

Grade level: 10

Course Title: Physical Science

Topic/Concept: Nature of Science

Time Allotment: 5 days

Unit Sequence: 1

Major Concepts to be learned:

- How does scientific knowledge develop?
- What is a scientist or engineer and what do they do?
- What types of people can be scientists and engineers?
- What is a controlled experiment and what are the parts?
- What is the difference between a hypothesis, theory, and a law?

Expected Skills to be demonstrated:

- I can define science and discuss skills commonly used by all scientists.
- I can explain the purpose of an investigation/experiment.
- I know the difference between a scientific hypothesis, theory, and a law.
- I know and can explain the differences between the scientific method and the engineering process and the purposes of each.
- I know that the scientific/engineering methods are fluid and not limited to the sequence of steps.
- I can engage in scientific experimentation and STEM challenges to model the scientific theory and engineering method.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

SEP – Planning and Carrying Out Investigation
SEP – Developing and using models
DCI – Structure and Function
CCC – Scale, Proportion, Quantity
CCC – Connections to Engineering and Tech

Instructional Strategies:

Assessments:

Set Up Binders
Problem solving activities
Lecture
Hands-on activity
Note Taking

- Lab Safety Quiz
- Variables Quiz
- Interpreting and Analyzing Data Quiz
- Nature of Science Unit Exam
- Nature of Science One-Pager

Grade level: 10

Course Title: Physical Science

Topic/Concept: Kinematics

Time Allotment: 15 days

Unit Sequence: 2

Major Concepts to be learned:

- What is the difference between distance and displacement?
- How do speed and velocity describe how fast an object moves?
- How does constant motion differ from changing motion?
- What information can be learned from a position-time graph?
- How can kinematic equations be used to solve motion problems?

How are scalars and vectors used to describe motion?
What does acceleration tell us about an object's motion?
How does gravity affect objects in free fall?
What information can be learned from a velocity-time graph?
How can kinematics be applied to real-world motion situations?

Expected Skills to be demonstrated:

- I will be able to calculate speed, velocity, and acceleration.
- I will be able to identify scalar and vector quantities.
- I will be able to interpret and analyze position-time and velocity-time graphs.
- I will be able to use correct units and dimensional analysis in calculations.
- I will be able to describe motion using words, equations, and graphs.

I will be able to distinguish between distance and displacement.
I will be able to solve motion problems using kinematic equations.
I will be able to determine slope and area relationships on motion graphs.
I will be able to analyze motion during free fall.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.I
3.2.9-12.J
3.2.9-12.K
HS-PS2-1(A-C)

SEP – Using Math and Computation Thinking
SEP – Analyzing and interpreting Data
SEP – Developing and Using Models
CCC – Patterns
CCC – Cause and Effect
DCI – Forces and Motion
DCI – Types of Interactions

Instructional Strategies:

Assessments:

Direct instruction with guided notes
Modeling problem-solving strategies
Real-world motion examples and applications
Graphing and graph analysis activities
Partner and small-group collaboration
Inquiry-based labs and investigations
Motion demonstrations and simulations
Scaffolded practice problems
Interactive discussions and think-pair-share
Interactive notebook activities

- Whiteboard practice: sketching motion graphs from descriptions
- Lab checkpoints
- Quizzes on graph reading and vocabulary
- Error analysis: fix incorrect motion graphs or calculations
- Homework practice on simple kinematics problems
- Unit test (calculations, graph interpretation, conceptual questions)
- CER writing
- Formal Hot Wheels lab report

Grade level: 10

Course Title: Physical Science

Topic/Concept: Using Vectors

Time Allotment: 10 days

Unit Sequence: 3

Major Concepts to be learned:

