment discusses the difference between mass and weight.</li> </ul>		<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Mass, weight, density</a></li> <li>• <a href="#">Thinking Map:</a> Students will compare mass and weight using a Double Bubble map.</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Unit 2 Physical properties</a></li> <li>• <a href="#">Retake Unit 2 Physical properties</a></li> </ul>
<p><a href="#">Enrichment, Practice, Remediation Key ideas</a></p>	<p>EPR Title (All 3 levels of E.P.R. included)</p>				
<p style="text-align: center;"><a href="#">Tier 2 and 3 Intervention Resources</a></p>					

## Unit 2 – Atomic Theory and Periodic Table

Dates: September 7 – September 26, 2023

High Priority

Time Allotted: 14 days (NWEA may be during unit)

### Essential Standards:

- **SC.912.P.8.4 (DOK 3):** Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons, and electrons, and differentiate among these particles in terms of their mass, electrical charges and location within the atom.
- **SC.912.P.8.3 (DOK 3):** Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
- **SC.912.P.8.5 (DOK 2):** Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
- **SC.8.P.8.6 (DOK 1):** Recognize that elements are grouped in the periodic table according to similarities of their properties.
- **SC.912.N.1.6 (DOK 2):** Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied. *Integrate by discussing the experiments that led to the atomic theory and how inferences were drawn from those observations. Integrate by discussing the organization of the periodic table and how inferences were drawn from the observations of similarities and differences between elements.*
- **SC.912.N.3.1 (DOK 3):** Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena thus, a scientific theory represents the most powerful explanation scientists have to offer. *Integrate by discussing atomic theory and how this theory developed. Integrate by the organization of the periodic table, the study of its trends, and how new elements are discovered by following the patterns and trends of the table.*
- **SC.912.N.3.2 (DOK 2):** Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science. *Integrate by discussing atomic theory and how this theory developed through the experimentation of many scientists over hundreds of years. Integrate by discussing the organization of the periodic table and how its organization developed through the contributions of many scientists over hundreds of years.*
- **SC.912.N.3.4 (DOK 2):** Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions. *Integrate by discussing atomic theory and why it is considered a theory and not a law.*
- **SC.912.N.3.5 (DOK 2):** Describe the function of models in science, and identify the wide range of models used in science. *Integrate in terms of the atomic model and its benefits and limitations.*
- **SC.8.N.3.1 (DOK 3):** Select models useful in relating the results of their own investigations. *Students can create models of atoms and their subatomic particles. Student can analyze the benefits and limitations of historical models of the atom.*
- **SC.8.N.3.2 (DOK 3):** Explain why theories may be modified but are rarely discarded. *Students can investigate how theories can be modified through their instruction of atomic theory. Students can create models of the periodic table. Students can investigate how theories can be modified through their instruction of the periodic table.*

### Storyline:

You will begin by teaching that atoms are the basic units of matter, and those atoms are made of protons, neutrons, and electrons (electrons surrounding a nucleus containing protons and neutrons). The suggested embedded nature of science standards includes teaching models and theories. The history of the atomic model is a good way to cover these standards, (as seen below). Students should have a good understanding of how different “landmark” experiments led to our current understanding of the atomic model.

Next, you will teach an overview of how the periodic table is organized (by atomic number and general reactivity in groups and periods). Students will need information about atomic number and its significance to number of protons, neutrons, and electrons. Students will also need to know why elements have different reactivity (valence electrons), how to determine the number of valence electrons, and its relatedness to group number. Furthermore, students will have to understand electron configuration and its relationship to the element’s location on the periodic table.

Resources with a ★ are suggested.

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<p><b>Atomic Theory</b>  <b>SC.912.P.8.4</b>  <b>SC.912.P.8.3</b>  <b>(7 Days)</b></p>	<p><b>Page Keeley Probes:</b>            ★ <a href="#">Is it a Model?</a> Elicit students' ideas about models and whether students recognize that models can take a variety of forms besides physical replicas.</p> <ul style="list-style-type: none"> <li>★ <a href="#">Is it a Theory?</a> -Elicit students' ideas about the nature of science and if they understand how theories differ from laws.</li> </ul>	<p><b>Active Learning Experiences:</b>            ★ <a href="#">5E Lesson The Structure of the Atom and its Particles</a> In this lesson, the 5E model is used to teach students about the structure of an atom. Students will study the atom's subatomic particles, including their masses, electrical charges, and locations. <a href="#">CEJ Chart</a></p> <ul style="list-style-type: none"> <li>★ <a href="#">PhET Simulation/Virtual Lab: Build an Atom</a></li> <li>★ <a href="#">Atomic Theory</a> The Purpose of the lesson is to teach the students about five major atomic theories using inquiry-based learning. <a href="#">CEJ Chart</a></li> <li>★ <a href="#">A.C.E.S. Atoms Stations</a></li> </ul>	<p><b>Interactive Notebook:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">Subatomic Particles Interactive Notebook</a></li> <li>★ <a href="#">Parts of an Atom Foldable</a></li> </ul> <p><b>Discovery Textbook:</b>            ★ <a href="#">Unit 6.4: Atomic Structure and Elements:</a></p> <ul style="list-style-type: none"> <li>- ENGAGE: all except videos "Elements" (1:09), "Introduction to Chem Elements" (3:10), and "The Emergence of Chemistry" (:56)</li> <li>- EXPLORE: Pg 1 ALL pg 2- ALL</li> <li>- EXPLAIN: All</li> <li>- EVALUATE: Practice quiz except #3</li> <li>★ <a href="#">Unit 6.1: Atoms and Elements review:</a></li> <li>- ENGAGE: ALL</li> <li>- EXPLORE: pg 2 At the bottom under the video clip,</li> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Practice quiz except #5 and 6</li> <li>★ <a href="#">The Tiniest Atoms</a> (1:55) Demonstrates the miniscule size of atoms.</li> <li>★ <a href="#">Starting Off with Atoms</a> reading passage that talks about subatomic particles and atomic theory.</li> <li>★ <a href="#">Getting to Know Mass:</a> PAGE 1 reading passage about mass.  <a href="#">SPANISH VERSION</a></li> </ul>	<p><b>Active Learning Experiences:</b>            ★ <a href="#">Atoms Escape Game part 1</a>            ★ <a href="#">Atoms Escape Game part 2</a>            ★ <a href="#">Atoms Escape Game part 3</a></p> <ul style="list-style-type: none"> <li>★ <a href="#">Atomic Theory</a> The article provides a chronological description of the development of the atomic theory.</li> </ul>	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">ADD file- (formative) ConceptMap ATOMICtheory/AtomicModel and timeline activity (may want to split these up)</a></li> <li>★ <a href="#">Atoms &amp; Atomic Theory Vocabulary &amp; Concept Cards</a></li> <li>★ <a href="#">Atom True False</a></li> <li>★ <a href="#">Quizizz Quiz #2</a> Atomic Theory</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>★ Tested with Periodic Table</li> </ul>
Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate

<p><b>Periodic Table</b>  <b>SC.912.P.8.5</b>  <b>SC.8.P.8.6</b>  <b>(7 days)</b></p>	<p><b>Discovery Techbook:</b>  ★ <a href="#">The Periodic Table</a> (2:49) Elements are placed on the periodic table in order of increasing atomic number.</p>	<p><b>Active Learning Experience:</b>  ★ <a href="#">Electron Configuration of Transition Metals:</a> (3:40) Locates the transition metals on the periodic table and presents the electron configuration.  ★ ADI LAB: <a href="#">Which Properties of the Elements Follow a Periodic Trend?: CER Chart</a>  <b>ADD PSH UPDATES File (NOS) PSH 2324 ADI Lab 7: Which properties follow a periodic trend?</b></p> <p>This lab gives students an opportunity to explore the values of different properties for all elements in the periodic table to determine if they follow.</p>	<p><b>Interactive Notebook:</b>  <a href="#">Periodic Table Interactive Notebook</a>  <a href="#">Periodic Table Interactive Notebook 2</a>  <a href="http://curriculum.osceola.k12.fl.us/middle/MSED Library/Parts of an Atom Foldable.pdf">http://curriculum.osceola.k12.fl.us/middle/MSED Library/Parts of an Atom Foldable.pdf</a></p> <p><b>Discovery Textbook:</b>  ★ <a href="#">Unit 6.5: Periodic Table:</a>  - ENGAGE: ALL except “The Periodic Table” (1:09) video, “The Four Greek Elements” video, “The Periodic Table” (3:56- will be used later) video and “United States, Russia and Japan video”  - EXPLAIN: ALL  - EVALUATE: Practice quiz listed below except #1, 3, 6-10  • <a href="#">Classifying the Periodic Table</a> Reading passage about metals, nonmetals, and metalloids.</p>	<p><b>Active Learning Experiences:</b>  ★ <a href="#">Periodic table Escape game</a>  • <a href="#">Forms of the periodic table:</a> Look at the different forms of the periodic table that have been proposed.</p> <p><b>Discovery Techbook:</b>  • <a href="#">Periodic Table-Periods and Groups:</a> Presents a general overview of the periodic table and explains how elements are divided into groups, rows, and periods.  • <a href="#">Elements:</a> reading passage that talks about subatomic particles (pg 2) and Metals, Nonmetals and metalloids (pg 1)</p>	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>• <b>ADD file- (formative) ConceptMap PeriodicTrends/Atomic Model connection</b></li> <li>• <a href="#">The Periodic Table Vocabulary &amp; Concepts Cards</a></li> <li>• <a href="#">Periodic Table exit ticket</a></li> <li>• <a href="#">Quizizz Quiz #2:</a> Electron Configuration</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Unit 3 B.P.8.6 and 8.P.8.7</a></li> <li>• <a href="#">Retake Unit 3</a></li> </ul>
<p><a href="#">Enrichment, Practice, Remediation Key ideas</a></p>	<p>EPR Title (All 3 levels of E.P.R. included)</p>				
<p style="text-align: center;"><a href="#">Tier 2 and 3 Intervention Resources</a></p>					

