



PHYSICAL SCIENCE

SCOPE & SEQUENCE
CREATED BY TEACHERS
FOR THE TEACHERS OF SRC

“Give the pupils something to do; not something to learn; and if the doing is of such a nature as to demand thinking; learning naturally results.”

~John Dewey



SANTA ROSA
COUNTY DISTRICT SCHOOLS

NINE WEEKS & CHAPTER

First Nine Weeks

Chapter 1: Nature of Science	-2 weeks
Chapter 14: Solids, Liquids and Gases	-1 week
Chapter 15: Classification of Matter	-2 weeks
Chapter 16: Properties of Atoms and the Periodic Table	-2 weeks
Chapter 17: Elements and Their Properties	-2 weeks

Second Nine Weeks

Chapter 18: Chemical Bonds	-2 weeks
Chapter 19 + 22: Chemical Reactions / Acids, Bases, and Salts	-3 weeks
Chapter 21: Solutions	-2 weeks
Chapter 23 + 24: Organic Compounds / New Materials through Chemistry	-2 weeks

Third Nine Weeks

Chapter 2: Motion	-2 weeks
Chapter 3: Forces and Newton's Laws	-2 weeks
Chapter 4: Work and Energy	-2 weeks
Chapter 5: Thermal Energy	-2 week

Fourth Nine Weeks

Chapter 6: Electricity	-2 weeks
Chapter 8.2: Nuclear Energy	-1 weeks
Chapter 9: Introduction to Waves	-2 weeks
Chapter 10/11/12: Sound / Electromagnetic Waves/ Light	-3 weeks

Biochemistry: Photosynthesis, Cellular Respiration, Carbon Cycle
"Catch-up" time and Exam Review

Physical Science Scope and Sequence

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<p>Weeks 1 & 2</p>	<p>Chapter 1: Nature of Science</p> <p>Safety & Instruments *Scientific Method Standard of Measurement *Significant Figures (supplement because not in book) *Scientific Notation (supplement because not in book) Collect, Organize and Analyze Data *Scientific Law and Theory Science & Technology</p>		<p>Dependent (responding) Variable Independent (manipulate) Variable Mass Variable Accuracy Precision Graph Model Length Density Conversion Factor Slope Direct Proportion Inverse Proportion Investigation Observation Scientist</p>	<p>SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics and earth/space science, and do the following: 1. Pose questions about the natural world, 2. Conduct systematic observations, 3. Examine books and other sources of information to see what is already known, 4. Review what is known in light of empirical evidence, 5. Plan investigations, 6. Use tools to gather, analyze, and interpret data (including use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. Pose answers, explanations, or description of events, 8. Generate explanations that explicator describe natural phenomena (inferences), 9. Use appropriate evidence and reasoning to justify these explanations to others, 10. Communicate results of scientific investigations, 11. Evaluate the merits of the explanations produced by others.</p> <p>SC.912.N.1.2 Describe and explain what characterizes science and its methods.</p> <p>SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.</p> <p>SC.912.N. 1.4 Identify sources of information and assess their reliability according to the strict standards of scientific explanations to explain the data presented.</p> <p>SC.912.N. 1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.</p> <p>SC.912.N. 1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.</p> <p>SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.</p> <p>SC.912.N.2.1 Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science)</p> <p>SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.</p>
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				<p>SC.912.N.2.3 Identify example of pseudoscience (such as astrology, phrenology) in society.</p> <p>SC.91.N.2.4 Scientific knowledge changes</p> <p>***SC.912.N.2.5 Describe instances in which scientists' varied background, talents, interests, and goals influence and the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations of scientists are a strength of science as they are a source of new, testable ideas, that have the potential to add new evidence to support one or another of the explanations.</p> <p>SC.912.N 3.1 Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.</p> <p>SC.912 N.3.2 Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.</p> <p>SC.912.N.3.3 Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships</p> <p>SC.912.N.3.4 Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.</p> <p>SC.912.N.3.5 Describe the function of models in science, and identify the wide range of models used in science.</p>
1 Weeks	<p>Chapter 14 : Solids Liquids and Gases</p> <p>Solids, Liquids, and Gases</p> <p>The Gas Laws</p> <p>Phase Changes</p>		<p>Pressure</p> <p>Charles's Law,</p> <p>Boyles's Law</p> <p>Endothermic</p> <p>Heat of Fusion</p> <p>Exothermic</p> <p>Heat of</p> <p>Vaporization</p> <p>Sublimation</p> <p>Deposition</p> <p>Water Cycle</p>	<p>SC.912.P.8.1 Differentiate among the four states of matter.</p> <p>SC.912.P.8.2 Differentiate between physical and chemical properties and physical and chemical changes of matter.</p> <p>SC.912.P.10.1 Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.</p> <p>SC.912.P.10.4 Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.</p> <p>SC.912.P.10.5 Relate temperature to the average molecular kinetic energy.</p> <p>SC.912.P.12.10 Interpret the behavior of ideal gases in terms of kinetic molecular theory.</p> <p>SC.912.P.12.11 Describe phase transitions in terms of kinetic molecular theory.</p>