- | | |
|---|---|
| <ul style="list-style-type: none">• How do scalars and vectors differ, and why does direction matter in physics?• How can vectors be added using graphical methods like tip-to-tail?• How does subtracting a vector change its direction and meaning?• How can the Pythagorean theorem be used to determine the magnitude of a resultant vector?• How do different angle and direction conventions (bearing, compass, Cartesian) affect how we describe motion?• How does changing the reference frame affect how we describe motion (relative motion)?• How are vectors used to describe real-world situations like force, velocity, and displacement? | <ul style="list-style-type: none">• How can a vector be represented using both magnitude and direction?• How can vectors be broken into x- and y-components to make calculations easier?• What is a resultant vector, and how does it represent net direction and magnitude?• How can trigonometry (SOH-CAH-TOA) be used to resolve vectors into components? |
|---|---|

Expected Skills to be demonstrated:

- | |
|---|
| <ul style="list-style-type: none">• I will be able to distinguish between scalars and vectors and explain why direction is important in describing motion.• I will be able to represent, add, and subtract vectors using graphical and component methods to determine resultant vectors.• I will be able to break vectors into x- and y-components and use them to solve motion problems.• I will be able to use the Pythagorean theorem and trigonometry (SOH-CAH-TOA) to calculate vector magnitude and direction.• I will be able to interpret different direction systems and apply them correctly in motion scenarios.• I will be able to describe and analyze motion from different reference frames and apply vector concepts to real-world situations. |
|---|

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.I
3.2.9-12.J
3.2.9-12.K
HS-PS2-1

SEP – Planning and Carrying Out Investigation
SEP – Using math and computational thinking
SEP – Analysing and Interpreting Data
DCI – Forces and Interactions
DCI – Motion and Relationship
CCC – Scale, Proportion, Quantity
CCC – Connections to Engineering and Tech
CCC – Energy and Matter

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects
Performance task
Interactive notebook activities

- Whiteboard practice (graphs, vectors, quick problems)
- Hot Wheels lab checkpoints and teacher observations
- Mini quizzes (digital or paper) on vocabulary and skills
- Error analysis and quick corrections of graphs or vectors
- Think-Pair-Share and peer explanations during problems
- Unit test (graphs, vectors, calculations, concepts)
- Hot Wheels lab report (data, graphs, analysis, conclusions)
- CER writing task using motion/vector evidence
- Vector problem-solving Quizzes

Grade level: 10

Course Title: Physical Science

Topic/Concept: Projectile Motion

Time Allotment: 12 days

Unit Sequence: 4

Major Concepts to be learned:

- How are horizontal and vertical motions independent in projectile motion?
- How do vector components, initial velocity, and launch angle affect a projectile's path?
- How do we determine key features of projectile motion such as time of flight, maximum height, and range?
- How does gravity influence the vertical motion of a projectile?
- How can kinematic equations, graphs, and vectors be used to analyze projectile motion?
- How is projectile motion applied to real-world situations like sports and ballistics?

Expected Skills to be demonstrated:

- I will be able to analyze motion by separating it into horizontal and vertical components.
- I will be able to use vector components, velocity, and launch angle to predict projectile paths.
- I will be able to determine key values in projectile motion, including time, height, and range.
- I will be able to explain how gravity specifically affects vertical motion during flight.
- I will be able to solve projectile motion problems using equations, graphs, and vector reasoning.
- I will be able to connect projectile motion concepts to real-world examples and applications.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.I
3.2.9-12.K
3.1.9-12.L
3.2.9-12.Q
HS-PS2-1(B,D)

SEP – Planning and Carrying Out Investigation
SEP – Constructing Explanations
SEP – Developing and Using Models
DCI – Forces and Interactions
CCC – Scale, Proportion, Quantity
CCC – Cause and Effect
CCC – Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects
Performance tasks

- Simulation checkpoints (predict → test → revise using digital projectile tools or demos)
- Teacher observation during labs (launch angle, range trials, data collection accuracy)
- Think-Pair-Share on motion predictions and explanations
- Error analysis of incorrect projectile paths or calculations
- Unit test
- CER writing task
- Problem-solving quizzes
- Catapult engineering project (design, build, test, and analyze projectile motion for accuracy and range)