## Unit 3 – Compounds, Mixtures, Solutions, Acids and Bases, and Prop of Water

**Dates:** September 27– October 25, 2023

**High Priority**

**Time Allotted:** 20 days (Ends in Q2)

### Essential Standards:

- **SC.912.P.8.7 (DOK 2):** Interpret formula representations of molecules and compounds in terms of composition and structure.
- **SC.8.P.8.5 (DOK 1):** Recognize that there a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
- **SC.912.P.8.11 (DOK 2):** Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
- **SC.912.L.18.12 (DOK 2):** Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
- **SC.8.P.8.8 (DOK 2):** Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
- **SC.8.P.8.9 (DOK 2):** Distinguish among mixtures (including solutions) and pure substances.
- **SC.8.N.3.1 (DOK 3):** Select models useful in relating the results of their own investigations.
- **SC.912.N.3.5 (DOK 2):** Describe the function of models in science, and identify the wide range of models used in science. *Integrate into the content by discussing how chemical formulas and electron diagrams are models and what their benefits and limitations are to the study of chemistry.*

### Storyline:

In this unit, you will begin by distinguishing between elements (already taught) and compounds. You should begin by teaching how atoms and elements combine to produce molecules and compounds (pure substances) and that the atoms are bound together with ionic and/or covalent bonds. Students should be taught some very basic properties of covalent and ionic bonds: covalent bonds occur between non-metals in which the atoms share electrons, ionic bonds occur between metals and non- metals and one atom transfers an electron to the other atom. Additionally, students need a general understanding of chemical formulas, how to “count atoms” in a chemical equation, and what a subscript and coefficient is. Students must be able to write basic ionic and covalent formulas. Finally, students must be able to predict ionic compounds based on the number of valence electrons and the ionic charge (oxidation numbers). Begin this unit by distinguishing between pure substances (elements & compounds) and the different types of mixtures: heterogeneous and homogeneous (solutions). When discussing homogeneous solutions, students need to understand the different parts of a solution (solvent and solute) as well as the concept of concentration and saturation. Next, you will teach students about pH, acidity and basicity and its relationship to the hydronium and hydroxyl ion concentration in a solution. Students need a general understanding of the characteristics of acids, bases, and salts. Finally, you will wrap up this unit by teaching students about the properties of water that help it to sustain life on Earth: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent. All of these properties are explored in depth in the “Whole New World” 5E lesson. It is highly recommended that you complete this lesson to address this concept.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Topic Name:
<b>Compounds, Mixtures And their Properties</b> <b>SC.912.P.8.7</b> <b>SC.8.P.8.5</b>	<b>Page Keeley Probes:</b> ★ <b>Chemical Bonds:</b> Elicit students’ ideas about chemical bonds. ★ <b>Is it Made of Molecule?:</b> Elicit students’ ideas	<b>Active Learning Experiences:</b> ★ <b>5E Lesson All The Small Things:</b> Students will differentiate matter into pure substances (elements and compounds) and	<b>Interactive Notebook:</b> • <b>Atoms &amp; Elements in a Chemical Equation Interactive Notebook</b> • <b>Elements and Compounds Interactive Notebook</b> <b>Molecules Foldable</b>	<b>Active Learning Experience:</b> • <b>ADI Lab 3. Rate of Dissolution: Why Do the Surface Area of the Solute, the Temperature of the Solvent, and the Amount of Agitation</b>	<b>Formative:</b> • <b>Element, compound, mixture fill in the blank</b> • <b>Element, compound, mixture, concept practice-</b>



<p><b>SC.8.P.8.9</b></p> <p><b>(13 days)</b></p>	<p>about molecules and whether students recognize that various examples of both physical and biological matter, ranging from objects to materials, can be made of molecules.</p> <ul style="list-style-type: none"> <li>• <b>Lemonade:</b> Elicit students' ideas about conservation of matter in the context of dissolving.</li> <li>★ <b>Sugar Water:</b> Elicit students' ideas about dissolving and what students think happens to sugar when it dissolves in water.</li> </ul> <p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>• <b>Element, Compound, and Mixture (3:56)</b> Students gain a better understanding of the different types of materials as pure substances and mixtures and learn to distinguish between homogeneous and heterogeneous mixtures.</li> <li>• <b>The Great Picnic Mix Up (4:10):</b> So you know that iced tea you like so much? Or that sweet soda drink? They're actually a few different things combined to make a new thing. In this episode of Crash Course Kids, Sabrina talks about all the different mixtures,</li> </ul>	<p>mixtures on a basic molecular level.. The definitions of pure substance, mixture, element, and compound will be introduced.</p> <p>★ <b>ADI Atoms in Elements and Compounds:</b> Students will use what they know about elements, compounds, and molecules to model how elements are combined to form compounds. <a href="#">CER Chart</a></p> <p><b>A.C.E.S.</b></p> <ul style="list-style-type: none"> <li>• <b>Chemical Bonds Stations,</b></li> <li>• <b>Elements, Compounds and Mixtures,</b></li> <li>• <b>Mixtures and Pure Substances (different stations than ECM)</b></li> </ul> <p><b>Discovery Techbook:</b></p> <ul style="list-style-type: none"> <li>• <b>Compounds: The Bonds that Bind:</b> Exploration that explains when two or more elements combine, they form a compound with different characteristics. Do the atoms bond together by sharing electrons or transferring electrons? <a href="#">SPANISH VERSION</a></li> <li>• <b>Molecules and Compounds</b> Exploration: What do you get when you combine highly corrosive sodium with</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Atoms &amp; Elements in a Chemical Equation Interactive Notebook</b></li> <li>• <b>Bonding Interactive Notebook</b></li> <li>• <b>Elements and Compounds Interactive Notebook</b></li> <li>• <b>Molecules Foldable</b></li> </ul> <p><b>Textbook Resources:</b></p> <p>★ <b>Unit 7.2 Compounds:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL except "Homogenous Mixtures" video segment used in explain, "Chemical Properties of Mixtures" video segment, or "Chemistry in History" reading passage, "Pizza Chemistry" reading passage used in explain.</li> <li>- EXPLORE: Pg 1- ALL</li> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Use only #1-4 and 8</li> </ul> <p>★ <b>Unit 6.4: Atomic Structure and Elements:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL except videos "Elements" (1:09), "Introduction to Chem Elements" (3:10), and "The Emergence of Chemistry" (:56)</li> <li>- EXPLORE: Pg 1- ALL</li> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Practice quiz except #3</li> </ul> <p>★ <b>Unit 6.1: Atoms and Elements review:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL</li> <li>- EXPLORE: pg 1- elements and compounds can be used, pg 2 At the</li> </ul>	<p><b>That Occurs When the Solute and the Solvent Are Mixed Affect the Rate of Dissolution?</b></p> <p>The purpose of this lab is to introduce students to the concepts of solutes, solvents, solubility, and rate of dissolution. <a href="#">CER Chart</a></p> <ul style="list-style-type: none"> <li>• <b>Introduction to Compounds</b> - How Atoms Bond Phet: Use this simulation as an introduction to molecules and compounds to help students understand that atoms are not randomly joined to form a compound/molecule, but join in very specific patterns.</li> <li>• <b>Dancing Ionic Compounds:</b> This lesson concentrates on teaching students to name and create formulas for ionic compounds with transition metals and group 1 and 2 metals.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Elements, Compounds &amp; Mixtures Vocabulary &amp; Concepts Cards</b></li> </ul> <p><b>Placemat Consensus:</b> Given a picture and description of a substance, groups will decide if that substance is an acid, base, or neutral.</p> <ul style="list-style-type: none"> <li>• <b>Quizizz Quiz #4:</b> Elements, Compounds, Solutions &amp; Mixtures</li> <li>• <b>Elements, Compounds and Mixtures - Science Quiz</b> Multiple Choice Quiz</li> <li>• <b>Elements, Compounds, Mixtures, Chemical Reactions (Quizlet)</b></li> <li>• <b>Quizizz Quiz #1:</b> Elements, Compounds, Solutions &amp; Mixtures</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• Will be assessed with Acids and Bases, and Properties of Water</li> </ul>
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	<p>solutions, and ants that can be at a picnic.</p>	<p>poisonous chlorine gas? <a href="#">SPANISH VERSION</a></p>	<p>bottom under the video clip</p> <ul style="list-style-type: none"> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Practice quiz except #5 and 6</li> <li>• <a href="#">Unit 7.1: Molecules:</a></li> <li>- ENGAGE: ALL except “Pure Carbon: The Chemistry of Diamond and Graphite” video segment, “Atoms and Molecules reading passage (used in explain) or “Molecule and Compounds” exploration (used in explore)</li> <li>- EXPLORE: Pg 1- ALL except “Molecules for Life”</li> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Practice quiz Use only #2, 4, 6 (review) and 15</li> <li>• <a href="#">Unit 6.3 Combining and Separating: Reactions:</a></li> <li>- ENGAGE: ALL except “Mixtures“ video segment used in explain, “Testing Paint Mixtures” video segment, or “How Can Matter Change” video segment</li> <li>- EXPLORE: Pg 1- ALL, pg 2- Use first paragraph and paragraph about solutions- Nothing about Colloids or Suspensions including all mixed up exploration. Nothing under “Muddy Waters” image pg 3 ALL</li> <li>- EXPLAIN: ALL</li> </ul>		
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<b>Topic Name:</b>	<b>Engage</b>	<b>Explore</b>	<b>Explain</b>	<b>Elaborate</b>	<b>Topic Name:</b>
<b>Acids and Bases</b> <b>SC.912.P.8.11</b>	<b><u>Page Keeley Probes:</u></b>	<b><u>Active Learning Experiences:</u></b> ★ <b><u>A.C.E.S. Acids and Bases.</u></b>	<b><u>Interactive Notebook:</u></b> • <a href="#">pH Interactive Notebook</a> <b><u>Discovery Textbook:</u></b>	<b><u>Active Learning Experiences:</u></b> ★ <a href="#">pH Scale</a> : In this Phet, students can test the pH	<b><u>Formative:</u></b> • <a href="#">Quizizz Quiz #2</a> : Acids, Bases, & pH

