

Physical Science CR

State Standard Number	State Standard Area/Description	Unit Name	Course Topic Description
SI	Science as Inquiry		
0	The Abilities Necessary to Do Scientific Inquiry		
SI.1	Write a testable question or hypothesis when given a topic	Scientific Inquiry	Unit Project: Scientific Inquiry
SI.2	Describe how investigations can be observation, description, literature survey, classification, or experimentation		
SI.3	Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls	Scientific Inquiry	Unit Project: Scientific Inquiry, Part 5
SI.4	Conduct an investigation that includes multiple trials and record, organize, and display data appropriately		
SI.5	Utilize mathematics, organizational tools, and graphing skills to solve problems	Scientific Nature Scientific Inquiry	Mathematics: The Language of Science Graphs
SI.6	Use technology when appropriate to enhance laboratory investigations and presentations of findings		
SI.7	Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations)	Scientific Nature	Models
SI.8	Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected	Scientific Nature	Acceptance of Plate Tectonic Theory

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SI.9	Write and defend a conclusion based on logical analysis of experimental data	Scientific Inquiry	Unit Project: Scientific Inquiry, Part 5
SI.10	Given a description of an experiment, identify appropriate safety measures	Scientific Inquiry	Safety During Investigations
0	Understanding Scientific Inquiry		
SI.11	Evaluate selected theories based on supporting scientific evidence	Scientific Nature	Acceptance of Plate Tectonic Theory Discussion: Scientific Theories and Society
SI.12	Cite evidence that scientific investigations are conducted for many different reasons	Scientific Nature	Scientific Endeavor Science and Society
SI.13	Identify scientific evidence that has caused modifications in previously accepted theories	Scientific Nature	Acceptance of Plate Tectonic Theory
SI.14	Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics)	Electricity and Magnetism	Avatar: Magnetic Resonance Imaging

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SI.15	Analyze the conclusion from an investigation by using data to determine its validity	Scientific Inquiry	Evaluating Your Experiment
SI.16	Use the following rules of evidence to examine experimental results:		
SI.16.a	Can an expert's technique or theory be tested, has it been tested, or is it simply a subjective, conclusive approach that cannot be reasonably assessed for reliability?		
SI.16.b	Has the technique or theory been subjected to peer review and publication?		
SI.16.c	What is the known or potential rate of error of the technique or theory when applied?		
SI.16.d	Were standards and controls applied and maintained?	Scientific Inquiry	Evaluating an Experimental Design
SI.16.e	Has the technique or theory been generally accepted in the scientific community?		
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0	Measurement and Symbolic Representation		
PS.1	Measure the physical properties of different forms of matter in metric system units (e.g., length, mass, volume, temperature)		
PS.2	Gather and organize data in charts, tables, and graphs	Scientific Inquiry	Graphs
PS.3	Distinguish among symbols for atoms, ions, molecules, and equations for chemical reactions		
PS.4	Name and write chemical formulas using symbols and subscripts	Chemical Reactions	Chemical Symbols in Reaction Equations
0	Atomic Structure		
PS.5	Identify the three subatomic particles of an atom by location, charge, and relative mass	Elements, Compounds and Mixtures	Atomic Theory
PS.6	Determine the number of protons, neutrons, and electrons of elements by using the atomic number and atomic mass from the periodic table	Elements, Compounds and Mixtures	Characterizing Elements

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PS.7	Describe the results of loss/gain of electrons on charges of atoms	Elements, Compounds and Mixtures	Tutorial: It's All About the Electrons
PS.8	Evaluate the uses and effects of radioactivity in people's daily lives		
PS.9	Compare nuclear fission to nuclear fusion	Chemical Reactions	Nuclear Reactions: Fusion Nuclear Reactions: Fission
PS.10	Identify the number of valence electrons of the first 20 elements based on their positions in the periodic table	Elements, Compounds and Mixtures	Patterns on the Periodic Table
0	The Structure and Properties of Matter		
PS.11	Investigate and classify common materials as elements, compounds, or mixtures (heterogeneous or homogeneous) based on their physical and chemical properties	Elements, Compounds and Mixtures	Elements Compounds Mixtures
PS.12	Classify elements as metals or nonmetals based on their positions in the periodic table	Elements, Compounds and Mixtures	Tutorial: Trends on the Periodic Table
PS.13	Predict how factors such as particle size and temperature influence the rate of dissolving	Elements, Compounds and Mixtures	Solubility