Grade level: 10

Course Title: Physical Science

Topic/Concept: Newton's Law & Application

Time Allotment: 13 days

Unit Sequence: 5

Major Concepts to be learned:

- How does Newton's First Law explain inertia and motion?
- How does Newton's Third Law explain action-reaction force pairs?
- How do balanced and unbalanced forces affect motion?
- How can net force be calculated in real-world situations?
- How can forces and motion be analyzed in accelerating systems?

How are force, mass, and acceleration related in Newton's Second Law?
How can free-body diagrams be used to analyze forces acting on an object?
How does friction influence the motion of objects?
How are Newton's Laws applied to systems such as elevators, pulleys, and vehicles?
How do Newton's Laws explain motion in everyday life and engineering applications?

Expected Skills to be demonstrated:

- I will be able to explain Newton's First, Second, and Third Laws of Motion.
 - I will be able to calculate net force, mass, and acceleration using Newton's Second Law.
 - I will be able to analyze how friction affects motion.
 - I will be able to solve force and motion problems involving multiple forces.
 - I will be able to explain how forces cause changes in motion.
 - I will be able to connect Newton's Laws to everyday applications and engineering designs.
- I will be able to identify balanced and unbalanced forces.
 - I will be able to draw and interpret free-body diagrams.
 - I will be able to identify action-reaction force pairs in real-world situations.
 - I will be able to apply Newton's Laws to systems such as elevators, pulleys, and vehicles.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.L
3.2.9-12.Q
3.2.9-12.S
HS-PS2-1
HS-PS2-2

SEP – Planning and Carrying Out Investigation
SEP – Constructing Explanations
DCI – Forces and Interactions
CCC – Scale, Proportion, Quantity
CCC – Cause and Effect
CCC – Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects
Performance tasks

- Free-body diagram practice
- Force calculation activities
- Partner problem solving
- Newton's Laws unit test
- Free-body diagram assessment
- Force and motion lab report
- Engineering or design challenge project

Grade level: 10

Course Title: Physical Science

Topic/Concept: Energy & Work

Time Allotment: 13 days

Unit Sequence: 6

Major Concepts to be learned:

- How is work calculated when a force causes displacement?
- What is the difference between kinetic and potential energy?
- How does the Law of Conservation of Energy apply to motion?
- How do friction and other nonconservative forces affect energy?
- How is power related to work and energy?

How are work, force, and displacement related?
How does energy transfer between kinetic and potential forms?
How can work and energy be used to analyze moving systems?
How can energy transformations be represented in real-world systems?
How are work and energy applied in everyday life and engineering situations?

Expected Skills to be demonstrated:

- I will be able to explain why work is only done when an object moves.
- I will be able to predict how height and speed affect an object's energy.
- I will be able to use energy relationships to solve complex motion problems.
- I will be able to evaluate the effects of friction and energy loss on motion.
- I will be able to compare the efficiency and power output of different systems.

I will be able to compare situations with high and low kinetic energy.
I will be able to track how energy changes throughout a system.
I will be able to determine when energy is conserved in a system.
I will be able to analyze energy transformations in machines and everyday objects.
I will be able to use work and energy concepts to explain real-world phenomena.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.O 3.2.9-12.P
3.2.9-12.R 3.2.9-12.Q
3.2.9-12.S
HS-PS3-1 HS-PS3-2

SEP – Constructing
DCI – Energy conservation
CCC – Systems and System Models
CCC – Cause and Effect
CCC – Energy and Matter

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Energy Calculations Practice
- Transformation Simulations
- Partner problem solving
- Work and Energy unit test
- Roller Coaster Project
- Energy Analysis Project