<p><b>SC.8.P.8.8</b> <b>(4 Days)</b></p>		<p><b>Discovery Techbook:</b>  ★ <u>Identifying Acids, Bases, and Neutral Solutions</u> Make predictions about the pH of common household substances and create a plan to calculate the pH of those substances.  ★ <u>Mixing Acids and Bases</u> Exploration Interactive- Conduct chemical reactions in this simulation. How are ions transferred between acids and bases?</p>	<p>★ <u>Unit 7.3 Acids and Bases:</u>  - ENGAGE: ALL except “Acids and Bases in our Lives” video segment used in explain, “Aspirin” video segment, “Vinegar” video segment or anything about Ions.  - EXPLORE: Pg 1- ALL, under chart to above Fast Food Chemistry is Honors pg 2- ALL  - EXPLAIN: ALL</p>	<p>of several substances and visualize hydronium, hydroxide, and water molecules in solution by concentration or the number of molecules.</p>	<p><b>Summative:</b> Will be assessed with Properties of water</p>
<p><b>Topic Name:</b></p>	<p><b>Engage</b></p>	<p><b>Explore</b></p>	<p><b>Explain</b></p>	<p><b>Elaborate</b></p>	<p><b>Topic Name:</b></p>
<p><b>Properties of Water</b> <b>SC.912.L.18.12</b> <b>(3 Days)</b></p>	<p><b>Phenomena:</b>  • <u>Properties of Water:</u> (6:49) Amoeba sisters explain the properties of water</p>	<p><b>Active Learning Experiences:</b>  ★ <u>5E Lesson A Whole New World:</u> Students will gain an understanding that water is unlike other liquids in the way that it moderates temperature, in its cohesive strength, in its ability to expand upon freezing, in its pH neutrality, and in its designation as the "universal solvent."   Stations- not in A.C.E.S. format  ★ <u>Properties of Water</u></p>	<p><b>Interactive Notebook:</b>  • <u>Properties of Water Interactive Notebook</u>   <b>Video:</b>  ★ <u>How Polarity Makes Water Behave Strangely:</u> (3:51) Ted Talk. Explains why water is unique due to the effects of polarity.</p>	<p><b>Active Learning Experiences:</b>  ★ <u>Water and Life:</u>(10:44) Paul Anderson begins with a brief description of NASA discoveries related to Mars, Mercury and water.  ★ <u>Life's Little Essential:</u> This NOVA informational text resource is intended to support reading in the content area.</p>	<p><b>Formative:</b>  • <u>Properties of Water Interactive Notebook</u>  • <u>Quizizz Quiz #3: Properties of Water</u>   <b>Summative:</b>  • Unit 3 Assessment  • RETAKE Unit 3</p>
<p><u>Enrichment, Practice, Remediation Key ideas</u></p>	<p>E.P.R. Title (All 3 levels of E.P.R. included)</p>				
<p style="text-align: center;"><u>Tier 2 and 3 Intervention Resources</u></p>					

## Quarter 2

### Unit 4 – Physical and Chemical Changes in Matter

Dates: October 26 – November 17, 2023

Medium Priority

Time Allotted: 16 days

#### Essential Standards:

- **SC.912.P.8.2 (DOK 2)**: Differentiate between physical and chemical **changes** in matter.
- **SC.912.P.8.1 (DOK 2)**: Differentiate among the four states of matter
- **SC.912.P.12.11 (DOK 2)**: Describe phase transitions in terms of kinetic molecular theory.
- **SC.912.P.10.4 (DOK 3)**: Describe heat as the energy transferred by convection, conduction, and radiation, and **explain the connection of heat to change in temperature or states of matter.** (Energy transformation will be focused more in depth LATER)
- **SC.912.P.10.5 (DOK 2)**: Relate temperature to the average molecular kinetic energy.
- **SC.912.P.11.1 (DOK 3)**: Interpret the behavior of ideal gases in terms of kinetic molecular theory
- **SC.7.P.11.1 (DOK 1)**: Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
- **SC.8.P.9.1 (DOK 3)**: Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
- **SC.912.N.1.1 (DOK 3)**: Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.1.3 (DOK 1)**: Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

#### Storyline:

Begin this unit by identifying that matter can undergo physical changes such as by changing color, shape, size, temperature, or state. Next, focus in on the different states of matter (solid, liquid, gas, and plasma) and how these states differentiate in terms of particle movement and spacing. Relate particle movement to the kinetic theory of matter and dive deeper into the behavior of gases. In general, students need to understand how changes in temperature, pressure, and volume impact gases but they DO NOT need to know all the names of the laws nor do they need to work out math formulas nor memorize those formulas. Elaborate on how temperature affected the kinetic energy in matter and relate this back to states of matter and phase changes. Students need to know how particle movement is related to kinetic energy and the impact of adding or removing energy from a system in terms of phase changes. They should fully understand the processes of melting, freezing, condensation, evaporation/vaporization, sublimation, and deposition. Next, you will teach students about evidence of chemical changes such as color change (differentiate this from physical color change), temperature change (differentiate this from physical temperature change), production of a gas (bubbles), production of an odor, and production of a precipitate (a solid). Students need to understand that chemical changes alter and rearrange the atoms in substances and are not easily reversible (if at all). You will make a clear differentiation of chemical and physical changes. Finally, students must understand that during a physical or chemical change, the Law of Conservation of Mass is observed. This is best demonstrated through experimentation.

Resources with a ★ are suggested.

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Physical and Chemical Changes</b> <b>SC.912.P.8.2</b> <b>(3 Days)</b>	<b>Page Keeley Probe:</b> ★ <a href="#">Is It a Solid?</a> : Elicit students' ideas about solids. The probe is designed to reveal the macroscopic and/or microscopic properties students use to decide whether a material is a solid.	<b>Active Learning Experiences:</b> ★ <a href="#">ADI Lab 1 Chemical and Physical Changes:</a> LESS Materials than one below. They will determine what evidence supports a physical or chemical change. <a href="#">CEJ sentence frames</a> <a href="#">CER Chart</a> ★ <a href="#">ADI Lab 2 Chemical and Physical Changes: What Set of Rules Should We Use to Distinguish Between Chemical and Physical Changes in Matter?</a> The purpose of this lab is to <b>introduce</b> students to the types of changes that matter can undergo. <a href="#">CER Chart</a>	<b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li><a href="#">Chemical &amp; Physical Changes Interactive Notebook</a></li> </ul> <b>Discovery Techbook:</b> <ul style="list-style-type: none"> <li>★ <a href="#">Unit 7.5: Chemical Reactions:</a> <ul style="list-style-type: none"> <li>- ENGAGE: ALL</li> <li>- except "Heat" video segment, or "Deep Sea" video segment</li> <li>- EXPLORE: Pg 1- ALL</li> <li>- under Fizz, Foam and Flames don't need valence electrons pg 2</li> <li>- Use Top paragraph- Law of conservation of mass, Video segment "Signs of Chemical reactions " 1 min only.</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: STEM Project Starters #1</li> <li>- EVALUATE: Practice quiz use only #3 and 8</li> </ul> </li> <li>★ <a href="#">At a Glance Chemistry:</a> Discusses chemical and physical changes relating it to a backyard cookout. <a href="#">SPANISH VERSION</a></li> </ul>	<b>Active Learning Experiences:</b> <ul style="list-style-type: none"> <li>★ <a href="#">Physical and Chemical changes Escape Game1</a></li> <li>★ <a href="#">Physical and Chemical changes Escape Game 2</a></li> <li>★ <a href="#">Physical and Chemical changes Escape Game 3</a></li> </ul>	<b>Formative:</b> <ul style="list-style-type: none"> <li>★ <a href="#">Quizizz Quiz #1: Chemical vs Physical Changes</a></li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• Will be assessed with Law of Conservation of Mass and 4 states of Matter.</li> </ul>
Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Law of Conservation of Mass</b> <b>SC.8.P.9.1</b> <b>(2 days)</b>	<b>Page Keeley Probes:</b> ★ <a href="#">Cookie Crumbles:</a> The probe is specifically designed to find out whether students believe there will be a change in weight when a whole object is broken up into many small pieces.	<b>Active Learning Experiences:</b> ★ <a href="#">5E Lesson Maintaining Mass:</a> Students will then explore a modified version of the experiment to determine ways that the teacher demonstration should have been changed to show	<b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• Graphic Organizers</li> </ul> <b>Discovery Textbook:</b> <ul style="list-style-type: none"> <li>★ <a href="#">What is the Conservation of Matter</a> (4:34 ) Reports that the law of the conservation of matter states that, during a chemical reaction, matter is</li> </ul>	<b>Active Learning Experience:</b> ★ <a href="#">ADI Lab 4 Conservation of Mass: How does the total mass of the substances formed as a result of a chemical change compare with the total mass of the</a>	<b>Formative:</b> <ul style="list-style-type: none"> <li>★ <a href="#">SOS strategy (DE resource): "Three Truths and a Lie" about the Law of Conservation of Mass</a></li> </ul> <b>Summative:</b> <ul style="list-style-type: none"> <li>• <a href="#">Unit 4 Test</a></li> </ul>