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				SC.912.N.1.1 Refer back to Ch. 1 SC912.E.7.1 Water Cycle
2 Weeks	<p>Chapter 15: Classification of Matter</p> <p>Classifying Matter</p> <p>Physical Properties</p> <p>Chemical Properties</p>		<p>Pure Substance</p> <p>Atom</p> <p>Element</p> <p>Compound</p> <p>Heterogeneous</p> <p>Homogeneous</p> <p>Solution</p> <p>Physical Change</p> <p>Viscosity</p> <p>Chemical Change</p> <p>Reactivity</p> <p>Precipitate</p> <p>Nuclear Reaction</p> <p>See Chapter 10</p>	<p>SC.912.P.8.2 Differentiate between physical and chemical properties and physical and chemical changes of matter.</p> <p>SC.912.P.8.8 Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.</p> <p>SC.912.P.10.4 Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.</p> <p>SC.912.P.10.14 Differentiate among conductors, semiconductors, and insulators.</p> <p>SC.912.N.1.1 Refer Back to Ch. 1</p> <p>SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.</p> <p>SC.912.N.4.2 Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.</p>
3 Week	<p>Chapter 16: Properties of Atoms and the Periodic Table</p> <p>Chapter 17: Elements and Their Properties</p> <p>Studying Atoms</p> <p>The Structure of An Atom</p> <p>*Dalton's Model</p> <p>*Bohr's Model</p> <p>Modern Atomic Theory</p> <p>Organizing the Elements</p> <p>Modern Periodic Table</p> <p>Representative Groups</p>		<p>Proton</p> <p>Electron</p> <p>Neutron</p> <p>Atomic Number</p> <p>Mass Number</p> <p>Isotopes</p> <p>Orbital</p> <p>Energy Level</p> <p>Period</p> <p>Group</p> <p>Periodic Law</p> <p>Atomic Mass</p> <p>Unit(AMU)</p> <p>Metals</p> <p>Transition Metals</p> <p>Nonmetals</p> <p>Metalloid</p> <p>Valence electron</p>	<p>SC.912.P.8.4 Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.</p> <p>SC.912.P 8.5 Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.</p>

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			Alkali metals, Alkaline earth metals Halogens Noble Gases	
2 nd 9 Weeks				
2 Weeks	Chapter 18 : Chemical Bonds Ionic Bonding <ul style="list-style-type: none"> • Electron Configurations • Ionization Energy Covalent Bonding <ul style="list-style-type: none"> • Polar and Non Polar Bonds Naming Compounds and Writing Formulas.		Electron dot diagram Ion Anion Cation Chemical Bond Ionic Bond Chemical Formula Crystal Covalent Bond Molecule Polar Covalent Bond Polyatomic Ion Metallic Bonds Alloy	SC.912.P.8.7 Interpret formula representations of molecules and compounds in terms of composition and structure.
2 Weeks	Chapter 19 : Chemical Reactions Chapter 22: Acids, Bases and Salts Describing Reactions <ul style="list-style-type: none"> • Balance Chemical Equations Types of Reactions Energy Changes in Reactions Reaction Rates Equilibrium Properties of Acids and <u>Bases</u>		Reactants Products Chemical Equation Coefficients Mole Molar Mass Chemical Energy Exothermic Reaction Endothermic Reaction, Reaction Rate Catalyst Equilibrium Reversible Reaction	SC.912.P.8.7 Interpret formula representations of molecules and compounds in terms of composition and structure. SC.912.P.8.8 Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions. SC.912.P.10.2 Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity. SC.912.P.10.4 Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.

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	Strength of Acids and Bases		Acid Base Indicator Salt Neutralization pH Buffer Electrolyte	SC.912.P.10.7 Distinguish between endothermic and exothermic chemical processes. SC.912.P.12.12 Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time. SC.912.N.1.1 Refer to Ch. 1 SC.912.P.10.12 Differentiate between chemical and nuclear reactions. SC.912.P.8.11 Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
2 Week	Chapter 21: Solutions Formation of Solutions Solubility and Concentration		Solute Solvent Molarities	SC.912.P.8.7 Interpret formula representations of molecules and compounds in terms of composition and structure. SC.912.P.10.14 Differentiate among conductors, semiconductors, and insulators. SC.912.N.1.1 Refer to Ch. 1 SC912.L.18.12 Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
2 Week	Chapter 23: Organic Compounds Chapter 24: New Materials Through Chemistry Biochemistry Carbon Compounds Polymers Reactions in Cells	Inquiry Lab: Quick Lab: Demo Lab: Teacher Demo: Denaturing an Enzyme	Organic compound Hydrocarbon Fossil fuels Nucleic acids Lipids Amino acids Proteins Carbohydrates Enzymes Photosynthesis Respiration Carbon cycle	<u>SC.912.L.18.1</u> Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules. SC912.L.18.7 Identify the reactants and products of photosynthesis. SC912.18.8 Identify the reactants and products of cellular respiration. SC91.E.7 Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon. SC.912.P.8.7 Interpret formula representations of molecules and compounds in terms of composition and structure.
3 rd 9 Weeks				

