Kenilworth Public Schools

Curriculum Guide

Content Area: Integrated Physical Science
Grade: 10
BOE Approved: 8/14/23

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Kelsey Logan BOE
Revision Approved: N/A

Integrated Physical Science

Grade 10

August 2023

Unit 1- Atoms & Matter	Unit 2- Periodic Table	Unit 3- Chemical Bonding	Unit 4- Basic Motion	Unit 5- Accelerated Motion and Forces	Unit 6- Energy
Weeks 1-8	Weeks 9-12	Weeks 13-20	Weeks 21-25	Weeks 26-33	Weeks 34-38
Unit Description: Everything is made of matter. In this unit, students will explore the definition of matter, how it changes to various states, and how matter can be mixed together to form other compounds. Atoms are the building blocks of matter, so by understanding the structure of an atom, one can begin to understand the chemical and physical properties	*Unit Description:* Atoms combine together to form elements, and elements are arranged using a model. The periodic table organizes elements based on their properties. It allows trends in physical properties and chemical reactivity to appear. Using the periodic table, the possible formation of chemical compounds can be predicted.	*Unit Description:* Chemical bonds hold all compounds together. The electron dot formula of an element will help predict what type of bond will form in a compound. Creating physical models of molecular structures will reinforce this concept. The different types of bonds will be contrasted. Both systems of naming compounds will be utilized when writing the name of a	*Unit Description:* Any object that moves from one location to another is considered motion. Motion is a change of position, which can be described in terms of the distance moved or the displacement. In this unit, students will cover the fundamentals of measuring and analyzing motion by exploring displacement, speed, and velocity. The motion of an object	*Unit Description:* The acceleration and force of an object are dependent on many factors that will be covered in this unit. Before forces can be explored, acceleration must be calculated using an object's velocity. Students will plan an investigation to show how an object's motion depends on the sum of the forces on the objects and mass of the object. Balanced and unbalanced forces	*Unit Description:* The different forms of energy will be identified and investigated and will include mechanical and non-mechanical forms. Students will investigate the transfer and transformation from one kind of energy to another using activities such as roller coaster simulations and analyzing household utility bills. At the end of this unit,

associated with an element.		molecular and ionic compound. Oxidation numbers are assigned to elements to help in the formation of compounds.	could be uniform or non-uniform depending on its velocity. The speed of an object is the distance covered per unit time and velocity is the displacement per unit time	can change or maintain the motion of an object. Newton's Laws of Motion are examined through actual real time investigations and using computer simulations.	students will have a better understanding of how energy transforms.
Unit Targets: ● Analyze the properties of matter for the purpose of classification. ● Connect the effects of energy transfer with the different states of matter. ● Identify classifications of matter (element, compound, homogeneous mixture, and heterogeneous mixture). ● Compare the modern atomic model to previous models of the atom ● Use atomic models to predict the	*Unit Targets:* ● Accurately explain the placement of elements on the periodic table and how patterns are used to place elements. ● Predict patterns in the chemical and physical properties of elements. ● Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. ● Determine the identity of missing elements based	*Unit Targets:* ● Differentiate between covalent, ionic, and metallic bonding in terms of valence electrons. ● Apply the concepts of ionic and covalent bonding to effectively represent compounds using chemical formulas and names. ● Construct Lewis structures for molecular compounds. Students will create Lewis Dot Structures for elements to model how atoms bond to form chemical compounds and	*Unit Targets:* ● Construct and analyze motion diagrams to determine motion of an object. ● Differentiate between displacement and motion using data gathered from experiments. ● Use simple mathematical expressions to show the relationship between velocity, speed, displacement, and motion.	*Unit Targets:* ● Identify an object's acceleration in an experiment. ● Explain how gravity impacts an object's free fall movement. ● Calculate an object's weight under various circumstances. ● Construct a 3D model that will be used to calculate force, velocity, and acceleration during a free fall.	*Unit Targets:* ● Energy is the ability of a system to produce a change in itself or the world around it, and it can be found in many forms. ● Work is the transfer of energy that occurs when a force is applied through a displacement. The work done on a system is equal to the change in energy of that system. ● The Work-Energy Theorem states that doing work on a system causes a change of energy in that system.

behaviors of atoms in interactions. ● Create a Bohr model including subatomic particles from the name of an element on the periodic table.	upon the properties of the other elements in the group.	model chemical reactions ● Balance chemical equations with respect to the Law of Conservation of Mass			● The sum of kinetic and potential energy is called mechanical energy.

Integrated Physical Science

Grade 10

August 2023

Course Description: Integrated Science is an introductory lab science course which will provide students with a background in Physics, Chemistry, and Earth Science with an emphasis on process science and hands-on activities.