	<p>★ <b>Ice Cubes in a Bag:</b> Elicit students' ideas about conservation of matter in the context of substances and change in state and whether students believe there will be a change in mass when ice changes to liquid water.</p> <ul style="list-style-type: none"> <li>★ <b>Burning Paper:</b> The probe is designed to find out if students think the mass changes as paper burns inside a closed system.</li> <li>★ <b>Nails in a Jar:</b> Elicit students' ideas about conservation of matter during a chemical change (oxidation).</li> </ul> <p><b>Phenomena:</b>  <b>Burning iron wool and change in mass:</b> (1:29) This is an excellent phenomenon to discuss chemical reactions and the conservation of mass.</p>	<p>conservation of mass effectively.</p> <p>★ <b>PhET Reactants, Products and Leftovers Simulator:</b> Create your own sandwich and then see how many sandwiches you can make with different amounts of ingredients.</p>	<p>neither created nor destroyed and the total mass of the reactants must equal the mass of the products.</p> <p><b>Law of conservation of mass animation:</b> In a closed system, a physical process such as applying heat may change the form of a substance.</p>	<p><b>original substances?</b>  The purpose of this lab is for students to <b>apply</b> what they have learned about atoms and chemical change to determine if mass is conserved during a chemical reaction. <a href="#">CER Chart</a></p> <p>★ <b>PhET Reactants, Products and Leftovers Simulator:</b> Create your own sandwich and then see how many sandwiches you can make with different amounts of ingredients.</p> <p>★ <b>Hands on Activity: Conservation of Mass in Chemical Reactions:</b> In this activity, you will use attachable beads to model a chemical reaction and relate the model to conservation of mass.</p>	
<b>Topic Name:</b>	<b>Engage</b>	<b>Explore</b>	<b>Explain</b>	<b>Elaborate</b>	<b>Evaluate</b>
<p><b>4 States of Matter, Phase Transitions, Heat Change, Molecular Kinetic Energy, Gases</b>  <a href="#">SC.912.P.8.1</a>  <a href="#">SC.912.P.12.11</a>  <a href="#">SC.912.P.10.4</a>  <a href="#">SC.7.P.11.1</a>  <a href="#">SC.912.P.10.5</a></p>	<p><b>Page Keeley Probes:</b></p> <p>★ <b>Floating Balloon:</b> The purpose of this assessment probe is to elicit students' ideas about the mass of a gas.</p> <p>★ <b>Hot and Cold Balloons:</b> The purpose of this assessment probe is to elicit students' ideas about conservation of matter.</p>	<p><b>Active Learning Experiences:</b></p> <p>★ <b>5.E Lesson States and Phases of Matter:</b> The student will collect and analyze data on the kinetic energy of molecules through the different states of matter. <b>DOES NOT INCLUDE PLASMA</b></p> <p>★ <b>ADI Lab 1 Thermal Energy and Matter:</b> <a href="#">What Happens at the</a></p>	<p><b>Interactive Notebook:</b></p> <ul style="list-style-type: none"> <li>Graphic Organizers</li> </ul> <p><b>Discovery Techbook:</b></p> <p>★ <b>Unit 5.4: States of Matter:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL except videos "The states of Matter" (2:40) used later, "Solid, Liquid, Gas" (6:24) used later and "Liquid Nitrogen: States of Matter" (5:56).</li> <li>- EXPLORE: Pg 1- ALL pg 2- ALL pg 3- ALL -</li> </ul>	<p><b>Active Learning Experiences:</b></p> <p>★ <b>Gas Laws:</b> This is a "gold star" lesson plan that incorporates the virtual manipulative "Gas Properties".</p> <p>★ <b>PhET Gas Properties:</b> This virtual manipulative allows you to investigate various aspects of gases through virtual experimentation</p>	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>★ <b>Quizizz Quiz #2: Chemical Changes and Reactions</b></li> <li>★ <b>Blooket Chemical Change: Chemical changes, chemical vs physical change, rate of reaction</b></li> <li>★ <b>Quizizz Quiz #3: Phase Changes</b></li> <li>★ <b>Quizizz Quiz #4: Law of Conservation of Mass</b></li> </ul>

<p><b>SC.912.P.12.10</b> <b>(10 Days)</b></p>	<p>★ <b>Is it Melting?</b> The probe is designed to find out if students recognize melting as a change in state from solid to liquid that involves one substance or if they confuse it with other physical changes, such as dissolving, that involve two substances.</p> <p>★ <b>What's in the Bubbles:</b> The probe is designed to find out if students recognize that the bubbles formed when water boils are the result of liquid water changing into water vapor.</p> <p><b>Phenomena:</b></p> <p>★ <b>Four States of Matter in Welding</b>(4:48): A welder wields a plasma torch to cut solid metal like a hot knife through butter. It's one-stop shopping to see all four states of matter.</p>	<p><b>Molecular Level When Thermal Energy Is Added to a Substance?</b> The purpose of this lab is to <b>introduce</b> students to the relationship between kinetic energy, thermal energy, and the states of matter. <b>CER Chart</b></p> <p>★ <b>Temperature and Chemical Reactions:</b> In this lesson students will investigate how temperature influences chemical reactions.</p> <p>★ <b>Modeling the Kinetic Theory:</b> In the end, students should have a firm grasp of how matter's behavior is changed when its structure is changed during phase transitions.</p> <p>★ <b>Timing is Everything for Reactions:</b> This predict, observe, and explain lesson allows students to investigate the influence of temperature on the rate of reactions.</p> <p>★ <b>Boyle's Law:</b> Through this hands-on activity, students will be able to identify the behavior of gases and the relationship between pressure and volume (Boyle's Law), volume and temperature (Charles' Law), and pressure and temperature (Gay-Lussac's Law).</p>	<p>focuses on changes in matter pg 4- ALL pg 5- ALL pg 6- ALL</p> <ul style="list-style-type: none"> <li>- EXPLAIN: ALL</li> <li>- EVALUATE: Practice quiz</li> </ul> <p>★ <b>Unit 6.2: Changes in state:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: Start at "What do you already know about changes in states?" Under videos</li> <li>- EXPLORE: Pg 1- ALL pg 2- ALL pg 3 ALL</li> <li>- EXPLAIN: ALL ELABORATE: STEM Project Starters #1 and 2</li> <li>- EVALUATE: Practice quiz except #1, 2, 7 and 10</li> </ul> <ul style="list-style-type: none"> <li>• <b>Rates of Chemical Reactions</b> (first :40 only): Video segment that has a great example of how temperature affects reaction rate.</li> <li>• <b>Chemical Reactions:</b> (1:38) Video segment that Demonstrates different methods of observing and documenting chemical changes.</li> <li>• <b>Signs of Chemical Reactions</b> (1 min only): gives indicators of chemical reactions</li> <li>• <b>Plasma</b> reading passage about the fourth state of matter.</li> <li>• <b>An Almanac of Matter Facts</b> - reading passage about all 4 states of matter.</li> </ul>	<p>★ <b>Hot on the Trail Investigations:</b> Investigate how temperature affects the rate of chemical reactions.</p> <p><b>Discovery Techbook:</b></p> <p>★ <b>Chemical reactions:</b> How do elements determine the color of fireworks?</p> <p>★ <b>Chemical Reactions:</b> What type of chemical reaction is used to prepare MREs for soldiers?</p>	<ul style="list-style-type: none"> <li>• <b>Discovery Techbook</b> Gas Laws &amp; Kinetic Theory</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• <b>Unit 4 Assessment</b></li> </ul>
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			<ul style="list-style-type: none"> <li>• <a href="#">Crash Course Physics Kinetic Theory and Phase Changes</a>: (9:09)</li> </ul>		
<a href="#">Enrichment,</a> <a href="#">Practice,</a> <a href="#">Remediation</a> <a href="#">Key ideas</a>	E.P.R. Title (All 3 levels of E.P.R. included)				
<a href="#">Tier 2 and 3 Intervention Resources</a>					

## Unit 5 – Chemical Reactions

**Dates:** November 27 – December 15, 2023

**Low (No) Priority**

**Time Allotted:** 15 days (NWEA during this unit)

### Essential Standards:

- **SC.912.P.8.8 (DOK 2):** Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
- **SC.912.P.12.12 (DOK 3):** Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.
- **SC.912.P.10.6 (DOK 3):** Create and interpret potential energy diagrams, for example: **chemical reactions**, orbits around a central body, motion of a pendulum. (catalyst affects)
- **SC.912.P.10.7 (DOK 2):** Distinguish between endothermic and exothermic chemical processes.
- **SC.912.N.1.1 (DOK 3):** Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.1.3 (DOK 1):** Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

### Storyline:

Begin this unit by recollecting acids and bases from the previous unit and how, when combined, it produces a neutral solution. This is an acid-base neutralization reaction. This can begin your discussion of the different types of chemical reactions and what characterizes each of them (what is happening in each reaction that you would be able to identify it). If possible, having students investigate each reaction through lab experience as well as see the reactions in writing is ideal. Students DO NOT have to balance reactions nor do they have to predict the products of a reaction. Next, students will need to explain how factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction. Again, this is best learned through investigation and hands-on opportunities. These can all be related back to kinetic theory of matter and how the particles in the solution are interacting for a better conceptual understanding. As it pertains to potential energy diagrams, students should understand what a catalyst does to lower the activation energy of a reaction.

Last, students will learn what an endo- and exothermic reaction is so that they can distinguish between the two. Again, this is best experienced through hands-on investigation and simple reactions with baking soda and vinegar or yeast and peroxide can yield measurable temperature decreases and increases, respectively. Additionally, students should understand the potential energy diagrams for endo and exothermic reactions such that in an endothermic reaction, the energy of the products is greater than the energy of the reactants and in an exothermic reaction, the energy of the products is lower than the energy of the reactants.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
Types of Reactions <b>SC.912.P.8.8</b>	<b>Phenomena:</b> ★ <a href="#">Chlorine &amp; Coke Chemical Reaction (0:48)</a> Quick demonstration of a	<b>Active Learning Experiences:</b> ★ <a href="#">5E Lesson – What is a chemical reaction?</a> Students will be able to	<b>Interactive Notebook:</b> • <a href="#">Chemistry Interactive Notebook</a> <b>Discovery Techbook:</b> ★ <a href="#">Unit 7.4:Chemical</a>	<b>Active Learning Experience:</b> ★ <a href="#">Precipitation Reaction Systems:</a> Precipitation reactions occur when	<b>Formative:</b> • <a href="#">Quizizz Quiz #1:</a> Types of Chemical Reactions <b>Summative:</b>