Grade level: 10

Course Title: Physical Science

Topic/Concept: Electricity & Magnetism

Time Allotment: 15 days

Unit Sequence: 7

Major Concepts to be learned:

- | | |
|---|--|
| <ul style="list-style-type: none">• How do electric charges interact, and what causes objects to become charged?• How do electric forces compare to gravitational forces in terms of attraction and repulsion?• How does electric current flow through a circuit, and what is needed for a complete circuit?• How do series and parallel circuits differ in terms of current, voltage, and resistance?• How do magnets produce magnetic fields, and how are those fields represented?• How are electricity and magnetism used together in real-world technologies like motors and generators?• How can energy be transferred and converted between electrical and mechanical forms? | <ul style="list-style-type: none">• How do voltage, current, and resistance relate to each other in a circuit?• How does energy transform as electricity flows through a circuit?• What factors affect the strength of an electric current in a circuit?• How do electromagnets work, and what factors increase their strength? |
|---|--|

Expected Skills to be demonstrated:

- | |
|--|
| <ul style="list-style-type: none">• I will be able to explain how electric charges interact and how objects become charged.• I will be able to describe how electric current flows in a complete circuit and how voltage, current, and resistance are related.• I will be able to compare and predict the behavior of series and parallel circuits.• I will be able to explain how electrical energy is transferred and transformed in circuits.• I will be able to describe how magnetic fields are produced and how electricity and magnetism interact (electromagnetism).• I will be able to apply my understanding of electricity and magnetism to real-world devices such as motors, generators, and electromagnets. |
|--|

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.O	3.2.9-12.S	SEP – Analyzing and interpreting data SEP - Modeling DCI – Energy conservation DCI - Electromagnets CCC – Systems and System Models CCC – Cause and Effect CCC – Energy and Matter CCC - Patterns
3.2.9-12.P	3.2.9-12.W	
3.2.9-12.R	3.2.9-12.X	
3.2.9-12.Q		
HS-PS2-4,5		

Instructional Strategies:

Assessments:

<p>Inquiry stations Claim–Evidence–Reasoning (CER) Doodle notes / visual note-taking Modeling and drawing activities Concept sorting / card sorts Phenomena-based lesson introductions Graphic Organizers Digital simulations and interactives Collaborative projects</p>	<ul style="list-style-type: none">• Circuit Practice and Quizzes• Digital Magnetic Field Investigation• Electromagnet Inquiry• Electricity and Magnetism unit test• House Project
---	---

Grade level: 10

Course Title: Physical Science

**Topic/Concept: Waves & the
Electromagnetic System**

Time Allotment: 10 days

Unit Sequence: 8

Major Concepts to be learned:

- How do waves transfer energy without transferring matter?
- How do frequency, wavelength, and amplitude describe wave behavior?
- How does sound travel through different mediums, and why can't it travel through a vacuum?
- How do waves interact through reflection, refraction, diffraction, and absorption?
- How do lenses and mirrors form images?
- How can wave properties explain everyday phenomena like echoes, rainbows, and hearing?
- How are waves used in technology such as sonar, medical imaging, and communication systems?

What are the differences between mechanical waves and electromagnetic waves?
How do transverse and longitudinal waves differ in motion and structure?
How do changes in frequency and amplitude affect sound (pitch and volume)
How do light waves behave when they reflect and refract?
How does the human eye use light to see objects?

Expected Skills to be demonstrated:

- I will be able to describe how waves transfer energy without transferring matter.
- I will be able to compare mechanical and electromagnetic waves and distinguish between transverse and longitudinal waves.
- I will be able to explain how frequency, wavelength, and amplitude describe wave behavior and affect sound.
- I will be able to describe how waves interact through reflection, refraction, diffraction, and absorption.
- I will be able to explain how light forms images using reflection, refraction, mirrors, and lenses.
- I will be able to connect wave properties to real-world phenomena and technologies.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.O 3.2.9-12.S
3.2.9-12.P 3.2.9-12.W
3.2.9-12.R 3.2.9-12.X
3.2.9-12.Q
HS-PS2-4,5