Unit 1: Atoms & Matter

Pacing/Days: Weeks 1-8

Unit Summary: Everything is made of matter. In this unit, students will explore the definition of matter, how it changes to various states, and how matter can be mixed together to form other compounds. Atoms are the building blocks of matter, so by understanding the structure of an atom, one can begin to understand the chemical and physical properties associated with an element.

Learning Targets

Unit Big Ideas: Everything is made of matter and atoms are the fundamental building block of matter.

Unit Essential Questions:

- What characteristics identify a substance?
- What distinguishes physical properties from chemical properties?
- What is an atom?
- Where are the locations of the subatomic particles within the structure of the atom?
- How are electrons configured around a nucleus?

Unit Enduring Understandings:	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
Students will understand that… ● Substances can be identified using physical and chemical properties. ● The classification of matter based on distinctive properties or characteristics	Students will know and be able to… HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

allows for a better understanding of the world around us. ● Atoms are the fundamental building blocks of all matter. ● Modern atomic theory explains how subatomic particles are arranged. Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. ● Bohr models are used to show where subatomic particles are located, surrounding the nucleus of the atoms	HS-PS1-3 - Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. HS-PS1-8 - Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. ● Analyze the properties of matter for the purpose of classification.(HS-PS1-3) ● Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1) ● Compare the modern atomic model to previous models of the atom (HS-PS1-8) ● Use atomic models to predict the behaviors of atoms in interactions. (HS-PS1-8) ● Create a Bohr model including subatomic particles from the name of an element on the periodic table. (HS-PS1-8) **Disciplinary Core Ideas** PS1.A: Structure and Properties of Matter ● The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3) **Science and Engineering Practices** Developing and Using Models Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

	• Develop a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-PS1-8)

Evidence of Learning :

Formative:

- Exit Tickets
- Oral Questioning
- Observations - during Card Sort activity
- Build an Atom Activity
- Poster Comparison Activity

Summative:

- Properties of Matter & Atomic Theory Test
- 3D Bohr Model Project - Students will need to apply all knowledge from parts of an atom, characteristics of matter, and classification of matter to construct a 3D model of their assigned element.

New Jersey State Learning Standards

NJSLS Standards: (Use Font: Times, Size:12, Not Bold) (List the standards for the subject area)

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. [Clarification Statement: Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.] [Assessment Boundary: Assessment is limited to main group elements. Assessment does not include quantitative understanding of ionization energy beyond relative trends.]

HS-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. [Clarification Statement: Emphasis is on understanding the strengths of forces between particles, not on naming specific intermolecular forces (such as dipole-dipole). Examples of particles could include ions, atoms,

molecules, and networked materials (such as graphite). Examples of bulk properties of substances could include the melting point and boiling point, vapor pressure, and surface tension.] [Assessment Boundary: Assessment does not include Raoult's law calculations of vapor pressure.] HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. [Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.] [Assessment Boundary: Assessment does not include quantitative calculation of energy released. Assessment is limited to alpha, beta, and gamma radioactive decays.]
Career Readiness, Life Literacies, and Key Skills (CLKS): (Use Font: Times, Size:12, Not Bold) (List standards, all K-12 curricula) 9.4.12.CI.1, 9.4.12.CT.2
Primary Interdisciplinary Connections: (Use Font: Times, Size:12, Not Bold) (List content areas and standards) MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, and HSN-Q.A.3
Computer Science and Design Thinking Standards: (Use Font: Times, Size:12, Not Bold) (List the standards to show integration, all K-12 curricula) 8.1.12.DA.6
Climate Change Standards: HS-ESS3-2, HS-ESS2-4
ELA Companion Standards: RST.9-10.7, RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9, SL.11-12.5

Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***
• The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. (HS-PS1-3) • Analyze the properties of matter for the purpose of classification.(HS-PS1-3) • Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. (HS-PS1-1) • Compare the modern atomic model to previous models of the atom (HS-PS1-8) • Use atomic models to predict the behaviors of atoms in interactions. (HS-PS1-8) • Create a Bohr model including subatomic	• Anchoring Phenomena - • Classification of Matter Activity (HS-PS1-3) Students will be able to distinguish between the different states of matter by using a guided lab exploring how the smallest unit of chemicals determine whether substances are classified as an element, compound, or mixture. • Identifying an Unknown Argument-Driven Inquiry Lab (HS-PS1-3) Students will be using their knowledge of classifying matter to identify an unknown substance. Students will be guided through the lab, working in groups to collaborate and draw conclusions. ○ CER Introduction Activity - students will make a claim about their unknown substance and use evidence gathered through this inquiry based lab to support their claims. After evidence has been provided, students will connect their evidence to their claim using reasoning to support their ideas. • Build an Atom Simulation (HS-PS1-1) Students will use a phet simulation to build atoms using their knowledge of parts of an atom and how they dictate the identity of an element. • History of Atomic Theory (HS-PS1-8)	Week 1 Week 2