<p><b>(7 Days)</b></p>	<p>reaction used to engage students before talking about types of reactions.</p> <p>★ <a href="#">Potassium Permanganate &amp; Glycerin Reaction (1:02)</a> Another quick demonstration of a reaction used to engage students before talking about types of reactions.</p>	<p>explain that for a chemical reaction to take place, the bonds between atoms in the reactants are broken, the atoms rearrange, and new bonds between the atoms are formed to make the products.</p> <p>★ <a href="#">Behind the Scenes with Double-Replacement Reactions:</a> In this lesson plan the students will engage in a laboratory experiment that requires them to identify the precipitate that forms when two aqueous solutions react together.</p>	<p><b>Reactions:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ALL except "Heat" video segment, or "Deep Sea" video segment</li> <li>- EXPLORE: Pg 1- ALL, under Fizz, Foam and Flames don't need valence electrons pg 2- ALL pg 3 ALL</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: STEM Project Starters #1</li> <li>- EVALUATE: Practice quiz, Use only #3 and 8</li> <li>• <a href="#">Chemical Reactions:</a> Reading passage that describes how Chemical reactions are changes that occur when atoms, ions, or molecules interact.</li> <li>• <a href="#">Signs of Chemical Reactions:</a> (3:53) Video segment that describes chemical reactions.</li> </ul>	<p>cations and anions of aqueous solutions combine to form an insoluble ionic solid, called a precipitate.</p> <p>★ <a href="#">Captured: The Moment Photosynthesis Changed the World:</a> This article discusses how geologists have made an important discovery about the origins of photosynthesis which has to do with oxidized manganese.</p> <p>★ <a href="#">What is Chemiluminescence?:</a> A reaction that gives off light but not heat-interesting article and C-Palms gives text-dependent questions students can use.</p>	<ul style="list-style-type: none"> <li>• Will be assessed with Reaction Rates</li> </ul>
<p><b>Topic Name:</b></p>	<p><b>Engage</b></p>	<p><b>Explore</b></p>	<p><b>Explain</b></p>	<p><b>Elaborate</b></p>	<p><b>Evaluate</b></p>
<p><b>Reaction Rate, Affected by and Endo/Exo Thermic</b>  <b>SC.912.P.12.12</b>  <b>SC.912.P.10.6</b>  <b>SC.912.P.10.7</b>  <b>(8 days)</b></p>	<p><b>Phenomena:</b></p> <p>★ <a href="#">Mythbusters- Cola's Corrosive Qualities (1:16)</a>- PART 1 How strong of an acid is Cola? Pennies, teeth, and steak are placed in beakers of acid and beakers of Cola and are compared to see just how corrosive Cola can be.</p> <p>★ <a href="#">Mythbusters- Cola's Corrosive Qualities (2:43)</a> PART 2 How strong of an acid is Cola? Pennies, teeth, and steak are placed in beakers of acid and</p>	<p><b>Active Learning Experiences:</b></p> <p>★ <a href="#">Reactions Rates:</a> This PHET virtual manipulative will allow you to explore what makes a reaction happen by colliding atoms and molecules.  <a href="#">Let's Get It Started:</a> Chemical Reaction Rates: This one-day investigation begins with a teacher demonstration that introduces students to the nature of catalysts and how they influence chemical reaction rates.</p>	<p><b>Interactive Notebook:</b>  <a href="#">Science Graphic Organizers (general)</a></p> <p><b>Discovery Techbook:</b></p> <p>★ <a href="#">How to speed up chemical reactions:</a> (4:55) This Ted Talk The complex systems of high school dating and chemical reactions may have more in common than you think.</p> <p>★ <a href="#">Catalysts</a> (:43) Video segment that discusses how Catalysts act to speed up or slow down the rate of chemical change in a reaction.</p> <p>★ <a href="#">Potential energy</a></p>	<p><b>Active Learning Experience:</b></p> <p>★ <b>Chemistry Escape Room (summative):</b>  <a href="#">Teacher Notes;</a>  <a href="#">Student Reference Sheet;</a>            Station Cards  <a href="#">Large</a> or <a href="#">Small;</a>  <a href="#">Student Recording Sheet;</a>  <a href="#">Escape Certificates;</a>  <a href="#">Editable Cards</a></p> <p>★ <a href="#">The Science and Math Behind Sour Fizzy Candy:</a> Master candymaker Wes Raley</p>	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Quizizz Quiz #2:</a> Potential Energy Diagrams/Endo &amp; Exothermic Reactions</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• Unit 5 Assessment</li> </ul>

	<p>beakers of Cola and are compared to see just how corrosive Cola can be.</p>		<p><b>diagrams:</b> Video focuses on potential energy diagrams for endothermic and exothermic reactions.</p> <p>★ <b>Endothermic and Exothermic Reactions</b> (:55) Heat is given off in an exothermic reaction; heat is absorbed in an endothermic reaction; the temperature of the surroundings decreases in an endothermic reaction.</p> <p>★ <b>The Role of Energy in Chemical Reactions:</b> (1:21) All chemical reactions involve energy. A chemical reaction that releases energy is called exothermic, and one that absorbs energy is called endothermic.</p>	<p>describes the process and science behind making sour fizzy.</p>	
<p><a href="#">Enrichment, Practice, Remediation Key Ideas</a></p>	<p>E.P.R. title- (All 3 levels of E.P.R. included)</p>				
<p style="text-align: center;"><a href="#">Tier 2 and 3 Intervention Resources</a></p>					

# Quarter 3

## Unit 6 – Forces

**Dates:** January 3 – January 18, 2024

**High Priority**

**Time Allotted:** 11 days

**Essential Standards:**

- **SC.912.P.10.10 (DOK 2):** Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
- **SC.912.P.12.4 (DOK 2):** Describe how the gravitational force between two objects depends on their masses and the distance between them.
- **SC.6.P.13.1 (DOK 2):** Investigate and describe types of forces, including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
- **SC.8.P.8.2 (DOK 2):** Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
- **SC.912.N.1.1 (DOK 3):** Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.3.3 (DOK 2):** Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
- **SC.912.N.3.4 (DOK 2):** Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions. ***Application & integration of these NOS standards within the context of forces and momentum include conducting experiments with different types of forces with manipulation of variables, and specific discussion about laws and how they are different than theories in the context of the Law of Universal Gravitation.***

**Storyline:**

***We've left some time in this unit so that you can re-teach classroom and school expectations after returning from winter break.*** To begin this unit the students should first investigate different types of forces, including contact and non-contact forces such as electrical force, magnetic force, and gravitational force. Make a point to identify as electrical and magnetic as “electromagnetic” and identify this with gravitational as TWO of the FOUR fundamental forces. The two nuclear forces should also be touched upon (will be discussed in more depth in nuclear chemistry unit) and students should have a good understanding of the relative magnitude (strength and distance) of these four forces. Next, students will learn how to differentiate between weight and mass and relate weight to gravitational force. Finally, students will understand that gravity is exerted by all objects that have mass and be able to recognize how the Law of Universal Gravitation relates mass and distance between two or more objects to gravitational force.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
	<b>Page Keeley Probes:</b> ★ <b>A World without Friction:</b> The purpose of this probe is to examine	<b>Active Learning Experience:</b> ★ <b>Fundamental Forces Card Sort</b>	<b>Interactive Notebook:</b> • <b>Forces and Motion Interactive Notebook</b> Discovery Techbook:	<b>Active Learning Experience:</b> ★ <b>Forces Escape Game</b>	<b>Formative:</b> • <b>Quizizz Quiz #1: Forces</b> • <b>Quizizz Quiz #2</b>