SEP – Analyzing and interpreting data
SEP - Modeling
DCI – Waves and Energy Transfer
DCI – Waves and Sound
CCC – Systems and System Models
CCC – Cause and Effect
CCC – Energy and Matter
CCC - Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Wave Components and Properties Quiz
- Digital Simulations
- Build a wave project
- Sound and Optics unit test
- Applications Project

Grade level: 10

Course Title: Physical Science

Topic/Concept: States of Matter

Time Allotment: 9 days

Unit Sequence: 9

Major Concepts to be learned:

- What are the three common states of matter?
- How do particles move in each state of matter?
- Why does a solid keep its shape while a liquid does not?

What are the characteristics of solids, liquids, and gases?
How are solids, liquids, and gases different from one another?
How are particles arranged in solids, liquids, and gases?

Expected Skills to be demonstrated:

- I will be able to compare the arrangement of particles in solids, liquids, and gases.
- I will be able to describe the relationship between particle motion and kinetic energy.
- I will be able to explain why solids have a definite shape and volume.
- I will be able to explain why gases have neither a definite shape nor a definite volume.
- I will be able to identify and define melting, freezing, vaporization, condensation, sublimation, and deposition.
- I will be able to explain how energy is absorbed or released during phase changes.
- I will be able to model phase changes using particle diagrams.
- I will be able to explain how adding or removing thermal energy causes matter to change state.

I will be able to explain how particle motion differs among the states of matter.
I will be able to use the particle model to explain the properties of solids, liquids, and gases.
I will be able to explain why liquids have a definite volume but take the shape of their container.
I will be able to describe how temperature affects the movement of particles.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.O 3.2.9-12.S
3.2.9-12.P 3.2.9-12.W
3.2.9-12.R 3.2.9-12.X
3.2.9-12.Q
HS-PS1-7
HS-PS2-6

SEP – Analyzing and interpreting data
SEP - Modeling
DCI – Waves and Energy Transfer
CCC – Systems and System Models
CCC – Cause and Effect
CCC – Energy and Matter
CCC - Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Inquiry Activity: Introduction of the Classification of Matter
- Lab Station Activity: Matter
- Mini-Lab: Law of the Conservation of Matter
- States of Matter unit test
- Project: An Investigation of Mass, Temperature, and Phase Change

Grade level: 10

Course Title: Physical Science

Topic/Concept: The Atom

Time Allotment: 10 days

Unit Sequence: 10

Major Concepts to be learned:

- Why are atoms considered the building blocks of matter?
- Where are protons, neutrons, and electrons located?
- What is atomic number?
- How can the number of protons, neutrons, and electrons be determined?
- What are isotopes?
- What are ions?

What evidence supports the existence of atoms?
How does the number of protons determine an element's identity?
What is mass number?
What are the charges and relative masses of subatomic particles?
How do isotopes of the same element differ?
How does gaining or losing electrons create ions?

Expected Skills to be demonstrated:

- I will be able to describe the structure of an atom.
- I will be able to identify and compare protons, neutrons, and electrons.
- I will be able to determine atomic number, mass number, and numbers of subatomic particles.
- I will be able to explain the difference between isotopes and ions.
- I will be able to describe how the atomic model has evolved.
- I will be able to explain how atomic structure affects chemical properties.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.A
3.2.9-12.R
3.2.9-12.H
HS-PS1-1
HS-PS2-8

SEP – Analyzing and interpreting data
SEP – Obtaining, evaluating and communicating information
DCI – Structure and Properties of Matter
CCC – Cause and Effect
CCC – Energy and Matter
CCC - Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Atomic Theory Timeline Model
- Class Project: Bohr Model Periodic Table
- Atomic and Isotope Calculations
- The Atom Unit Test
- Project: The Atom Children's Book

