



PHYSICAL SCIENCE PACING GUIDE

FIRST QUARTER					
UNIT	MODULE	PACING	LESSONS	STANDARDS	LEARNING OBJECTIVES
Intro to the Curriculum	Module 1: The Nature of Science	5 days	Lesson 1: The Methods of Science Lesson 2: Standards of Measurement Lesson 3: Communicating with Graphs Lesson 4: Science and Technology	This module introduces “the what” science is and provides tools for the study of science.	<u>Lesson 1: The Methods of Science</u> <ul style="list-style-type: none"> Students will understand how science is used to answer questions. <u>Lesson 2: Standards of Measurement</u> <ul style="list-style-type: none"> Students will understand how standards and units are important in discussing scientific ideas. <u>Lesson 3: Communicating with Graphs</u> <ul style="list-style-type: none"> Students will understand how to both read and communicate with graphs. <u>Lesson 4: Science and Technology</u> <ul style="list-style-type: none"> Students will understand the driving forces behind technological advancement.
	Module 2: Motion	3.5 days	Lesson 1: Describing Motion Lesson 2: Velocity and Momentum Lesson 3: Acceleration	PSCI.PS2.1 PSCI.PS2.2	<u>Lesson 1: Describing Motion</u> <ul style="list-style-type: none"> Students will understand how to describe where an object is and how its moving. <u>Lesson 2: Velocity and Momentum</u> <ul style="list-style-type: none"> Students will understand a motor bike’s velocity and momentum can change even if it maintains its speed. <u>Lesson 3: Acceleration</u> <ul style="list-style-type: none"> Students will understand that a motor bike’s arc can be described with a constant acceleration.
Unit 1: The Nature of Science	Module 3: Forces and Newton’s Law	5.5 days	Lesson 1: Forces	PSCI.PS2.3 PSCI.PS2.4 PSCI.PS2.5	<u>Lesson 1: Forces</u> <ul style="list-style-type: none"> Students will understand that the mass of an object affects the forces on it.

			Lesson 2: Newton's Laws of Motion Lesson 3: Using Newton's Laws		<u>Lesson 2: Newton's Laws of Motion</u> <ul style="list-style-type: none"> Students will understand how Newton's laws of motion describe how forces move cars. <u>Lesson 3: Using Newton's Laws</u> <ul style="list-style-type: none"> Students will explore the interactions between force, acceleration, and momentum.
Unit 2: Energy	Module 4: Work and Energy	7 days	Lesson 1: Work and Machines Lesson 2: Describing Energy Lesson 3: Conservation of Energy	PSCI.PS3.1 PSCI.PS3.3 PSCI.PS3.4	<u>Lesson 1: Work and Machines</u> <ul style="list-style-type: none"> Students will understand that work is done when something moves in the direction it is forced. <u>Lesson 2: Describing Energy</u> <ul style="list-style-type: none"> Students will understand that the transfer of energy from warm air to cold ice does work. <u>Lesson 3: Conversation of Energy</u> <ul style="list-style-type: none"> Students will understand that cooling a block of ice does not destroy the heat energy.
	Module 5: Thermal Energy	5 days	Lesson 1: Temperature, Thermal Energy, and Heat Lesson 2: Conduction, Convection, and Radiation Lesson 3: Using Thermal Energy	PSCI.PS3.2 PSCI.PS3.4	<u>Lesson 1: Temperature, Thermal Energy, and Heat</u> <ul style="list-style-type: none"> Students will explore the relationships between heat, thermal energy, and temperature. <u>Lesson 2: Conduction, Convection, and Radiation</u> <ul style="list-style-type: none"> Students will understand how they can promote and restrict the movement of heat. <u>Lesson 3: Using Thermal Energy</u> <ul style="list-style-type: none"> Students will explore thermodynamics and using heat to do work.
	Module 6: Electricity	5 days	Lesson 1: Electric Charge Lesson 2: Electric Current	PSCI.PS3.5	<u>Lesson 1: Electric Charge</u> <ul style="list-style-type: none"> Students will explore static electricity. <u>Lesson 2: Electric Current</u> <ul style="list-style-type: none"> Students will understand how conductors and currents affect each other.