<p><b>Types of Forces</b>  <b>SC.912.P.10.10</b>  <b>SC.6.P.13.1</b>  <b>(7 Days)</b></p>	<p>students' ideas about an imaginary frictionless environment and reveal students' ideas about the effect of friction on motion.</p> <ul style="list-style-type: none"> <li>★ <b>Can Magnets Push or Pull Without Touching?</b> Elicit students' ideas about <b>magnetic force</b> and if whether students recognize that magnets can push (repel) or pull (attract) certain objects at a distance without touching the object.</li> <li>★ <b>Do the Objects Need to Touch?:</b> Elicit students' ideas about <b>electric forces</b> and if students recognize that electric forces can act at a distance without direct contact.</li> <li>★ <b>Does it Have to Touch?:</b> The purpose of this assessment probe is to elicit beginning ideas about <b>types of forces</b> and if students recognize that forces can act both in direct contact with an object and at a distance.</li> <li>★ <b>Talking About Forces:</b> The purpose of this assessment probe is to elicit beginning ideas about <b>forces</b> and if students generally identify forces as pushes and pulls.</li> </ul> <p><b>Phenomena:</b></p> <ul style="list-style-type: none"> <li>• <b>Phenomena for Forces (5:27)</b> Five cool physics tricks,</li> </ul>	<ul style="list-style-type: none"> <li>★ <b>Electromagnetic Interactive:</b> Investigate Faraday's law and how a changing magnetic flux can produce a flow of electricity. The Exploration demonstrates what happens when a magnet moves through an electric coil and how its movement affects the brightness of the bulb, as well as the magnitude and sign of the voltage.</li> <li>★ <b>5E Lesson To Pull or Not To Pull:</b> Students will participate in a tug of war game while exploring contact forces.</li> <li>★ <b>Monster Truck Pull:</b> Exploration Powerful forces are in action at this monster truck pull. <b>SPANISH VERSION</b></li> <li>★ <b>Hands on Activity Marble Madness:</b> In this activity, you will demonstrate how unbalanced forces affect the speed and direction of an object's motion.</li> <li>★ <b>ADI LAB 8- Force and Motion: How Do Changes in Pulling Force Affect the Motion of an Object?:</b> The purpose of this lab is to <b>introduce</b> students to the relationship between the force acting on an object and the resulting motion of</li> </ul>	<p><b>Unit 1.2 Interaction of Force and Mass:</b></p> <ul style="list-style-type: none"> <li>- ENGAGE: ONLY Classifying Forces and below can be used.</li> <li>- EXPLORE: Pg 1- ALL pg 2- ALL</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: STEM project starters #1</li> <li>★ <b>Nuclear Forces (2:11)</b> Examines the four fundamental forces acting upon Earth. The video takes a look at the nuclear forces: the strong force and weak force.</li> <li>★ <b>Reviewing Fundamental Forces (4:19)</b> Video segment that depicts the properties and characteristics of the four fundamental forces: gravity, electromagnetic force, strong nuclear force, and weak nuclear force.</li> <li>• <b>Newton's Law of Universal Gravitation (:39)</b> Animation that depicts Newton's Law of universal gravitation.</li> <li>• <b>Contact and Non-Contact Force: (3:03)</b> Reveals that contact forces are those that physically touch an object and non-contact forces act without physical contact.</li> </ul>	<p><b>Discovery Techbook:</b></p> <ul style="list-style-type: none"> <li>• <b>Weight on Different Planets:</b> Enrich student's thinking with activity</li> <li>• <b>The Penny Myth (2:09)</b> What would happen if someone dropped a penny from the top of the Empire State Building?</li> <li>• <b>A Force is a Push or Pull (2:02):</b> Jared uses balloons to show us that a force is a push or pull. He also explains that the force of air is what makes a jet take-off.</li> </ul>	<p><b>Weight, Mass &amp; Gravity</b></p> <ul style="list-style-type: none"> <li>• <b>Blooket Forces:</b> All content covered</li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Will be assessed with Mass and Weight and Law of Gravity</li> </ul> </li> </ul>
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	<p>but how do they work?</p> <ul style="list-style-type: none"> <li>• <a href="#">Explained: 5 Fun Physics Phenomena (6:10)</a> Five cool physics tricks, but how do they work?</li> <li>• <a href="#">Frank Gregore introduction to Physics (3:57)</a>: Full HD powerful video choreographed to dramatic music, introducing students to the amazing subject of Physics.</li> </ul>	<p>that object.</p> <ul style="list-style-type: none"> <li>★ <a href="#">5E Lesson Levitation Engineers Exploring Forces</a>: Students will experiment with magnets to identify magnetic properties and the differences between contact and non-contact forces.</li> <li>★ <a href="#">PhET Forces and Motion Simulation</a></li> </ul>			
<b>Topic Name:</b>	<b>Engage</b>	<b>Explore</b>	<b>Explain</b>	<b>Elaborate</b>	<b>Evaluate</b>
<p><b>Law of Gravity, Mass vs Weight</b>  <b>SC.912.P.12.4</b>  <b>SC.8.P.8.2</b>  <b>(4 days)</b></p>	<p><b>Page Keeley Probes:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">What Will Happen to the Weight?</a>: The purpose of the assessment probe is to elicit students' ideas about <b>weight</b>.</li> <li>★ <a href="#">Why Things Fall</a>: Elicit students' ideas about <b>falling objects</b> and if students recognize the role of mass and forces in understanding why heavy and light objects can fall at the same rate.</li> <li>★ <a href="#">Apple on the Ground</a>: Elicit students' ideas about <b>gravity</b> and if students recognize that gravitational force is a pull by the Earth, toward the Earth, regardless of whether an object is falling or is stationary.</li> <li>★ <a href="#">Gravity Rocks!</a>: Elicit students' ideas about <b>gravity and if</b> students recognize that objects</li> </ul>	<p><b>Active Learning Experiences:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">ADI LAB 6 - Strength of Gravitational Force</a>: How Does the Gravitational Force That Exists Between Two Objects Relate to Their Masses and the Distance Between Them?: The purpose of this lab is to <b>introduce</b> students to the relationship between mass, distance, and the strength <a href="#">CEJ Chart</a></li> <li>★ <a href="#">Hands on Activity: Mass and Gravity</a>: In this activity, you will explore whether you can scientifically prove Newton's law of universal gravitation.</li> <li>★ <a href="#">Lose Weight Without Dieting</a>: In this Exploration you</li> </ul>	<p><b>Interactive Notebook:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Mass vs. Weight Interactive Notebook</a></li> </ul> <p><b>Discovery Textbook:</b></p> <ul style="list-style-type: none"> <li>★ <a href="#">Newton's Laws: Unit 1.4</a> YOU WILL NOT BE TEACHING NEWTON'S LAWS IN THIS UNIT- ONLY USING A SMALL PART 5E</li> <li>- ENGAGE: All can be used except "Dynamite Jail Break" video segment, "Paper Strength: Newton's Laws" video segment and "G whiz: The Physics of a Stunt Pilot" video segment.</li> <li>- EXPLORE: Pg 1- 1<sup>st</sup> paragraph only pg 2- ALL text</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: STEM Project Starters #1 -</li> <li>★ <a href="#">Unit 1.3 Gravity</a>: ENGAGE: All except</li> </ul>	<p><b>Active Learning Experiences:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Crash Course Kids - Gravity (3:11)</a>: So, if gravity pulls everything down, then why don't things on the bottom of the Earth get pulled down into space</li> <li>• <a href="#">Mass vs Weight (4:46)</a>: Eureka! explains the difference between weight and mass, and shows how only mass is the same on the moon and on the earth.</li> </ul>	<p><b>Formative:</b></p> <ul style="list-style-type: none"> <li>•</li> </ul> <p><b>Summative:</b></p> <ul style="list-style-type: none"> <li>• Unit 6 Assessment</li> </ul>



	<p>closest to the center of Earth's mass experience the greatest gravitational force. The probe also reveals whether students confuse energy of position (potential energy) with gravitational force.</p>	<p>will weigh a bowling ball in different locations.  <a href="#">SPANISH VERSION</a>  ★ <a href="#">Moon- Earth Pinball</a> Interactive that shows how mass stays the same on both Earth and the Moon.  <a href="#">SPANISH VERSION</a></p>	<p>“The Physics of Falling” video segment, “Forces and Motion” video segment, and “Galactic Collisions”</p> <ul style="list-style-type: none"> <li>▪ video segment.</li> <li>- EXPLORE: Pg 1- ALL pg 2-ALL pg 3 ALL</li> <li>- EXPLAIN: ALL</li> <li>- EXPLAIN: ALL</li> <li>- ELABORATE: Stem Project Starters #2</li> <li>• <a href="#">Law of Universal Gravitation (4:15)</a> Defines and explores Newton's Law of Universal Gravitation.</li> <li>• <a href="#">Getting to Know Gravity</a>: Learn the basics about Gravity and uncover common misconceptions about the concept. <a href="#">SPANISH VERSION</a></li> <li>• <a href="#">Getting to Know Mass: PAGE 2-</a> relates mass and gravity. <a href="#">SPANISH VERSION</a></li> <li>• <a href="#">Weight vs. Mass: What's the Difference? (1:31)</a> Mass is not the same as weight.</li> </ul>		
<p><a href="#">Enrichment, Practice, Remediation Key Ideas</a></p>	<p>E.P.R. Title (All 3 levels of E.P.R. included)</p>				
<p><a href="#">Tier 2 and 3 Intervention Resources</a></p>					

## Unit 7 – Motion and Momentum

Dates: January 19 – February 7, 2024

Medium High Priority

Time Allotted: 14 days

### Essential Standards:

- **SC.912.P.12.2 (DOK 3):** Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
- **SC.912.P.12.3 (DOK 3):** Interpret and apply Newton's three Laws of Motion.
- **SC.912.P.12.1 (DOK 3):** Distinguish between scalar and vector quantities and assess which should be used to describe an event.
- **SC.912.P.12.5 (DOK 3):** Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
- **SC.912.P.12.6 (DOK 3):** Qualitatively apply the concept of angular momentum.
- **SC.6.P.13.3 (DOK 2):** Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
- **SC.6.P.12.1 (DOK 3):** Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
- **SC.912.N.1.1 (DOK 3):** Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.1.2 (DOK 2):** Describe and explain what characterizes science and its methods.
- **SC.912.N.3.3 (DOK 2):** Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
- **SC.912.N.3.4 (DOK 2):** Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions. **Areas for integration of these NOS standards include experimentation as it relates to motion, calculating velocity & acceleration, and changing variables/experimenting to demonstrate Newton's 3 Laws of Motion. Specific instruction on laws and how they are different than theories in the context of the Newton's Laws of Motion and Laws of Conservation of Momentum.**

### Storyline:

To begin the unit, students will need to investigate and describe how balanced and unbalanced forces act upon object(s) to change its speed or direction and cause motion. This is best explored through experimentation and hands-on inquiry. Make sure to include some friction surfaces to incorporate friction as an opposing force to both moving and stationary objects. This is a great introduction to Newton's Laws of Motion as students relate their lab experiences to each of Newton's Laws.

Next, students will relate the balanced and unbalanced forces they've experienced to net forces. They will have to be able to calculate the net force acting upon an object and its resulting motion and direction. This is a good place to introduce the concepts of scalar and vector quantities because you'll already be talking about the force vectors to calculate net force.

After that, students will calculate speed by measuring distance and time of objects, differentiate speed from velocity (vector vs scalar), and will determine if the object is accelerating (changing speed) and whether the acceleration is positive or negative.

Again, this is best taught through experimentation and hands-on inquiry and gives students a chance to practice their measurement skills and recording and analyzing data. Students will interpret distance and time data and graphs and recognize that this relationship between distance and time represents an object's speed.

*If time allows, elaborate on these concepts by teaching about momentum and the law of conservation of momentum, as well as angular momentum. These two concepts do not overlap the FSSA content and should therefore be considered extension content until after the FSSA.*

Resources with a ★ are suggested.