particles from the name of an element on the periodic table. (HS-PS1-8)	This video explains the history of atomic theory. While students are watching, they should complete the Video Questioning Worksheet • Atomic Theory Poster Comparison (HS-PS1-8) Students will create posters to compare and contrast the various versions of the atomic theory. • History of the Atom Card Sort (HS-PS1-8) Students will match and sort cards to correctly identify the scientists and their contributions to the model atomic theory. This activity can be used as a reinforcement activity or to review for the test. • 3D Bohr Model Project (HS-PS1-8) (HS-PS1-1) Students will need to apply all knowledge from parts of an atom, characteristics of matter, and classification of matter to construct a 3D model of their assigned element. • Properties of Matter & Atomic Theory Test Students will be assessed on their understanding of the concepts in this unit.	Week 3-4 Week 5 Week 6-7 Week 8

Differentiating Instruction:
Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts

• Modification of content, student products, and assessment tools (rubrics for example)
• Testing accommodations
• Authentic assessments (ex: write an email to your state senator about a current event issue you are passionate about, design/implement a class debate, create and balance a college freshman budget, create a commercial that dispels a myth about climate change)

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace and content of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction
• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Unit 2: The Periodic Table

Pacing/Days: Weeks 9-12

Unit Summary: Atoms combine together to form elements, and elements are arranged using a model. The periodic table organizes elements based on their properties. It allows trends in physical properties and chemical reactivity to appear. Using the periodic table, the possible formation of chemical compounds can be predicted.

Learning Targets

Unit Big Ideas: The periodic table of elements is an organized model that contains all elements and their important information, such as its name, chemical symbol, atomic number, and atomic mass.

Unit Essential Questions:

- How is the periodic table used to predict atomic properties?
- How do properties or characteristics influence the placement of elements on the periodic table?
- What is the relationship between an element's placement on the periodic table and its trends?
- How can the placement of an element on the periodic table become known when a specific trend is observed?
- How are valence electrons related to the properties of each element?

Unit Enduring Understandings:	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
Students will understand that… • The placement of elements on the periodic table is based upon specific properties and characteristics of elements. (HS-PS1-1) • The properties and characteristics of elements follow noticeable patterns and trends on the periodic table. (HS-PS1-1)	Students will know and be able to… • HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. • HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

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- Patterns are used to help understand properties of elements and their relationship between each other. (HS-PS1-1)
- There are connections between where an element is located on the periodic table and the trends that are observed. (HS-PS1-1)
- Valence electrons are essential for how elements bond together and the periodic table shows these properties. (HS-PS1-1)

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Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. (HS-PS1-1), (HS-PS1-2)
- Accurately explain the placement of elements on the periodic table and how patterns are used to place elements. (HS-PS1-1)
- Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. (HS-PS1-1) (HS-PS1-2)
- Determine the identity of missing elements based upon the properties of the other elements in the group.(HS-PS1-1)

Crosscutting Concepts

- Predict patterns in the chemical and physical properties of elements. (HS-PS1-1)
- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS1-1), (HS-PS1-2)

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Evidence of Learning :

Formative: (Use Font: Times, Size:12, Not Bold)

- Exit Tickets
- Poster projects
- Battleship Activity
- Periodic People
- Think-Pair-Shares
- Climate Change Compound Lab

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Summative: (Use Font: Times, Size:12, Not Bold)

- Periodic Table Bulletin Board
- Engineering & The Periodic Table
- Periodic Table Unit Test

New Jersey State Learning Standards

NJSLS Standards:

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. [Clarification Statement: Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.] [Assessment Boundary: Assessment is limited to main group elements. Assessment does not include quantitative understanding of ionization energy beyond relative trends.]

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen.] [Assessment Boundary: Assessment is limited to chemical reactions involving main group elements and combustion reactions.]

Career Readiness, Life Literacies, and Key Skills (CLKS):

9.4.2.CT.1, 9.4.2.CT.2:, 9.4.2.CI.1, 9.4.2.CT.3

Primary Interdisciplinary Connections:

MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, and HSN-Q.A.3

Computer Science and Design Thinking Standards: 8.2.12.ED.1
Climate Change Standards: HS-ESS2-4, HS-ESS3-2,
ELA Companion Standards: RST.9-10.7, RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9, SL.11-12.5

Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***
• Accurately explain the placement of elements on the periodic table and how patterns are used to place elements. (HS-PS1-1) • Predict patterns in the chemical and physical properties of elements. (HS-PS1-1) • Use the periodic table as a model to predict the relative properties of	• Periodic Table Intro Activity Teacher will pre-arrange a seating chart arranged by one characteristic in rows, and the other in columns. Students will then try to predict the arrangement by gathering information from fellow classmates and by collaborating with their peers. This activity will lead into a discussion about patterns and how they can be useful in life. • Anchoring Phenomena - Trends Without any prior knowledge, students will observe how chemical reactions get more violent as you move down a group on the periodic table. Teacher will demonstrate by placing lithium, potassium, and sodium into beakers of water. Students will record their observations. (HS-PS1-2)	Week 9

elements based on the patterns of electrons in the outermost energy level of atoms. (HS-PS1-1) (HS-PS1-2) • Determine the identity of missing elements based upon the properties of the other elements in the group.(HS-PS1-1)	• Periodic People Activity Students will use their knowledge of patterns to organize people into their periodic table. This activity should be completed after discussing patterns as a group. • Interactive Periodic Table This resource will be used to show students the different uses and applications of each element on the periodic table. • Periodic Table Battleships Students will use their knowledge of elements' physical and chemical properties, atomic number, mass, and name to play this game. • Periodic Table Bulletin Board Students will create a tile for their assigned element. One their tile, they must include the element name, symbol, atomic number, atomic mass, and uses or application of their element. At the end of this unit project, students will arrange their elements on the bulletin board using the patterns they have observed. • Engineering and the Periodic Table Students will connect engineering and the periodic table by exploring how engineers use the physical and chemical properties of elements in the world around us. Students will design element superheroes based on their properties. There are options for extension activities and differentiated approaches to their lab. • Climate Change and Chemical Bonding Research Lab	Week 10 Weeks 11-12

	Students will explore the chemicals that contribute to Climate change. • Periodic Table Unit Test Students will be assessed on their understanding of the concepts in this unit.	

Differentiating Instruction: Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content, student products, and assessment tools (rubrics for example)
• Testing accommodations
• Authentic assessments (ex: write an email to your state senator about a current event issue you are passionate about, design/implement a class debate, create and balance a college freshman budget, create a commercial that dispels a myth about climate change)

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace and content of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction

• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Unit 3: Bonding

Pacing/Days: Weeks 13-20

Unit Summary: Chemical bonds hold all compounds together. The electron dot formula of an element will help predict what type of bond will form in a compound. Creating physical models of molecular structures will reinforce this concept. The different types of bonds will be contrasted. Both systems of naming compounds will be utilized when writing the name of a molecular and ionic compound. Oxidation numbers are assigned to elements to help in the formation of compounds.

Learning Targets

Unit Big Ideas: Atoms connect together using chemical bonds to build compounds of all shapes and sizes. Chemical bonding is the key to many of the chemical and physical properties of the world around us. In this unit, students will explore how atoms form complex compounds and how those compounds react together by modeling and predicting the outcome of chemical reactions.

Unit Essential Questions:

- Why do elements form chemical bonds in nature and how does this determine their properties?
- How are the properties of an element determined by its electron arrangement?
- How is mass conserved during a chemical reaction?
- What occurs during a chemical reaction and how do we represent it?
- How are the names and formulas of ionic and covalent compounds written?

Unit Enduring Understandings:	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
Students will understand that… ● Atoms join together to form an element and elements join together to form compounds.(HS-PS1-2) ● The formation of chemical bonds can be explained by the atom's ability to satisfy the Octet Rule and achieve stability. (HS-PS1-2) ● The type of chemical bond an element forms can be linked to its valence electrons and its location on the periodic table. (HS-PS1-2) ● Chemical formulas can be used to represent the ratios in which atoms combine to form compounds. (HS-PS1-4) ● Chemical reactions can be represented using chemical equations and these equations must be balanced in order to	Students will know and be able to… HS-PS1-2 - Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. ● Differentiate between covalent, ionic, and metallic bonding in terms of valence electrons. (HS-PS1-2) HS-PS1-4 - Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. ● Construct Lewis structures for molecular compounds. (HS-PS1-4) Students will create Lewis Dot Structures for elements to model how atoms bond to form chemical compounds and model chemical reactions HS-PS1-7 - Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. ● Apply the concepts of ionic and covalent bonding to effectively represent compounds using chemical formulas and names. (HS-PS1-7)

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<td>satisfy the Law of Conservation of Mass (HS-PS1-4) (HS-PS1-7)</td>
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Balance chemical equations with respect to the Law of Conservation of Mass (HS-PS1-7)

Disciplinary Core Ideas
PS1.B: Chemical Reactions

The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. (HS-PS1-2), (HS-PS1-7)

Crosscutting Concepts
Connections to Nature of Science
Scientific Knowledge Assumes an Order and Consistency in Natural Systems

Science assumes the universe is a vast single system in which basic laws are consistent. (HS-PS1-7)

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Evidence of Learning :
Formative:

Bonding Charades Activity
Molecular Modeling Activity
Ionic Bonding Matchmaker Games
Candy Chemical Reaction Lab
Class discussions
Review Game
Exit Tickets
Do Nows

Summative:

Chemical Bonding Project
Ionic Compound Naming Quiz
Balancing Equation Quiz

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- Bonding Unit Test

New Jersey State Learning Standards

NJSLS Standards: (Use Font: Times, Size:12, Not Bold) (List the standards for the subject area)

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen.] [Assessment Boundary: Assessment is limited to chemical reactions involving main group elements and combustion reactions.]

