

Course: INTEGRATED PHYSICAL SCIENCE Sub-topic: General

Course

Unit: Unit 0 - Lab Safety

Timeline: Week 36

Topic: Lab Safety and Protocol

Topic: Lab Safety Rules

Unit: Unit 1 - Matter and Measurement

Timeline: Week 37

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S3.C.1.1 (Advanced) Describe the observable physical properties of matter.

S3.C.1.1.1 (Advanced) Describe matter in terms of its observable properties (e.g., weight, mass, shape, size, color, texture, state).

S3.C.1.1.2 Classify matter using observable physical properties (e.g., weight, mass, shape, size, color, texture, state).

S3.C.1.1.3 Classify a substance as a solid, liquid, or gas.

(Advanced)	Classify a substance as a solid, liquid, or gas.	
S3.C.1.1.4	Recognize and identify how water goes through phase	

(Advanced) changes (i.e., evaporation, condensation, freezing, and melting).

S3.C.1.1.5 (Advanced) Describe how the properties of matter can be changed (e.g., heating, cooling, physical weathering).

S4.C.1.1 (Advanced) Describe observable physical properties of matter.

S4.C.1.1.1 (Advanced) Use physical properties [e.g., mass, shape, size, volume, color, and texture, magnetism, state (i.e., solid, liquid, and gas), conductivity (i.e., electrical and heat)] to describe matter.

S4.C.1.1.2
(Advanced) Categorize/group objects using physical characteristics.

S5.C.1.1 (Advanced) Describe the observable physical properties of matter.

S5.C.1.1.1 (Advanced)	Identify characteristic properties of matter that are independent of mass and volume.	
--------------------------	---	--

S5.C.1.1.2
(Advanced) Differentiate between volume and mass.

S5.C.1.2 (Advanced) Describe that matter can undergo chemical and physical changes.

S5.C.1.2.1 (Advanced) Describe how water changes from one state to another.

Identify differences between chemical and physical changes of matter.

S5.C.3.1.1 (Advanced) Differentiate between the mass and weight of an object.

S6.C.1.1 (Advanced)	Explain that matter has observable physical properties.	
S6.C.1.1.1	Describe how characteristic physical properties of matter can	

56.C.1.1.1 Describe how characteristic physical properties of matter can be used to distinguish one substance from another (e.g., boiling point, freezing/melting points).
(Advanced)

S6.C.1.1.2
(Advanced) Explain that materials are characterized by having a specific amount of mass in each unit of volume (density).

S6.C.1.2 (Advanced) Describe that matter can undergo chemical and physical changes.

S6.C.1.2.1
(Advanced)

Describe how water changes from one state to another.

S6.C.1.2.2 (Advanced) Identify differences between chemical and physical changes of matter.

S6.C.2.1.2 (Advanced) Describe the effect of heat on particle motion during phase changes.

S7.C.1.1 (Advanced)	Describe the structure of matter and its chemical and physical properties.	
S7.C.1.1.1 (Advanced)	Use characteristic physical or chemical properties of matter to distinguish one substance from another (e.g., density, freezing/melting points, solubility, ability to rust).	
S7.C.1.1.2 (Advanced)	Recognize that the atom is the basic building block for all matter.	
S8.C.1.1 (Advanced)	Explain concepts about the structure and properties (physical and chemical) of matter.	
S8.C.1.1.1 (Advanced)	Explain the differences among elements, compounds, and mixtures.	
S8.C.1.1.2 (Advanced)	Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test).	

Topic: The Scientific Method

Topic: Matter Classification and Changes

Topic: Measurement

Topic: Density

Topic: Unit Conversions

Unit: Unit 2 - Understanding Atoms

Timeline: Week 39

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S7.C.1.1.2 (Advanced)	Recognize that the atom is the basic building block for all matter.	
S11.C.1.1.1 (Advanced)	Explain that matter is made of particles called atoms and that atoms are composed of even smaller particles (e.g., protons, neutrons, electrons).	
S11.C.2.1.1 (Advanced)	Compare or analyze waves in the electromagnetic spectrum (e.g., ultraviolet, infrared, visible light, Xrays, microwaves) as well as their properties, energy levels, and motion.	

Topic: Atomic Theory

Topic: Isotopes

Topic: Relative Abundance

Topic: Atomic Emission Spectra

Topic: The Bohr Model

Topic: Electron Configurations

Unit: Unit 3 - The Periodic Table

Timeline: Week 41

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S11.C.1.1.4 (Advanced)	Explain how the relationships of chemical properties of elements are represented in the repeating patterns within the periodic table.	
------------------------	---	--

Topic: Intro to the Periodic Table

Topic: Effective Nuclear Charge

Topic: Periodic Trends

Topic: Reactivity

Unit: Unit 4 - Nomenclature

Timeline: Week 44

Topic: Chemical Formulas

Topic: Naming/Formulas for Ionic Compounds

Topic: Naming/Formulas Acidic Compounds

Topic: Naming/Formulas Molecular Compounds

Unit: Unit 5 - Motion

Timeline: Week 46

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S3.C.3 (Advanced)	Principles of Motion and Force	
S3.C.3.1.1 (Advanced)	Identify and describe an object's motion (e.g., start/stop, push/pull, up/down, left/right, faster/slower, spinning).	
S3.C.3.1.2 (Advanced)	Describe an object's position in terms of its relationship to another object or stationary background (e.g., behind, beside, on top of, above, below).	
S4.C.3 (Advanced)	Principles of Motion and Force	
S4.C.3.1 (Advanced)	Identify and describe different types of force and motion resulting from these forces, or the effect of the interaction between force and motion.	
S4.C.3.1.2 (Advanced)	Compare the relative movement of objects or describe types of motion that are evident (e.g., bouncing ball, moving in a straight line, back and forth, merry-go-round).	
S4.C.3.1.3 (Advanced)	Describe the position of an object by locating it relative to another object or a stationary background (e.g., geographic direction, left, up).	
S5.C.3 (Advanced)	Principles of Motion and Force	
S5.C.3.1.2 (Advanced)	Explain how the mass of an object resists change to motion (inertia).	
S6.C.3 (Advanced)	Principles of Motion and Force	
S6.C.3.1.1 (Advanced)	Compare speed and velocity.	