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<p><b>Motion, Newton's 3 Laws,</b>  <b>SC.912.P.12.2</b>  <b>SC.912.P.12.3</b>  <b>SC.6.P.13.3</b>  <b>(8 Days)</b></p>	<p><b>Page Keeley Probes:</b>            ★ <b>How Far Did it Go?:</b>            The purpose of this assessment probe is to see whether students recognize that units of distance traveled must be measured with a measurement device from the starting point to the ending point.</p> <ul style="list-style-type: none"> <li>• <b>NASCAR Racing:</b> The purpose of this assessment probe is to determine what students mean when they use words to describe motion, such as speed, velocity, and acceleration.</li> <li>• <b>Roller Coaster Ride:</b> The purpose of this assessment probe is to elicit students' meaning of words used to describe motion, such as speed, velocity, and acceleration.</li> <li>• <b>Lifting Buckets:</b> The purpose of this probe is to elicit students' ideas about Newton's second law.</li> <li>• <b>Outer Space Push:</b> This probe is a type of thought experiment designed to elicit students' ideas about Newton's first law of motion.</li> <li>• <b>Checking the Speedometer:</b> One of</li> </ul>	<p><b>Active Learning Experiences:</b>            ★ <b>1-Dimensional Motion Lab:</b> Students will be able to recognize the motion of an object is always judged with respect to some frame of reference, interpret position and time data to describe and quantify the motion of an object, &amp; construct, interpret, and predict position-time and velocity-time graphs for linear motion</p> <ul style="list-style-type: none"> <li>★ <b>Crash Test Dummies:</b> Students will investigate inertia and Newton's laws of motion by completing an engineering challenge.</li> <li>★ <b>Skate Force - Using a Skateboard to Investigate Force, Mass and Acceleration:</b> This lesson investigates Newton's First and Second Laws of Motion by observation and interpretation of graphs.</li> <li>• <b>ADI LAB 8 - Force and Motion: How Do Changes in Pulling Force Affect the Motion of an Object?:</b> The purpose of this lab is to <b>introduce</b> students to the relationship between the force acting on an object and</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• Graphic Organizers</li> <li>• Resource</li> </ul> </li> <li>• <b>Video Clips:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Formative:</b> <ul style="list-style-type: none"> <li>• Assessments</li> </ul> </li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Assessment</li> </ul> </li> </ul>

	<p>the primary difficulties that students experience in determining the speed of a moving object is differentiating between quantities and changes in quantities.</p> <ul style="list-style-type: none"> <li>• <b>Crossing the Finish Line:</b> The purpose of this assessment probe is to elicit students' ideas about comparing motions.</li> </ul>	<p>the resulting motion of that object. <a href="#">CEJ Chart</a></p> <ul style="list-style-type: none"> <li>• <b>ADI Lab 9, Mass and Motion: How Do Changes in the Mass of an Object Affect Its Motion?</b> The purpose of this lab is to <i>introduce</i> students to the relationship between the force acting on an object, the object's mass, and the resulting motion of that object. <a href="#">CEJ Chart</a></li> </ul>			
<b>Topic Name:</b>	<b>Engage</b>	<b>Explore</b>	<b>Explain</b>	<b>Elaborate</b>	<b>Evaluate</b>
<p><b>Scalar, Vector, Angular Momentum Motion and Distance vs Time Graphs</b>  <b>SC.912.P.12.1</b>  <b>SC.912.P.12.5</b>  <b>SC.912.P.12.6</b>  <b>SC.6.P.12.1</b>  <b>(6 days)</b></p>	<p><b>Page Keeley Probes:</b></p> <ul style="list-style-type: none"> <li>★ <b>Following Jack: Part 1:</b> The purpose of this assessment probe is to identify how students interpret a motion diagram and whether they have an operational understanding of the concept of speed.</li> <li>★ <b>Following Jack: Part 2:</b> The purpose of this assessment probe is to determine whether students can translate a motion diagram into a graph—a position versus time graph—to represent the motion of a moving object.</li> </ul>	<p><b>Active Learning Experiences:</b></p> <ul style="list-style-type: none"> <li>★ <b>The Adventures of "Shelly the Sea Turtle:"</b> Students are given the opportunity to be creative and distinguish between scalar and vector quantities and assess which should be used to describe an event.</li> <li>★ <b>Momentum &amp; the Law of Linear Momentum:</b> This is a largely self-paced unit for students to learn the basics of Momentum as well as the Law of Conservation of Momentum.</li> <li>★ <b>Spinning Around – Angular Momentum:</b> Students are introduced to the concept of angular momentum involving a rotating stool, small weights, and a bicycle wheel with handles.ng the</li> </ul>	<p><b>Interactive Notebook:</b></p> <ul style="list-style-type: none"> <li>• <b>Graphic Organizers</b></li> <li>• <b>Resources</b></li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Formative:</b> <ul style="list-style-type: none"> <li>• Assessments</li> </ul> </li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Assessment</li> </ul> </li> </ul>

		<p>time of deceleration during a crash decreases the force of impact.</p> <ul style="list-style-type: none"> <li>• <b>Hands on Activity: Measuring Changes of Motion:</b> In this activity, students will measure, record, and graph changes in the motion of a ball that is rolled across the floor.</li> <li>• <b>Are You Faster Than A Middle Schooler?:</b> Students record and graph motion of objects and calculate average speed. Lesson plan, rubrics, and sample data sheet are included.</li> </ul>			
<a href="#">Enrichment, Practice, Remediation Key Ideas</a>	E.P.R. Title (All 3 Levels of E.P.R. included)				
<a href="#">Tier 2 and 3 Intervention Resources</a>					

## Unit 8 – Energy, Systems and Transformations

<b>Dates:</b> February 8 – February 28, 2024	<b>High Priority</b>	<b>Time Allotted:</b> 15 days MOCK test 2/19-2/23 -2 days
<b>Essential Standards:</b> <ul style="list-style-type: none"> <li>• <b>SC.912.P.10.1 (DOK 2):</b> Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.</li> <li>• <b>SC.912.P.10.2 (DOK 3):</b> Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.</li> <li>• <b>SC.912.P.10.6 (DOK 3):</b> Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a</li> </ul>		

pendulum.

- **SC.7.P.11.1 (DOK 2):** Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or state of matter.
- **SC.6.P.11.1 (DOK 2):** Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
- **SC.7.P.11.3 (DOK 3):** Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
- **SC.7.P.11.2 (DOK 2):** Investigate and describe the transformation of energy from one form to another.
- **SC.7.P.11.4 (DOK 2):** Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
- **SC.912.N.1.1 (DOK 3):** Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of events, generate explanations that explicate or describe natural phenomena (inferences).
- **SC.912.N.1.2 (DOK 2):** Describe and explain what characterizes science and its methods.
- **SC.912.N.3.3 (DOK 2):** Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
- **SC.912.N.3.4 (DOK 2):** Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions. **Areas for integration of these NOS standards include experimentation as it relates to energy and energy transformations. Specific instruction on laws and how they are different than theories in the context of the Law of Conservation of Energy.**

**Storyline:**

To begin this unit, students will identify and describe different forms of energy (kinetic, potential, thermal, electromagnetic (light), electrical, chemical, sound and mechanical) and their transformations from one type to another; paying emphasized attention to kinetic and potential and situations in which energy is transformed from one form to the other (energy diagrams). Students will cite evidence that energy transformations observe the Law of Conservation of Energy by explaining where the “missing” energy goes. Next, elaborate on heat energy by discussing heat transfer by conduction, convection, and radiation, noting that heat moves from hotter objects (more kinetic molecular energy) to colder objects (less kinetic molecular energy). Finally, students will be introduced to the concept of open, closed, and isolated systems and the transfer of matter and energy into and out of those systems. These concepts can be demonstrated with hands-on activities using matter and heat energy.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Energy Transformations</b> <b>SC.7.P.11.2</b> <b>SC.7.P.11.3</b> <b>(7 Days)</b>	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Interactive Notebook:</b> - Graphic Organizers - Resource • <b>Video Clips:</b> - Resource • <b>Digital Tutorials:</b> - Resource • <b>Textbook Resources:</b> - Resource	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Formative:</b> - Assessments • <b>Summative:</b> - Assessment

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Potential and Kinetic Energy</b> <b>SC.6.P.11.1</b> (6 days)	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• Graphic Organizers</li> <li>• Resources</li> </ul> </li> <li>• <b>Video Clips:</b> <ul style="list-style-type: none"> <li>• Resources</li> </ul> </li> <li>• <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>• Resources</li> </ul> </li> <li>• <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>• Resources</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Formative:</b> <ul style="list-style-type: none"> <li>• Assessments</li> </ul> </li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Assessment</li> </ul> </li> </ul>
<b>Heat Transfer</b> <b>SC.7.P.11.4</b> (4 Days)	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• Graphic Organizers</li> <li>• Resource</li> </ul> </li> <li>• <b>Video Clips:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>★ Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Formative:</b> <ul style="list-style-type: none"> <li>• Assessments</li> </ul> </li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Assessment</li> </ul> </li> </ul>
<a href="#">Enrichment</a> , <a href="#">Practice</a> , <a href="#">Remediation</a> <a href="#">Key Ideas</a>	Enrichment: Practice: Remediation:				E.P.R. Instructions
<a href="#">Tier 2 and 3 Intervention Resources</a>					

## Unit 9 – Behavior of Waves

<b>Dates:</b> February 29 – March 21, 2024	<b>Low Priority</b>	<b>Time Allotted:</b> 10 days (Ends in Q4)
<b>Essential Standards:</b> <ul style="list-style-type: none"> <li>• <b>SC.912.P.10.21 (DOK 2):</b> Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver (the Doppler Effect).</li> <li>• <b>SC.912.P.12.7 (DOK 1):</b> Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.</li> <li>• <b>SC.7.P.10.2 (DOK 2):</b> Observe and explain that light can be reflected, refracted, and/or absorbed.</li> <li>• <b>SC.7.P.10.3 (DOK 2):</b> Recognize that light waves, sound waves, and other waves move at different speeds in different materials.</li> <li>• <b>SC.912.N.1.1 (DOK 3):</b> Define a physical science problem and do the following: Pose questions about the natural world, conduct systematic observations, examine books and other sources of information to see what is already known, review what is known in light of empirical evidence, plan investigations, use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), pose answers, explanations, or descriptions of</li> </ul>		



events, generate explanations that explicate or describe natural phenomena (inferences).

- **SC.912.N.2.4 (DOK 3):** Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
- **SC.912.N.3.1 (DOK 3):** Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.

**Application and integration of these NOS standards could come from the integration of a scientific experiment related to waves and/or the Doppler Effect. The theory standards can be addressed when talking about Einstein’s Theory of Relativity and what characterizes a theory vs a law. Students should conduct experiments and investigations into light and sound waves. The 5E Lesson Battle of the Waves will allow students to conduct investigation about the speed of light and sound through matter and make predictions and collect data**

**Storyline:**

In this unit, students will differentiate between the different types of waves (electromagnetic - light and mechanical - sound) and how they move differently through different mediums (mechanical waves need a medium to pass through). Next, students should experience how waves move at different speeds through different mediums (solids, liquids, gases) so that they are able to explain this phenomenon. Lightning and thunder is a phenomenon they are familiar with that will allow them relate to this concept. Finally, students will observe and explain that light can be reflected, refracted and/or absorbed. This is best taught through experimental, hands-on inquiry activities to make the content tangible. The 5E Lessons on Battle of the Waves and Catching the Light specifically target the concepts addressed in this unit.

