

Correlations of Reading Essentials in Science to NC Physical Science Standard (High School) Course of Study

Competency Goal 1: The learner will develop abilities necessary to do and understand scientific inquiry.	
1.01 Identify questions and problems that can be answered through scientific investigations.	Multiple Titles
1.02 Design and conduct scientific investigations to answer questions about the physical world.	Multiple Titles
1.03 Formulate and revise scientific explanations and models using logic and evidence to: <ul style="list-style-type: none"> • Explain observations. • Make inferences and predictions. • Explain the relationship between evidence and explanation. 	Multiple Titles
1.04 Apply safety procedures in the laboratory and in field studies: <ul style="list-style-type: none"> • Recognize and avoid potential hazards. • Safely manipulate materials and equipment needed for scientific investigations. 	N/A
1.05 Analyze reports of scientific investigations from an informed scientifically literate viewpoint including considerations of: <ul style="list-style-type: none"> • Appropriate sample. • Adequacy of experimental controls. • Replication of findings. • Alternative interpretations of the data. 	Multiple Titles

Competency Goal 2: The learner will construct an understanding of forces and motion.	
2.01 Measure and mathematically/graphically analyze motion: <ul style="list-style-type: none"> • Frame of reference (all motion is relative - there is no motionless frame). • Uniform motion. • Acceleration. 	<i>Force and Motion</i> <i>Motion</i> <i>Newton's Laws of Motion</i>
2.02 Investigate and analyze forces as interactions that can change motion: <ul style="list-style-type: none"> • In the absence of a force, an object in motion will remain in motion or an object at rest will remain at rest until acted on by an unbalanced force. • Change in motion of an object (acceleration) is directly proportional to the unbalanced outside force and inversely proportional to the mass. • Whenever one object exerts a force on another, an equal and opposite force is exerted by the second on the first. 	<i>Newton's Laws of Motion</i> <i>Motion</i> <i>Gravity</i>
Competency Goal 3: The learner will analyze energy and its conservation.	
3.01 Investigate and analyze storage of energy: <ul style="list-style-type: none"> • Kinetic energy. • Potential energies: gravitational, chemical, electrical, elastic, nuclear. • Thermal energy. 	<i>Force and Motion</i> <i>Electricity and Magnetism</i> <i>Heat</i> <i>Atomic Energy</i> <i>Newton's Laws of Motion</i> <i>Chemical Energy</i> <i>Energy Sources</i> <i>Gravity</i>
3.02 Investigate and analyze transfer of energy by work: <ul style="list-style-type: none"> • Force. • Distance. 	<i>Force and Motion</i> <i>Motion</i> <i>Newton's Laws of Motion</i>

Competency Goal 3: The learner will analyze energy and its conservation.	
<p>3.03 Investigate and analyze transfer of energy by heating:</p> <ul style="list-style-type: none"> • Thermal energy flows from a higher to a lower temperature. • Energy will not spontaneously flow from a lower temperature to a higher temperature. • It is impossible to build a machine that does nothing but convert thermal energy into useful work. 	<p><i>Heat</i> <i>States of Matter</i></p>
<p>3.04 Investigate and analyze the transfer of energy by waves:</p> <ul style="list-style-type: none"> • General characteristics of waves: amplitude, frequency, period, wavelength, velocity of propagation. • Mechanical waves. • Sound waves. • Electromagnetic waves (radiation). 	<p><i>Sound</i> <i>Hearing and Sound</i> <i>Light</i> <i>Electricity and Magnetism</i></p>

Competency Goal 4: The learner will construct an understanding of electricity and magnetism.	
<p>4.01 Investigate and analyze the nature of static electricity and the conservation of electrical charge:</p> <ul style="list-style-type: none"> • Positive and negative charges. • Opposite charges attract and like charges repel. • Analyze the electrical charging of objects due to the transfer of charge. 	<p><i>Electricity and Magnetism</i> <i>Electrical Circuits</i></p>
<p>4.02 Investigate and analyze direct current electrical circuits:</p> <ul style="list-style-type: none"> • Ohm's law. • Series circuits. • Parallel circuits. 	<p><i>Electrical Circuits</i></p>
<p>4.03 Investigate and analyze magnetism and the practical applications of the characteristics of magnets.</p> <ul style="list-style-type: none"> • Permanent magnets • Electromagnetism • Movement of electrical charges 	<p><i>Electricity and Magnetism</i> <i>Electrical Circuits</i></p>

Competency Goal 5: The learner will build an understanding of the structure and properties of matter.	
5.01 Develop an understanding of how scientific processes have led to the current atomic theory. <ul style="list-style-type: none"> • Dalton's atomic theory. • J.J. Thomson's model of the atom. • Rutherford's gold foil experiment • Bohr's planetary model. • Electron cloud model. 	<i>Atomic Energy</i>
5.02 Examine the nature of atomic structure: <ul style="list-style-type: none"> • Protons. • Neutrons. • Electrons. • Atomic mass. • Atomic number. • Isotopes. 	<i>Atomic Energy</i>
5.03 Identify substances through the investigation of physical properties: <ul style="list-style-type: none"> • Density. • Melting point. • Boiling point. 	<i>Physical and Chemical Properties and Changes States of Matter Measuring Matter</i>
Competency Goal 6: The learner will build an understanding of regularities in chemistry.	
6.01 Analyze the periodic trends in the physical and chemical properties of elements. <ul style="list-style-type: none"> • Groups (families). • Periods. 	<i>The Periodic Table of Elements</i>
6.02 Investigate and analyze the formation and nomenclature of simple inorganic compounds. <ul style="list-style-type: none"> • Ionic bonds (including oxidation numbers). • Covalent bonds. • Metallic bonds. 	<i>Atoms, Molecules, and Compounds</i>

Competency Goal 6: The learner will build an understanding of regularities in chemistry.	
<p>6.03 Identify the reactants and products of chemical reactions and balance simple equations of various types:</p> <ul style="list-style-type: none"> • Single replacement. • Double replacement. • Decomposition. • Synthesis. 	<p><i>Chemical Energy</i> <i>Chemical Reactions</i></p>
<p>6.04 Measure and analyze the indicators of chemical change including:</p> <ul style="list-style-type: none"> • Development of a gas. • Formation of a precipitate. • Release/absorption of energy (heat or light). 	<p><i>Chemical Reactions</i></p>
<p>6.05 Investigate and analyze the properties and composition of solutions:</p> <ul style="list-style-type: none"> • Solubility curves. • Concentration. • Polarity. • pH scale. • Electrical conductivity. 	<p><i>Mixtures and Solutions</i></p>
<p>6.06 Describe and explain radioactivity and its practical application as an alternative energy source:</p> <ul style="list-style-type: none"> • Alpha, beta, and gamma decay. • Fission. • Fusion. • Nuclear waste. 	<p><i>Atomic Energy</i> <i>Energy Sources</i> <i>Consumption and Waste</i></p>