Topic: Observing Motion

Topic: Distance vs. Displacement

Topic: Speed and Velocity

Topic: Graphing Motion

Topic: Acceleration

Unit: Unit 6 - Forces

Timeline: Week 48

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S3.C.3 (Advanced)	Principles of Motion and Force	
S4.C.3.1 (Advanced)	Identify and describe different types of force and motion resulting from these forces, or the effect of the interaction between force and motion.	
S4.C.3.1.1 (Advanced)	Describe changes in motion caused by forces (e.g., magnetic, pushes or pulls, gravity, friction).	
S6.C.3.1 (Advanced)	Explain why an object's motion is the result of all forces acting on it.	
S8.C.3.1 (Advanced)	Describe the effect of multiple forces on the movement, speed, or direction of an object.	
S8.C.3.1.1 (Advanced)	Describe forces acting on objects (e.g., friction, gravity, balanced versus unbalanced).	

S11.C.3.1
(Advanced)

Use the principles of motion and force to solve real-world challenges.

Topic: Definition of a Force

Topic: Newton's Laws

Topic: Friction

Topic: Gravity

Topic: Free-Fall and Air Resistance

Topic: Projectile Motion (Conceptual)

Topic: Momentum

Unit: Unit 7 - Work and Energy

Timeline: Week 50

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

S3.C.2.1 (Advanced) Recognize basic energy types and sources and how energy can be changed from one form to another.

S3.C.2.1.1 (Advanced) Identify basic forms and sources of energy (e.g., Sun, heat, light, sound).

S4.C.2.1 (Advanced) Recognize basic energy types and sources, or describe how energy can be changed from one form to another.

S4.C.2.1.1 (Advanced) Identify energy forms, energy transfer, and energy examples (e.g., light, heat, electrical).

S4.C.2.1.2 (Advanced) Describe the flow of energy through an object or system (e.g., feeling radiant heat from a light bulb, eating food to get energy, using a battery to light a bulb or run a fan).

S5.C.2.1 (Advanced) Describe basic energy types and sources, and how energy can be changed from one form to another.

S5.C.2.1.1 (Advanced) Describe how energy exists in many forms (e.g., electrical, mechanical, chemical, heat, light, sound) and can be transformed within a system.

S5.C.2.1.2 (Advanced) Describe how heat energy is usually a byproduct of an energy transformation.

S5.C.2.1.3 (Advanced) Distinguish between kinetic and potential energy.

S5.C.2.1.4 (Advanced) Explain how energy is conserved.

S6.C.2.1 (Advanced) Explain how energy can be transformed from one form to another and describe the results of the transformation.

S7.C.2.1 (Advanced) Describe how energy flows through the living world.

S7.C.2.1.1 (Advanced) Describe how energy is obtained and used by organisms throughout their lives.

S7.C.2.1.2 (Advanced) Describe how energy is transferred and conserved in a closed system.

S7.C.3.1.3 (Advanced) Explain the mechanical advantages of simple machines.

S8.C.2.1 (Advanced) Describe energy sources, transfer of energy, or conversion of energy.

S8.C.2.1.3 (Advanced) Describe how one form of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) can be converted into a different form of energy.

S8.C.3.1.3 (Advanced) Explain that mechanical advantage helps to do work (physics) by either changing a force or changing the direction of the applied force (e.g., simple machines, hydraulic systems).

S11.C.2.1 (Advanced) Analyze energy sources and transfer of energy, or conversion of energy.

Topic: Definition of Work and Energy

Topic: Power

Topic: Kinetic Energy

Topic: Potential Energy

Topic: Law of Conservation of Energy

Unit: Unit 8 - Gases

Timeline: Week 52

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S11.C.1.1.5](#) Predict the behavior of gases through the application of laws (e.g., Boyle’s law, Charles’ law, or ideal gas law).
(Advanced)

Topic: Kinetic Molecular Theory

Topic: Pressure Conversions

Topic: Ideal Gas Law

Topic: Avogadro's Law

Topic: Boyle's Law

Topic: Charles's Law

Topic: Gay-Lussac's Law

Unit: Unit 9 - Heat and Temperature

Timeline: Week 1

STANDARDS: STANDARDS

STATE: Pennsylvania State Anchors (2010)

[S6.C.2.1.1](#) Describe how heat moves in predictable ways from warmer objects to cooler ones until they reach the same temperature.
(Advanced)

[S6.C.2.1.2](#) Describe the effect of heat on particle motion during phase changes.
(Advanced)

[S8.C.2.1.2](#) Explain how energy is transferred from one place to another through convection, conduction, or radiation.
(Advanced)

Topic: Measuring Temperature

Topic: Temperature Calculations

Topic: Energy Transfer

Topic: Specific Heat

Topic: Phase Diagrams