

THS IPS Curriculum Map

Standard Area	State Standard	Process Skills	Activity/Lab/Lesson	Resources	Assessment
	<p>Newton's laws of motion and gravitation describe the relationships among forces acting on and between objects, their masses, and changes in their motion – but have limitations</p>	<p>Through Collaboration during inquiry Students will: Develop, communicate and justify an evidence-based analysis of the forces acting on an object and the resultant acceleration produced by a net force</p> <p>Develop, communicate and justify an evidence-based scientific prediction regarding the effects of the action-reaction force pairs on the motion of two interacting objects</p> <p>Through Critical Thinking and Reasoning students can use and relate their knowledge of the standard in the following context...</p> <p>Examine the effect of changing masses and distance when applying Newton's law of universal gravitation to a system of two bodies</p> <p>Identify the limitations of Newton's laws in extreme situations</p> <p>Applying Information Literacy Students can through inquiry apply their knowledge to answer questions like....</p> <p>How can forces be acting on an object without changing the object's motion?</p> <p>Why do equal but opposite action and reaction forces not cancel?</p> <p>Using Invention students can apply their knowledge</p> <p>Newton's laws are used in a variety of design processes such as vehicle safety, aerospace, bridge design and interplanetary probes.</p> <p>An understanding of forces leads to safer building designs such as earthquake-safe buildings.</p> <p>Forces present in the earth lead to plate tectonics.</p>	<p>Unit 1 Investigations Forces and Motions. Labs include investigations focused on speed (1.3), acceleration (2.3) and Newton's 2nd Law (3.1)</p>	<p>Introduction to Physical Science Text</p> <p>Ramp and Car physics kit</p> <p>Photo-gate timers</p> <p>Phet laptop based simulators including Moving Man and The Ramp</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit.</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>
	<p>Energy exists in many forms (mechanical, chemical, electrical, radiant, thermal, and nuclear) that can be quantified and experimentally determined</p>	<p>Through Collaboration during inquiry students demonstrates understanding of important information and skills such as....</p> <p>Use appropriate measurements, equations and graphs to gather, analyze, and interpret data on the quantity of energy in a system or an object</p> <p>Develop, communicate, and justify an evidence-based scientific explanation regarding the potential and kinetic nature of mechanical energy</p> <p>Quantify how force and distance relate to each other in terms of simple machines with emphasis on gears, levers, pulleys as well as identify and describe The Six Simple Machines</p> <p>Use, apply and define the concepts of Work, Energy and Power.</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>Using information literacy students will be able to: Society and energy providers must conduct a cost-benefit analysis of different ways to provide electricity to our society.</p> <p>An understanding of energy transformations is necessary when designing clean energy systems that convert any type of energy into electricity such as wind generators and solar cells.</p> <p>There are advantages and disadvantages to using various energy sources such as gasoline, diesel, ethanol, hydrogen, and electricity as transportation fuel.</p> <p>Evaluate how Politics plays a role in shaping energy policy such as balancing conflicting stakeholder needs.</p> <p>Energy plays a role in living systems and Earth's systems. For example, cells convert sugar to ATP and then to energy, energy inside the earth drives plate tectonic phenomena such as earthquakes and volcanoes, and energy from the Sun drives weather.</p> <p>Using Critical thinking and reasoning students can :</p> <p>Identify different energy forms, and calculate their amounts by measuring their defining characteristics</p> <p>Use direct and indirect evidence to develop predictions of the types of energy associated with objects</p> <p>Relating how simple machines have allowed for the construction of major ancient and modern monuments.</p> <p>Identifying simple machines in context and be able to explain how they make tasks in our daily lives easier.</p> <p>Identifying appropriate values for central equations</p> <p>Using the inquiry process students can answer questions such as..</p> <p>What factors can be measured to determine the amount of energy associated with an object?</p> <p>What are the most common forms of energy in our physical world?</p> <p>What makes an energy form renewable or nonrenewable?</p> <p>What makes some forms of energy hard to measure?</p> <p>Through self direction Students should be able to apply their knowledge of the standards in the following context.</p> <p>Critically evaluate scientific claims made in popular media or by peers regarding the application of energy forms, and determine if the evidence presented is appropriate and sufficient to support the claims.</p> <p>Use the historical context and impact of early energy research and consider the potential implications for current energy studies on science and our society.</p>	<p>Investigations using simple machines Using Unit 2 Work and Energy</p> <p>Investigations include Forces in Machines 4.1 The lever 4.2 Gears and Design 4.3 Work 5.1</p>	<p>Introduction to Physical Science Text</p> <p>Lever and Gear Physics kits</p> <p>Specific Heat equipment</p> <p>Photo-gate timers</p> <p>Phet laptop based simulators</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit.</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>