			Lesson 3: More Complex Circuits		<u>Lesson 3: More Complex Circuits</u> <ul style="list-style-type: none"> Students will understand how to make electric circuits that provide electricity to the devices that need it, without losing the electricity to the surroundings.
	Module 7: Magnetism and Its Uses	4.5 days	Lesson 1: Magnetism Lesson 2: Electricity and Magnetism Lesson 3: Producing Electricity	PSCI.PS2.6	<u>Lesson 1: Magnetism</u> <ul style="list-style-type: none"> Students will explore the significance of magnetic poles and the role they play on Earth. <u>Lesson 2: Electricity and Magnetism</u> <ul style="list-style-type: none"> Students will explore how magnetic fields form in the presence of an electric current. <u>Lesson 3: Producing Electric Current</u> <ul style="list-style-type: none"> Students will explore the properties of electromagnetic induction and understand the function of generators and transformers.
	Module 8: Energy Sources and the Environment	7 days	Lesson 1: Fossil Fuels Lesson 2: Nuclear Energy Lesson 3: Renewable Energy Sources Lesson 4: Environmental Impacts	PSCI.PS3.4 PSCI.PS3.3	<u>Lesson 1: Fossil Fuels</u> <ul style="list-style-type: none"> Students will explore the types of fossil fuels that are used for energy. <u>Lesson 2: Nuclear Energy</u> <ul style="list-style-type: none"> Students will explore the potential benefits and risks of nuclear energy. <u>Lesson 3: Renewable Energy Sources</u> <ul style="list-style-type: none"> Students will explore the clean-energy alternatives to fossil fuels. <u>Lesson 4: Environmental Impacts</u> <ul style="list-style-type: none"> Students will explore the carrying capacity of Earth and the impact humans have on the environment.
SECOND QUARTER					
UNIT	MODULE	PACING	LESSONS	STANDARDS	LEARNING OBJECTIVES
Unit 3: Waves	Module 9: Introduction to Waves	5 days	Lesson 1: The Nature of Waves Lesson 2: Wave Properties Lesson 3: The Behavior of Waves	PSCI.PS4.1	<u>Lesson 1: The Nature of Waves</u> <ul style="list-style-type: none"> Students will explore the properties of waves and how they transfer energy. <u>Lesson 2: Wave Properties</u> <ul style="list-style-type: none"> Students will understand the differences between longitudinal and transverse waves. <u>Lesson 3: The Behavior of Waves</u> <ul style="list-style-type: none"> Students will explore how waves behave when they encounter either an obstacle or another medium.

	Module 10: Sound	5 days	Lesson 1: The Nature of Sound Lesson 2: Properties of Sound Lesson 3: Music Lesson 4: Using Sound	PSCI.PS4.1	<u>Lesson 1: The Nature of Sound</u> <ul style="list-style-type: none"> Students will understand how sound is made, travels, and is heard. <u>Lesson 2: Properties of Sound</u> <ul style="list-style-type: none"> Students will understand how sound is measured. <u>Lesson 3: Music</u> <ul style="list-style-type: none"> Students will understand how music is made and how it is different from noise. <u>Lesson 4: Using Sound</u> <ul style="list-style-type: none"> Students will explore the uses of sound in technology.
	Module 11: Electromagnetic Waves	6 days	Lesson 1: What are electromagnetic waves? Lesson 2: The Electromagnetic Spectrum Lesson 3: Radio Communication	PSCI.PS4.2	<u>Lesson 1: What are electromagnetic waves?</u> <ul style="list-style-type: none"> Students will understand the similarities and differences between electromagnetic waves and other waves. <u>Lesson 2: The Electromagnetic Spectrum</u> <ul style="list-style-type: none"> Students will explore the electromagnetic spectrum. <u>Lesson 3: Radio Communication</u> <ul style="list-style-type: none"> Students will explore the uses of radio and microwaves in communication.
	Module 12: Light	8 days	Lesson 1: The Behavior of Light Lesson 2: Light and Color Lesson 3: Producing Light Lesson 4: Using Light	PSCI.PS4.2	<u>Lesson 1: The Behavior of Light</u> <ul style="list-style-type: none"> Students will explore how light interacts with itself and other materials. <u>Lesson 2: Light and Color</u> <ul style="list-style-type: none"> Students will explore how color is seen and what happens with different colors are mixed.. <u>Lesson 3: Producing Light</u> <ul style="list-style-type: none"> Students will explore how lightbulbs, lasers, and other emitters of light work. <u>Lesson 4: Using Light</u> <ul style="list-style-type: none"> Students will explore ways to use polarizing filters, holograms, and optical fibers.
Unit 4: Matter	Module 13: Solids, Liquids, and Gases	5 days	Lesson 1: Matter and Thermal Energy	PSCI.PS1.1 PSCI.PS1.2	<u>Lesson 1: Matter and Thermal Energy</u> <ul style="list-style-type: none"> Students will understand kinetic theory and how it connects the arrangement and behavior of atoms, ions, and molecules to the common state of matter.