Grade level: 10

Course Title: Physical Science

Topic/Concept: Chemical Bonding

Time Allotment: 15 days

Unit Sequence: 11

Major Concepts to be learned:

- | | |
|--|--|
| <ul style="list-style-type: none">• Why are atoms form bonds?• How does conductivity help identify bond type?• Why do atoms form bonds?• How do ionic, covalent, and metallic bonds differ?• What evidence can be used to classify a substance as ionic, molecular, or metallic? | <ul style="list-style-type: none">• How can we determine the type of bonding in an unknown substance?• How does solubility provide evidence about bonding?• How can we predict the type of bond that will form?• How does bonding explain the properties of substances? |
|--|--|

Expected Skills to be demonstrated:

- | |
|--|
| <ul style="list-style-type: none">• I will be able to interpret chemical fromulas.• I will be able to use an element's location on the periodic table to determine its oxidation number and bonding tendencies.• I will be able to draw electron dot diagrams for individual elements, and to show ionic bond formation.• I will be able to explain why elements form compounds, and what most elements need to achieve this. Include which elements do not tend to form compounds and why. |
|--|

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.A
3.2.9-12.R
3.2.9-12.H
HS-PS1-1
HS-PS2-8

SEP – Analyzing and interpreting data
SEP – Obtaining, evaluatiing and communcaition information
DCI – Structure and Properties of Matter
CCC – Cause and Effect
CCC – Energy and Matter
CCC - Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Drawing Covalent and Ionic Bonds
- Activity: Ionic Naming Race
- Activity: Mixed Naming
- Naming Quiz, Unit Exam
- Project: Elemental Superhero Project

Grade level: 10

Course Title: Physical Science

Topic/Concept: Chemical Reactions

Time Allotment: 20 days

Unit Sequence: 12

Major Concepts to be learned:

- What is a chemical reaction?
- What evidence indicates that a chemical reaction has occurred?
- How are chemical equations used to describe chemical reactions?
- How are atoms rearranged during a reaction?
- How does the Law of Conservation of Mass apply to chemical reactions?

How can a chemical reaction be distinguished from a physical change?
What do reactants and products represent?
Why must chemical equations be balanced?
Why are atoms neither created nor destroyed in a chemical reaction?

Expected Skills to be demonstrated:

- I will be able to identify if a chemical reaction has occurred based on a description or visual representation.
- I will be able to balance chemical equations with regards to the Law of Conservation of Mass.
- I will be able to explain the Law of Conservation of Mass and how it relates to the amount of reactants and products in a chemical reaction.
- I will be able to differentiate between numbers that can be changed to balance a chemical reaction and numbers that cannot be changed.
- I will be able to apply knowledge of chemical bonds and classification of reactions to predict the products that will result from a reaction.
- I will be able to apply knowledge of chemical bonds and classification of reactions to predict the products that will result from a reaction.
- I will be able to describe, in detail, five factors that affect the rate of chemical reactions.

PA STEEL Standards/NGSS Standards:

SEP/DCI/CCC:

3.2.9-12.A
3.2.9-12.R
3.2.9-12.H
HS-PS1-1
HS-PS2-8

SEP – Analyzing and interpreting data
SEP – Obtaining, evaluating and communicating information
DCI – Structure and Properties of Matter
CCC – Cause and Effect
CCC – Energy and Matter
CCC – Patterns

Instructional Strategies:

Assessments:

Inquiry stations
Claim–Evidence–Reasoning (CER)
Doodle notes / visual note-taking
Modeling and drawing activities
Concept sorting / card sorts
Phenomena-based lesson introductions
Graphic Organizers
Digital simulations and interactives
Collaborative projects

- Predicting Products of Chemical Reactions
- Activity: Balancing Reactions
- Lab Stations: Reactions Review
- Balancing and Classifying Quiz, Unit Exam
- Tea and Reaction Rate Lab