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

HS-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [Clarification Statement: Emphasis is on using mathematical ideas to communicate the proportional relationships between masses of atoms in the reactants and the products, and the translation of these relationships to the macroscopic scale using the mole as the conversion from the atomic to the macroscopic scale. Emphasis is on assessing students' use of mathematical thinking and not on memorization and rote application of problem-solving techniques.] [Assessment Boundary: Assessment does not include complex chemical reactions.]

Career Readiness, Life Literacies, and Key Skills (CLKS):

9.4.2.CT.1, 9.4.2.CT.2:, 9.4.2.CI.1, 9.4.2.CT.3

Primary Interdisciplinary Connections: MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, and HSN-Q.A.3
Computer Science and Design Thinking Standards: (Use Font: Times, Size:12, Not Bold) (List the standards to show integration, all K-12 curricula) 8.1.12.DA.6
Climate Change Standards: https://www.nj.gov/education/standards/climate/learning/gradeband/index.shtml HS-ESS3-4, HS-ESS3-5
ELA Companion Standards: RST.9-10.7, RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9, SL.11-12.5

Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***
• Differentiate between covalent, ionic, and metallic bonding in terms of valence electrons. (HS-PS1-2) • Calculate formula mass, molar mass and percent compositions. (HS-PS1-2) (HS-PS1-2)	• Anchoring Phenomena - Match burning in slow motion Students will make observations and predictions about what is happening in the video. • Bonding Charades (HS-PS1-2) Students will collaborate with a group to put on a skit to represent each of type of chemical bonds	Week 13

• Apply the concepts of ionic and covalent bonding to effectively represent compounds using chemical formulas and names. (HS-PS1-7) • Construct Lewis structures for molecular compounds. (HS-PS1-4) • Balance chemical equations. (HS-PS1-7) • Model chemical reactions by performing scientific experiments. (HS-PS1-4)	• Molecular Modeling (HS-PS1-4) Students will construct 3D models of molecules and use these models to show how atoms come together to form compounds. • Ionic Bonding Matchmaker Game (HS-PS1-7) Students will use this interactive simulation to practice and reinforce the concepts of ionic bonding. • Ionic Compound Naming Quiz (HS-PS1-7) Students will be assessed on their understanding of ionic bonding and naming ionic compounds. • Candy Chemical Reactions (HS-PS1-2) Students will use different candies to model how chemical elements use their valence electrons to make and break bonds. This activity will simulate what happens at a molecular level during chemical reactions • Chemical Bonding Project (HS-PS1-2) This formative assessment will provide students with choices to demonstrate their understanding of the types of chemical bonds. • Balancing Chemical Equation Game (HS-PS1-7) Students will use the pHet simulation to practice balancing chemical equations. • Balancing Equation Quiz (HS-PS1-7) Students will be assessed on their ability to balance chemical equations.	Week 14 Week 15 Week 16-17 Week 18 Week 19

	• Bonding Unit Test Students will be assessed on the concepts covered in this unit. • Anchoring Phenomena (Revisited) - Match burning in slow motion At the end of the unit, students will work together to explain the phenomena. Groups will discuss with the class to come up with a final explanation.	Week 20

Differentiating Instruction: Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:
• Use of visual and multisensory formats
• Use of assisted technology
• Use of prompts
• Modification of content, student products, and assessment tools (rubrics for example)
• Testing accommodations
• Authentic assessments (ex: write an email to your state senator about a current event issue you are passionate about, design/implement a class debate, create and balance a college freshman budget, create a commercial that dispels a myth about climate change)

Examples of Strategies and Practices that Support Gifted & Talented Students:
• Adjusting the pace and content of lessons
• Curriculum compacting
• Inquiry-based instruction
• Independent study
• Higher-order thinking skills
• Interest-based content
• Student-driven instruction

• Real-world problems and scenarios

Examples of Strategies and Practices that Support English Language Learners:
• Pre-teaching of vocabulary and concepts
• Visual learning, including graphic organizers
• Use of cognates to increase comprehension
• Teacher modeling
• Pairing students with beginning English language skills with students who have more advanced English language skills
• Scaffolding
•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Unit 4: Basic Motion

Pacing/Days: Weeks 21-25

Unit Summary: Any object that moves from one location to another is considered motion. Motion is a change of position, which can be described in terms of the distance moved or the displacement. In this unit, students will cover the fundamentals of measuring and analyzing motion by exploring displacement, speed, and velocity. The motion of an object could be uniform or non-uniform depending on its velocity. The speed of an object is the distance covered per unit time and velocity is the displacement per unit time.