			Lesson 2: Properties of Fluids Lesson 3: Behaviors of Gases		Lesson 2: Properties of Fluids <ul style="list-style-type: none"> Students will explore the properties and behavior of fluids, including three of the major principles that describe fluids- Archimedes', Pascal's, and Bernoulli's. Lesson 3: Behaviors of Gases <ul style="list-style-type: none"> Students will explore how gases are affected by changes in pressure, volume, and temperature.
	Module 14: Classifications of Matter	3 days	Lesson 1: Composition of Matter Lesson 2: Properties of Matter	PSCI.PS1.3	Lesson 1: Composition of Matter <ul style="list-style-type: none"> Students will explore the composition of matter, with a focus on identifying and classifying pure substances and mixtures. Lesson 2: Properties of Matter <ul style="list-style-type: none"> Students will apply the law of conservation of mass to chemical changes.
THIRD QUARTER					
UNIT	MODULE	PACING	LESSONS	STANDARDS	LEARNING OBJECTIVES
Unit 4: Matter	Module 15: Properties of Atoms and the Periodic Table	5.5 days	Lesson 1: Structures of the Atom Lesson 2: Masses of Atoms Lesson 3: The Periodic Table	PSCI.PS1.4	Lesson 1: Structures of the Atom <ul style="list-style-type: none"> Students will explore the subatomic particles that make up atoms, how scientist model atoms, and the history of the atomic model. Lesson 2: Masses of Atoms <ul style="list-style-type: none"> Students will understand isotopes and the role that atomic mass plays in the organization of the periodic table. Lesson 3: The Periodic Table <ul style="list-style-type: none"> Students will explore the origins of the periodic table as well as the structure and function of the different elements.
	Module 16: Elements and Their Properties	5 days	Lesson 1: Metals Lesson 2: Nonmetals Lesson 3: Mixed Groups	PSCI.PS1.3 PSCI.PS1.4 PSCI.PS1.5	Lesson 1: Metals <ul style="list-style-type: none"> Students will explore metals and their properties. Lesson 2: Nonmetals <ul style="list-style-type: none"> Students will understand isotopes and the role that atomic mass plays in the organization of the periodic table. Lesson 3: Mixed Groups <ul style="list-style-type: none"> Students will explore mixed groups, semiconductors, and metalloids.
Unit 5: Reactions	Module 17: Chemical Bonds	4.5 days	Lesson 1: Stability in Bonding Lesson 2:	PSCI.PS1.4 PSCI.PS1.5 PSCI.PS1.6	Lesson 1: Stability in Bonding <ul style="list-style-type: none"> Students will explore how and why compounds form. Lesson 2: Types of Bonds