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PS.14	Investigate and compare methods for separating mixtures by using the physical properties of the components	Elements, Compounds and Mixtures	Separating Mixtures
PS.15	Using selected elements from atomic numbers 1 to 20, draw Bohr models		
PS.16	Name and write the formulas for simple ionic and covalent compounds	Elements, Compounds and Mixtures	Ionic Bonds Covalent Bonds
PS.17	Name and predict the bond type formed between selected elements based on their locations in the periodic table	Elements, Compounds and Mixtures	Ionic Bonds Covalent Bonds Tutorial: Trends on the Periodic Table
PS.18	Diagram or construct models of simple hydrocarbons (four or fewer carbons) with single, double, or triple bonds		
PS.19	Analyze and interpret a graph that relates temperature and heat energy absorbed during phase changes of water		
PS.20	Predict the particle motion as a substance changes phases	Matter, Energy and Change	The Kinetic Theory of Matter
0	Chemical Reactions		

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PS.21	Classify changes in matter as physical or chemical	Matter, Energy and Change	Physical and Chemical Changes
PS.22	Identify evidence of chemical changes		
PS.23	Classify unknowns as acidic, basic, or neutral using indicators	Elements, Compounds and Mixtures	What Are Acids and Bases?
PS.24	Identify balanced equations as neutralization, combination, and decomposition reactions		
PS.25	Determine the effect of various factors on reaction rate (e.g., temperature, surface area, concentration, agitation)		
PS.26	Illustrate the laws of conservation of matter and energy through balancing simple chemical reactions	Chemical Reactions	Conservation of Energy and Matter Tutorial: Balancing Chemical Reactions
PS.27	Distinguish between endothermic and exothermic reactions	Chemical Reactions	Energy Gains and Losses
PS.28	Identify chemical reactions that commonly occur in the home and nature	Chemical Reactions	Tutorial: Types of Reactions

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0	Forces and Motion		
PS.29	Differentiate between mass and weight	Energy in Motion	Gravity, Mass and Weight
PS.30	Compare the characteristics and strengths of forces in nature (e.g., gravitational, electrical, magnetic, nuclear)		
PS.31	Differentiate between speed and velocity	Energy in Motion	Speed Velocity
PS.32	Plot and compare line graphs of acceleration and velocity	Energy in Motion	Graphing Velocity and Acceleration
PS.33	Calculate velocity and acceleration using equations	Energy in Motion	Velocity Acceleration
PS.34	Demonstrate Newton's three laws of motion (e.g., inertia, net force using $F = ma$, equal and opposite forces)	Energy in Motion	Newton's First Law of Motion Newton's Second Law of Motion Newton's Third Law of Motion
PS.35	Describe and demonstrate the motion of common objects in terms of the position of the observer	Energy in Motion	Tutorial: Motion

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0	Energy		
PS.36	Measure and calculate the relationships among energy, work, and power	Machines	Work Power
PS.37	Model and explain how momentum is conserved during collisions		
PS.38	Analyze diagrams to identify changes in kinetic and potential energy		
PS.39	Distinguish among thermal, chemical, electromagnetic, mechanical, and nuclear energy	Matter, Energy and Change	Forms of Energy
PS.40	Demonstrate energy transformation and conservation in everyday actions	Matter, Energy and Change	Energy Transformations The Law of Conservation of Energy Energy Conservation
0	Interactions of Energy and Matter		
PS.41	Identify the parts and investigate the properties of transverse and compression waves		

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PS.42	Describe the relationship between wavelength and frequency	Waves	What is a Wave? Frequency and Period
PS.43	Investigate and construct diagrams to illustrate the laws of reflection and refraction		
PS.44	Illustrate the production of static electricity	Electricity and Magnetism	Static Electricity
PS.45	Evaluate diagrams of series and parallel circuits to determine the flow of electricity	Electricity and Magnetism	Series and Parallel Circuits
PS.46	Diagram a magnetic field	Electricity and Magnetism	Magnetic Fields
PS.47	Explain how electricity and magnetism are related	Electricity and Magnetism	Electric Currents and Magnetic Fields
PS.48	Compare properties of waves in the electromagnetic spectrum	Waves	The Electromagnetic Spectrum
PS.49	Describe the Doppler effect on sound	Waves	The Doppler Effect

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PS.50	Identify positive and negative effects of electromagnetic/mechanical waves on humans and human activities (e.g., sound, ultraviolet rays, X-rays, MRIs, fiber optics)	Electricity and Magnetism	The Electromagnetic Spectrum
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