Learning Targets

Unit Big Ideas: You can use displacement and velocity to describe an object's motion.

Unit Essential Questions:

- What is motion and which properties are related to motion?
- How do motion diagrams represent motion?
- What is displacement?
- What is the difference between speed and velocity?

Unit Enduring Understandings:	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
Students will understand that… ● A motion diagram shows the position of an object at successive equal time intervals, which can be used to represent motion.(HS-PS2-1) ● Changing position is considered displacement, which has motion magnitude and direction.(HS-PS2-1) ● An object's velocity tells how fast it is moving and in which direction it is moving; speed is the magnitude of velocity. (HS-PS2-1)	Students will know and be able to… • HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. ● Construct and analyze motion diagrams to determine motion of an object. ● Differentiate between displacement and motion using data gathered from experiments. ● Use simple mathematical expressions to show the relationship between velocity, speed, displacement, and motion.

	Disciplinary Core Ideas PS2.A: Forces and Motion ● Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1) **Science and Engineering Principles** Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ● Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-PS2-1)

Evidence of Learning :

Formative:

- Distance and Displacement Lab
- Speed and Velocity Lab
- Key Terms Activity
- Graphing Speed Activity
- Motion Diagram Activity
- Exit Tickets
- Group discussions
- Do Nows
- Review Test

Summative:

- Basic Motion Unit Test
- Key Terms Quiz

New Jersey State Learning Standards
NJSLS Standards: (Use Font: Times, Size:12, Not Bold) (List the standards for the subject area) • HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object sliding down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]
Career Readiness, Life Literacies, and Key Skills (CLKS): (Use Font: Times, Size:12, Not Bold) (List standards, all K-12 curricula) 9.4.2.CT.1, 9.4.2.CT.2:, 9.4.2.CI.1, 9.4.2.CT.3
Primary Interdisciplinary Connections: (Use Font: Times, Size:12, Not Bold) (List content areas and standards) MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, and HSN-Q.A.3
Computer Science and Design Thinking Standards: (Use Font: Times, Size:12, Not Bold) (List the standards to show integration, all K-12 curricula) 8.1.12.DA.6

Climate Change Standards: (Use Font: Times, Size:12, Not Bold) (List standards to show integration. https://www.nj.gov/education/standards/climate/learning/gradeband/index.shtml HS-ESS3-4, HS-ESS3-5
ELA Companion Standards: (Use Font: Times, Size:12, Not Bold) RST.9-10.7, RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9, SL.11-12.5

Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***
• Construct and analyze motion diagrams to determine motion of an object. (HS-PS2-1) • Differentiate between displacement and motion using data gathered from experiments. (HS-PS2-1) • Use simple mathematical expressions to show the relationship between velocity, speed, displacement, and motion. (HS-PS2-1)	• Key Term Activity Students will define the key terms of this unit and will create a vocabulary practice activity with a partner. Students will; then share their activities with the class, and the class will practice the terms. • Key Term Quiz Students will be assessed on the key terms of this chapter. It is important to have a working knowledge of these terms, so students will need to apply the terms to various scenarios. • Motion Diagram Activity Students will create and analyze motion diagrams by creating 3D models. Students will use a toy car and a numberline on the floor to model and express motion.	Week 21 Week 22 Week 23

	• Distance and Displacement Lab Students will determine their distance and displacement using a meter stick and the set of instructions provided. This lab will cover simple mathematical problems, measurements, and accuracy. • Graphing Speed Activity Students will gather data from a word problem, and using their knowledge, they will convert, analyze, and graph the data to show average speed over a period of time. • Speed and Velocity Lab Students will calculate their speed and velocity while performing different tasks. • Basic Motion Test Students will be assessed on their knowledge of motion, distance, displacement, speed, and velocity through a series of scenarios where students will need to apply the concepts to answer each question.	Week 24 Week 25

Differentiating Instruction: Students with Disabilities, English Language Learners, and Gifted & Talented Students

Examples of Strategies and Practices that Support Students with Disabilities:

- Use of visual and multisensory formats
- Use of assisted technology
- Use of prompts
- Modification of content, student products, and assessment tools (rubrics for example)
- Testing accommodations

• Authentic assessments (ex: write an email to your state senator about a current event issue you are passionate about, design/implement a class debate, create and balance a college freshman budget, create a commercial that dispels a myth about climate change)

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• Curriculum compacting
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• Higher-order thinking skills
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• Student-driven instruction
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•Word walls
•Sentence frames
•Think-pair-share
•Cooperative learning groups

Unit 5: Accelerated Motion and Forces

Pacing/Days: Weeks 26-33

Unit Summary: The acceleration and force of an object are dependent on many factors that will be covered in this unit. Before forces can be explored, acceleration must be calculated using an object's velocity. Students will plan an investigation to show how an object's motion depends on the sum of the forces on the objects and mass of the object. Balanced and unbalanced forces can change or maintain the motion of an object. Newton's Laws of Motion are examined through actual real time investigations and using computer simulations.