			Types of Bonds Lesson 3: Writing Formulas and Naming Compounds		<ul style="list-style-type: none"> Students will explore ionic and covalent bonds. Lesson 3: Writing Formulas and Naming Compounds <ul style="list-style-type: none"> Students will explore methods for writing chemical formulas, the importance of oxidation numbers, and how to name polyatomic ions.
	Module 18: Chemical Reactions	5.5 days	Lesson 1: Chemical Changes Lesson 2: Classifying Chemical Reactions Lesson 3: Chemical Reactions and Energy Lesson 4: Reaction Rates and Equilibrium	PSCI.PS1.6 PSCI.PS1.7	Lesson 1: Chemical Changes <ul style="list-style-type: none"> Students will understand how to write and balance chemical equations. Lesson 2: Classifying Chemical Reactions <ul style="list-style-type: none"> Students will explore the different types of chemical reactions. Lesson 3: Chemical Reactions and Energy <ul style="list-style-type: none"> Students will explore the relationship between chemical reactions and energy. Lesson 4: Reaction Rates and Equilibrium <ul style="list-style-type: none"> Students will explore reaction rates and equilibria.
	Module 19: Radioactivity and Nuclear Reactions	4.5 days	Lesson 1: The Nucleus Lesson 2: Nuclear Decays and Reactions Lesson 3: Radiation Technologies and Applications	PSCI.PS1.5	Lesson 1: The Nucleus <ul style="list-style-type: none"> Students will understand isotopes, atomic numbers, and mass numbers. Lesson 2: Nuclear Decays and Reactions <ul style="list-style-type: none"> Students will understand the types of nuclear radiations, when nuclear fission occurs, and when nuclear fusion occurs. Lesson 3: Radiation Technologies and Applications <ul style="list-style-type: none"> Students will understand how nuclear radiation is detected, medical applications of nuclear radiation, and applications of radioactivity and half-life.
FOURTH QUARTER					
UNIT	MODULE	PACING	LESSONS	STANDARDS	LEARNING OBJECTIVES
Unit 6: Applications of Chemistry	Module 20: Solutions	8 days	Lesson 1: How Solutions form Lesson 2: Concentration and Solubility Lesson 3: Particles in Solution	PSCI.PS1.3	Lesson 1: How Solutions form <ul style="list-style-type: none"> Students will explore solutes, solvents, and solutions. Lesson 2: Concentration and Solubility <ul style="list-style-type: none"> Students will explore concentration and solubility. Lesson 3: Particles in Solution <ul style="list-style-type: none"> Students will explore how ions form in solutions.

			Lesson 4: Dissolving without Water		<u>Lesson 4: Dissolving without Water</u> <ul style="list-style-type: none"> Students will explore how polarity affects solubility.
	Module 21: Acids, Bases, and Salts	5 days	Lesson 1: Acids and Bases Lesson 2: Strengths of Acid and Bases Lesson 3: Salts	PSCI.PS1.7 PSCI.PS1.8	<u>Lesson 1: Acids and Bases</u> <ul style="list-style-type: none"> Students will understand how acids and bases form ions in solution and how common acids and bases are used. <u>Lesson 2: Strengths of Acid and Bases</u> <ul style="list-style-type: none"> Students will explore what makes an acid or a base either strong or weak. <u>Lesson 3: Salts</u> <ul style="list-style-type: none"> Students will explore what a salt is and how it forms.
	Module 22: Organic Compounds	7 days	Lesson 1: Simple Organic Compounds Lesson 2: Substituted Hydrocarbons Lesson 3: Petroleum-A Source of Organic Compounds Lesson 4: Biological Compounds	PSCI.PS1.3 PSCI.PS1.5	<u>Lesson 1: Simple Organic Compounds</u> <ul style="list-style-type: none"> Students will understand organic compounds and hydrocarbons. <u>Lesson 2: Substituted Hydrocarbons</u> <ul style="list-style-type: none"> Students will understand the properties and uses of substituted hydrocarbons. <u>Lesson3: Petroleum-A Source of Organic Compounds</u> <ul style="list-style-type: none"> Students will understand how organic compounds can combine to form polymers. <u>Lesson 4: Biological Compounds</u> <ul style="list-style-type: none"> Students will understand the structure of proteins, carbohydrates, lipids, and nucleic acids.