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2 Weeks	<p>Chapter 2: Motion</p> <p>Distance and Displacement</p> <p>Speed and Velocity</p> <p>Acceleration</p>		<p>Frame of Reference</p> <p>Relative Motion</p> <p>Vector</p> <p>Speed</p> <p>Velocity</p> <p>Acceleration</p> <p>Freefall</p>	<p>SC.912.P.12.2 Analyze the motion of an object in terms.</p> <p>MA.912.S.3.2 Collect, organize, and analyze data sets, determine the best format for the data and present visual summaries</p> <p>S.C.912.N.1.1 Refer back to Ch. 1</p> <p>SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation</p>
2 Weeks	<p>Chapter 3: Forces and Newton's Laws</p> <p>Relationship between force, mass and motion.</p> <p>Newton's Laws</p> <p>Acceleration</p> <p>Universal Forces</p>		<p>Force</p> <p>Newton</p> <p>Net Force</p> <p>Friction</p> <p>Air resistance</p> <p>Gravity</p> <p>Gravitational force</p> <p>Terminal velocity</p> <p>Projectile motion</p> <p>Inertia</p> <p>Weight</p> <p>Momentum</p> <p>Law of Conservation of Momentum</p> <p>Fundamental Forces</p>	<p>SC.912.P.12.3 Interpret and apply Newton's three laws of motion.</p> <p>SC.912.P.12.4 Describe how the gravitational force between two objects depends on their masses and the distance between them.</p> <p>SC.912.P.10.10 Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).</p> <p>SC.912.N.1.1 Refer back to Ch. 1</p> <p>SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation</p> <p>SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.</p> <p>SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.</p> <p>SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations</p>
2 Weeks	<p>Chapter 4: Work and Energy</p> <p>Work and Power</p> <p>Work and Machines</p> <p>Mechanical Advantage and Efficiency</p> <p>Simple Machines</p>		<p>Work</p> <p>Power</p> <p>Joule</p> <p>Watt</p> <p>Machine</p> <p>Lever</p> <p>Incline plane</p> <p>Wheel and axle</p> <p>Mechanical advantage</p> <p>Efficiency</p>	<p>SC.912.P.10.3 Compare and contrast work and power qualitatively and quantitatively.</p> <p>SC.912.N.1.1 Refer back to Ch. 1</p> <p>SC.912.N.4.2 Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.</p>

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1 Weeks	Chapter 5: Thermal Energy Energy and Its Forms Energy Conversion and Conservation Energy Resources		Energy Kinetic Energy Potential Energy Mechanical Energy Nonrenewable Energy Renewable Energy	SC.912.P.10.1 Differentiate among the various forms of energy and recognize that they can be transformed from one form to others. SC.912.N.1.1 Refer back to Ch. 1 SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.
4th 9 Weeks				
2 Weeks	Chapter 6: Electricity Electricity Charge and Static Electricity Electric Current and Ohm’s Law Electric Circuits Electronic Devices		Electric Charge Electric Force Electric Field Static Electricity Law Of Conservation of Charge Induction Electric Current Electrical Conductor Electrical Insulator Resistance	SC.912.P.10.14 Differentiate among conductors, semiconductors, and insulators. SC.912.P.10.15 Investigate and explain the relationships among current, voltage, resistance, and power. SC.912.N.4.2. Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
1 week	Chapter 8.2: Nuclear Energy		Fusion Fission Nuclear Reactor Nuclear Waste	C912.P.10.12 Differentiate between chemical reactions and nuclear reactions. <u>SC.912.P.10.11</u> : Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.

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<p>2 Weeks</p>	<p>Chapter 9: Introduction to Waves</p> <p>Mechanical Waves</p> <p>Properties of Mechanical Waves</p> <p>Behavior of Waves</p>		<p>Vibration Mechanical Wave Medium Transverse Wave Compression Rarefaction Longitudinal Wave Frequency Period Wavelength Amplitude Reflection Refraction Diffraction Interference Intensity Decibel Loudness Pitch Doppler effect Resonance</p>	<p>SC.912.P.10.18 Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.</p> <p>SC.912.N.1.1 Refer back to Ch.1</p> <p>SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.</p> <p>SC.912.N.4.2 Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.</p>
<p>3 Weeks</p>	<p>Chapter 10: Sound Chapter 11: Electromagnetic Waves Chapter 12: Light</p> <p>Electromagnetic Waves</p> <p>The Electromagnetic Spectrum</p> <p>Behavior of Light And Color</p> <p>Sources of Light</p>		<p>Electromagnetic waves Electromagnetic radiation Photons Electromagnetic Spectrum Transparent Translucent Opaque Regular Reflection Diffuse Reflection Primary Color Secondary Color Pigment Luminous</p>	<p>SC.912.P.10.18 Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.</p> <p>SC.912.P.10.21 Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.</p> <p>SC.912.P.12.7 Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.</p> <p>SC.912.N.4.1 Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.</p>