Learning Targets

Unit Big Ideas: Acceleration is the rate of change in an object's velocity.

Unit Essential Questions:

- How is acceleration different from velocity?
- How do objects in free fall move?
- What is a force?
- How are the weight and mass of an object related?
- What effect does air have on falling objects?

Unit Enduring Understandings:	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
Students will understand that… ● Acceleration is the rate at which an object's velocity changes. (HS-PS2-1) ● Gravity impacts the rate at which an object in a free fall moves. ● Force is a push or pull movement on an object, and it can increase or decrease depending on the magnitude of the applied force. (HS-PS2-1)	Students will know and be able to… HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. ● Identify an object's acceleration in an experiment. ● Explain how gravity impacts an object's free fall movement.

● Weight is the gravitational force experienced by the object, which is directly proportional to its mass. (HS-PS2-2) ● Objects in free fall are impacted by drag forces.(HS-PS2-3)	HS-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. ● Calculate an object's weight under various circumstances. HS-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. ● Construct a 3D model that will be used to calculate force, velocity, and acceleration during a free fall. **Disciplinary Core Ideas** PS2.A: Forces and Motion ● Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1) ● Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. (HS-PS2-2) ● If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (HS-PS2-2), (HS-PS2-3) **Science and Engineering Principles** Analyzing and Interpreting Data Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data. ● Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-PS2-1)

	Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ● Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3)

Evidence of Learning :

Formative:

- Acceleration Scenarios
- Forces Interactive Activity
- Falling for Gravity Activity
- Weight On Different Planets Worksheet
- Exit Tickets
- Group discussions
- Do Nows

Summative:

- Egg Drop Project
- Acceleration and Forces Unit Test

New Jersey State Learning Standards

NJSLS Standards: (Use Font: Times, Size:12, Not Bold) (List the standards for the subject area)

HS-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object

sliding down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

HS-PS2-2 Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. [Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.] [Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.]

HS-PS2-3 Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. [Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]

Career Readiness, Life Literacies, and Key Skills (CLKS): (Use Font: Times, Size:12, Not Bold) (List standards, all K-12 curricula)
9.4.2.CT.1, 9.4.2.CT.2:, 9.4.2.CI.1, 9.4.2.CT.3

Primary Interdisciplinary Connections: (Use Font: Times, Size:12, Not Bold) (List content areas and standards)
MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, and HSN-Q.A.3

Computer Science and Design Thinking Standards: (Use Font: Times, Size:12, Not Bold) (List the standards to show integration, all K-12 curricula)
8.1.12.DA.6

Climate Change Standards: (Use Font: Times, Size:12, Not Bold) (List standards to show integration.
https://www.nj.gov/education/standards/climate/learning/gradeband/index.shtml

HS-ESS3-5: Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
ELA Companion Standards: (Use Font: Times, Size:12, Not Bold) RST.9-10.7, RST.11-12.1, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9, SL.11-12.5

Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***
• Identify an object's acceleration in an experiment. (HS-PS2-1) • Explain how gravity impacts an object's free fall movement. (HS-PS2-1) • Calculate an object's weight under various circumstances. (HS-PS2-2) • Construct a 3D model that will be used to calculate force, velocity, and acceleration during a free fall. (HS-PS2-3)	• Anchoring Phenomena - Laying on a Bed of Nails Students will watch this video and write down their thoughts on a piece of paper. Encourage students to think about and try to explain how something like this is possible. A class discussion will follow. • Acceleration Scenarios(HS-PS2-1) Students will be presented with multiple scenarios and tasks where they will need to apply the principles of motion and acceleration to answer and complete the challenges. • Force Interactive Activity(HS-PS2-2) Students will use an interactive simulation to investigate the variables that affect the acceleration of an object and the manner in which those variables affect the acceleration. • Falling for Gravity Activity (HS-PS2-1)	Week 26 Week 27 Week 28

	In this set of activities, you will investigate and compare the rate that different objects fall to the ground. • Weight On Different Planets(HS-PS2-2) Students will explore how gravity impacts the weight of an object by calculating their weight on different planets. • Egg Drop Project (HS-PS2-3) Students will design a container that will protect an egg, when dropped from extreme heights and be able to explain how and why each component of your container reduces impact force. • Acceleration and Forces Unit Test Students will be assessed on acceleration and forces using scenarios where concepts must be applied to solve the problem. • Anchoring Phenomena (Revisited) - Laying on a Bed of Nails At the end of the unit, students will work together to explain the phenomena. Groups will discuss with the class to come up with a final explanation.	Week 29 Week 30-32 Week 33

Differentiating Instruction:
Students with Disabilities, English Language Learners, and Gifted & Talented Students

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Unit 6: Energy

Pacing/Days: Weeks 34-38

Unit Summary: The different forms of energy will be identified and investigated and will include mechanical and non-mechanical forms. Students will investigate the transfer and transformation from one kind of energy to another using activities such as roller coaster simulations and analyzing household utility bills. At the end of this unit, students will have a better understanding of how energy transforms.