To elaborate on these concepts for the high school standards, students will use their understanding of waves to learn about and describe the Doppler Effect. They only need an overall conceptual understanding of how waves behave when the source is moving (compaction and rarefaction of the waves) and its relation to pitch as well as what “red shift” and “blue shift” means in terms of objects moving toward or away from an observer.

Furthermore, students need to have a conceptual understanding of  $E = mc^2$ , what these variables stand for, and how manipulating one affects the others.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Waves and Their Mediums</b> <b>SC.7.P.10.3</b> <b>(7 Days)</b>	★ Active Learning Experience linked with description. ● Active Learning Experience linked with description.	★ Active Learning Experience linked with description. ● Active Learning Experience linked with description.	● <b>Interactive Notebook:</b> ● Graphic Organizers ● Resource ● <b>Video Clips:</b> - Resource ● <b>Digital Tutorials:</b> - Resource ● <b>Textbook Resources:</b> - Resource	★ Active Learning Experience linked with description. ● Active Learning Experience linked with description.	● <b>Formative:</b> ● Assessments ● <b>Summative:</b> ● Assessment
Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Reflection, Refraction and Absorption</b>	★ Active Learning Experience linked with description.	★ Active Learning Experience linked with description.	● <b>Interactive Notebook:</b> ● Graphic Organizers ● Resources ● <b>Video Clips:</b>	★ Active Learning Experience linked with description.	● <b>Formative:</b> ● Assessments ● <b>Summative:</b> ● Assessment

<b>SC.7.P.10.2</b> <b>(7 days)</b>	<ul style="list-style-type: none"> <li>Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>Resources</li> <li><b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> </li> <li><b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Active Learning Experience linked with description.</li> </ul>	
<a href="#">Enrichment, Practice, Remediation Key Ideas</a>	Enrichment: Practice: Remediation:				E.P.R. Instructions
<a href="#">Tier 2 and 3 Intervention Resources</a>					

## Quarter 4

### Unit 10 – The Electromagnetic Spectrum

<b>Dates:</b> March 22 – March 28, 2024	<b>Low Priority</b>	<b>Time Allotted:</b> 5 days
<p><b>Essential Standards:</b></p> <ul style="list-style-type: none"> <li><b>SC.912.P.10.18 (DOK 3):</b> Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.</li> <li><b>SC.7.P.10.1 (DOK 2):</b> Illustrate that the Sun’s energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.</li> <li><b>SC.912.N.3.5 (DOK 2):</b> Describe the function of models in science, and identify the wide range of models used in science.</li> <li><b>SC.8.N.3.1 (DOK 3):</b> Select models useful in relating the results of their own investigations. <b>Integration of this standard could include students making models of the different parts of the Electromagnetic Spectrum.</b></li> </ul> <p><b>Storyline:</b>            This unit begins with a brief overview of the properties of waves (wavelength, frequency, and energy) and their relationship to one another. Next you will introduce students to the different parts of the electromagnetic spectrum (radio waves, microwave, infrared waves, visible light waves, ultraviolet waves, x-rays, and gamma rays) by identifying characteristics of each type of wave such as its relative frequency, wavelength, and energy, as well as its applications and hazards.</p>		

**Resources with a ★ are suggested.**

<b>Topic Name:</b>	<b>Engage</b>	<b>Explore</b>	<b>Explain</b>	<b>Elaborate</b>	<b>Evaluate</b>
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<p><b>Electromagnetic Spectrum</b>  <b>SC.7.P.10.1</b>  <b>SC.8.E.5.11</b>  <b>(7 Days)</b></p>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>• Graphic Organizers</li> <li>• Resource</li> </ul> </li> <li>• <b>Video Clips:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> <li>• <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>- Resource</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ Active Learning Experience linked with description.</li> <li>• Active Learning Experience linked with description.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Formative:</b> <ul style="list-style-type: none"> <li>• Assessments</li> </ul> </li> <li>• <b>Summative:</b> <ul style="list-style-type: none"> <li>• Assessment</li> </ul> </li> </ul>
<p><a href="#">Enrichment, Practice, Remediation Key Ideas</a></p>	<p>Enrichment: Practice: Remediation:</p>				<p>E.P.R. Instructions</p>
<p><a href="#">Tier 2 and 3 Intervention Resources</a></p>					

## Unit 11 – FSSA Review

<p><b>Dates:</b> March 29 – May 3, 2024</p>	<p><b>Time Allotted:</b> 26 days</p>
<p><b>Storyline:</b>  Using your FSSA Mock Assessment data and State historical data, you and your PLC will map out a comprehensive review of the most critical standards. It is critical that you continue to use best practices in science instruction such as utilizing materials that follow the 5E model, using 5E lessons, ADI labs, Station Rotation, etc. Using review packets and computer-based review are not suggested for classroom use; only as a supplement for at home review.</p> <p>All resources will found on the TEAMS or Canvas</p>	

## Unit 12 – Work, Power, and Electricity

Dates: May 8 – May 17, 2024

Low Priority

Time Allotted: 7 days

### Essential Standards:

- **SC.912.P.10.3 (DOK 2):** Compare and contrast work and power qualitatively and quantitatively.
- **SC.912.P.10.15 (DOK 3):** Investigate and explain the relationships among current, voltage, resistance, and power.
- **SC.912.P.10.14 (DOK 2):** Differentiate among conductors, semiconductors, and insulators.
- **SC.912.N.1.3 (DOK 1):** Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
- **SC.912.N.1.6 (DOK 2):** Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied. *Application & integration of these NOS standards could include an ADI investigation (argument driven inquiry) in which the students make claims, provide evidence, and rationale supporting whether objects are conductors, semiconductors, or insulators. Students could also make inferences through observations about how current, resistance, and voltage changes due to changing the other factors in a circuit.*

### Storyline:

Begin this unit by introducing the concepts of work and power. Students need to understand the concepts of work and power (qualitatively) and how to calculate work and power (quantitatively).

Next, students will be introduced to Ohm's Law and the relationship between current, voltage, and resistance ( $V=IR$ ). Students should be given the opportunity to investigate electricity and this relationship as the standard suggests. Added into that concept can be the concept of conductors, semiconductors, and insulators. These should be relatively easy to tie into current, voltage, and resistance. The most effective way to teach these concepts are through hands-on investigation.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Physical and Chemical Properties</b> <a href="#">SC.912.P.8.2</a> <a href="#">SC.8.P.8.4</a> (9 Days)		★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resource</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul>	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>
<b>Mass vs Weight</b> <a href="#">SC.8.P.8.2</a> (2 days)	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resources</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul>	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>
<b>Density</b> <a href="#">SC.8.P.8.3</a> (3 Days)	★ <a href="#">Density – Floating Logs:</a> Elicit students' ideas about density and if students think changing the size of an object affects its density. • <a href="#">Density – Floating High or Low:</a> Elicit students' ideas about density and	★ Active Learning Experience linked with description. • Active Learning Experience linked with description. ★	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resource</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> •	★ Active Learning Experience linked with description. ★ Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>

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<a href="#">Tier 2 and 3 Intervention Resources</a>					

## Unit 13 – Nuclear Reactions

<b>Dates:</b> May 20 – May 29, 2024	<b>Low Priority</b>	<b>Time Allotted:</b> 7 days
<p><b>Essential Standards:</b></p> <ul style="list-style-type: none"> <li>• <b>SC.912.P.10.12 (DOK 2):</b> Differentiate between chemical and nuclear reactions.</li> <li>• <b>SC.912.P.10.10 (DOK 2):</b> Compare the magnitude and range of the four fundamental forces (<del>gravitational</del>, electromagnetic, weak nuclear, strong nuclear).</li> <li>• <b>SC.912.P.10.11 (DOK 3):</b> Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.</li> <li>• <b>SC.912.N.4.1 (DOK 2):</b> Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.</li> <li>• <b>SC.912.N.4.2 (DOK 3):</b> Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental. <i><b>Integrate these into the curriculum by discussing or debating nuclear energy usage and possible implications on society.</b></i></li> </ul> <p><b>Storyline:</b></p>		



In this unit, students will get a general overview of the difference between chemical reactions which involve the electrons of an atom, and nuclear reactions which involves the nucleus (protons and neutrons). In learning about nuclear reaction, weak and strong nuclear forces will be reviewed from an earlier unit. Additionally, students need to understand the difference between different types of nuclear reactions such as radioactive decay, fission, and fusion). Related energy releases and hazards of nuclear decay should be discussed.

**Resources with a ★ are suggested.**

Topic Name:	Engage	Explore	Explain	Elaborate	Evaluate
<b>Physical and Chemical Properties</b> <a href="#">SC.912.P.8.2</a> <a href="#">SC.8.P.8.4</a> (9 Days)		★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resource</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul>	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>
<b>Mass vs Weight</b> <a href="#">SC.8.P.8.2</a> (2 days)	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resources</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resources</li> </ul>	★ Active Learning Experience linked with description. • Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>
<b>Density</b> <a href="#">SC.8.P.8.3</a> (3 Days)	★ <a href="#">Density – Floating Logs:</a> Elicit students' ideas about density and if students think changing the size of an object affects its density. • <a href="#">Density – Floating High or Low:</a> Elicit students' ideas about density and	★ Active Learning Experience linked with description. • Active Learning Experience linked with description. ★	• <b>Interactive Notebook:</b> <ul style="list-style-type: none"> <li>Graphic Organizers</li> <li>Resource</li> </ul> • <b>Video Clips:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Digital Tutorials:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> • <b>Textbook Resources:</b> <ul style="list-style-type: none"> <li>Resource</li> </ul> •	★ Active Learning Experience linked with description. ★ Active Learning Experience linked with description.	• <b>Formative:</b> <ul style="list-style-type: none"> <li>Assessments</li> </ul> • <b>Summative:</b> <ul style="list-style-type: none"> <li>Assessment</li> </ul>

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