Learning Targets

Unit Big Ideas: Energy is the ability of a system to produce change in itself or its environment.

Unit Essential Questions:

- What is energy and what are the different forms of energy?
- How are work and energy related?
- Under what conditions is energy conserved?
- What is mechanical energy, and when is it conserved?

Unit Enduring Understandings: Students will understand that…	**Student Learning Targets/Learning Objectives :**(Use Font: Times, Size:12, Bulleted, Not Bold)
• Energy is the ability of a system to produce a change in itself or the world around it, and it can be found in many forms. • Work is the transfer of energy that occurs when a force is applied through a displacement. The work done on a system is equal to the change in energy of that system. • The Work-Energy Theorem states that doing work on a system causes a change of energy in that system.	HS-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. • Calculate the work and power needed to move an object at different speeds. • Predict how energy changes from one form to another. HS-PS3-2**.** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields. • Compare potential and kinetic energy released by an object.

<table>
<tr>
<td>● The sum of kinetic and potential energy is called mechanical energy.</td>
<td>Disciplinary Core Ideas
PS3.A: Definitions of Energy
● Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system’s total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. (HS-PS3-1), (HS-PS3-2)
● At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy. (HS-PS3-2) (HS-PS3-3)

PS3.B: Conservation of Energy and Energy Transfer
● Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system. (HS-PS3-1)
● Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems. (HS-PS3-1), (HS-PS3-4)

Crosscutting Concepts
Connections to Engineering, Technology, and Applications of Science
Influence of Science, Engineering, and Technology on Society and the Natural World
● Modern civilization depends on major technological systems. Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks. (HS-PS3-3)</td>
</tr>
<tr>
<td colspan="2">Evidence of Learning :
Formative:
● Energy, Work, and Power Lab
● Rubber Band Energy Lab</td>
</tr>
</table>

- Studying Energy Changes in a Roller Coaster Lab
- Observing Energy Changes
- Exit Tickets
- Do Nows
- Class discussion

Summative:

- Forms of Energy Research Project
- Energy Unit Test

New Jersey State Learning Standards

NJSLS Standards: (Use Font: Times, Size:12, Not Bold) (List the standards for the subject area)

HS-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. [Clarification Statement: Emphasis is on explaining the meaning of mathematical expressions used in the model.] [Assessment Boundary: Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.]

HS-PS3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). [Clarification Statement: Examples of phenomena at the macroscopic scale could include the conversion of kinetic energy to thermal energy, the energy stored due to position of an object above the earth, and the energy stored between two electrically-charged plates. Examples of models could include diagrams, drawings, descriptions, and computer simulations.]

Career Readiness, Life Literacies, and Key Skills (CLKS): (Use Font: Times, Size:12, Not Bold) (List standards, all K-12 curricula) 9.4.2.CT.1, 9.4.2.CT.2:, 9.4.2.CI.1, 9.4.2.CT.3
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Climate Change Standards: (Use Font: Times, Size:12, Not Bold) (List standards to show integration. https://www.nj.gov/education/standards/climate/learning/gradeband/index.shtml HS-ESS2-4: Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
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Lesson Plans		
Standard ***Student Learning Targets***	***Learning Experiences and Instructional Strategies*** ***(Tag: Amistad & Holocaust, DEI, LGBTQ, AAPI)***	***Timeframe***

• Calculate the work and power needed to move an object at different speeds.(HS-PS3-1) • Predict how energy changes from one form to another. (HS-PS3-1) • Compare potential and kinetic energy released by an object. (HS-PS3-2)	• Anchoring Phenomena - • Energy, Work, and Power Lab (HS-PS3-1) Students will investigate how work, power, and energy change when someone climbs the stairs at different rates. • Rubber Band Energy Lab (HS-PS3-2) Students will observe the relationship between potential and kinetic energy. • Observing Energy Change Exploration (HS-PS3-1) Students will be given a windup toy and will compare how the object moves with and without windup. While winding up, students will discuss how the spring feels and relate this to energy transformation. • Studying Energy Changes in a Roller Coaster Lab (HS-PS3-2) Students will investigate the relationship between potential and kinetic energy. • Forms of Energy Research Project Groups of students will be assigned a type of energy that they will need to research and develop a presentation. Students will be given a project guideline sheet and rubric. • Energy Unit Test Students will be assessed on acceleration and forces using scenarios where concepts must be applied to solve the problem.	Week 34 Week 35 Week 37 Week 38
Differentiating Instruction:		

Students with Disabilities, English Language Learners, and Gifted & Talented Students

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