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	Students will develop an in depth understanding of how electricity acts as a form of energy, directly connecting it to the technology in their lives.	<p>While engaged in Inquiry Collaboration student demonstrates understanding of important information such as...</p> <p>Quantitatively describe Current, resistance, voltage,</p> <p>Describing and diagraming simple circuits (parallel, series, and & or)</p> <p>Apply ohms laws as well as relating current, resistance and voltage to specific circuits</p> <p>Identify the contributions of Nikola Tesla and Thomas Edison</p> <p>Recognizing and recalling isolated details such The contributions of people such as Edison and Tesla</p> <p>Defining and describing Current, resistance, voltage in a qualitative manor</p> <p>Identify and draw simple circuits</p>	<p>Unit 3 Electricity and Magnetism Labs including</p> <p>6.1 What is charge? 6.1 Charge 7.1 Voltage 7.2 Current 7.3 Resistance 8.1 Ohms Law</p>	<p>Introduction to Physical Science Text</p> <p>Circuit kits and Motor Kits</p> <p>Multi meters</p> <p>Phet laptop based simulators including the circuit simulators</p> <p>Household Wiring kits</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit..</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>
	Students will develop an in-depth understanding of how Light as a form of energy interacts with matter.	<p>While engaged in tasks that involve Critical thinking and reasoning student demonstrates understanding of important information such as...</p> <p>Compare and contrast the wave and particle nature of light</p> <p>Explain the relationship of color and wavelength using specific examples</p> <p>Apply and describe multiple uses for Additive and Subtractive Primary Colors</p> <p>Diagram the parts of a wave (wavelength and frequency)and link how they relate to the energy contained in electromagnetic radiation</p> <p>Diagram and describe Regions and scale of the Electromagnetic spectrum including energy, wavelength and frequency</p> <p>Reflection and refraction and how they relate to mirrors and lenses</p> <p>Polarization</p> <p>While involved in activities students use self direction and can</p> <p>Explain the relationship of color and wavelength using examples used in class</p> <p>Apply and describe uses for Additive and Subtractive Primary Colors that were demonstrated in lab</p> <p>Diagram the parts of a wave (wavelength and frequency)</p> <p>Describe the types of the Electromagnetic radiation.</p> <p>Explain how mirrors and lenses work in a basic manor</p>	<p>Unit 5 Light and Optics labs</p> <p>14.1 Introduction to Light 14.2 Color 15.1 Seeing an image 15.2 the Human eye</p> <p>Color mixing lab</p> <p>Gas Discharge tubes and wave particle duality lab.</p>	<p>Course textbook</p> <p>Discharge tubes</p> <p>Spectroscopes</p> <p>Light and optics kits</p> <p>Phet Online simulators</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit..</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>
	When energy changes form, it is neither created nor destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases	<p>While engaged in tasks that address standards the student demonstrates understanding of important information such as....</p> <p>Describe energy transformations both quantitatively and qualitatively</p> <p>Differentiate among the characteristics of mechanical and electromagnetic waves that determine their energy</p> <p>Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate energy conservation and loss .</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>Incremental strides have been made in improving the efficiency of different forms of energy production and consumption. For example, today's engines are much more efficient than those from 50 years ago, and batteries are more powerful and last longer than those from just a few years ago.</p> <p>Different technologies such as light-emitting diodes, compact fluorescent lights, and incandescent light bulbs have different efficiencies and environmental impacts.</p> <p>Use direct and indirect evidence to develop and support claims about the conservation of energy in a variety of systems, including transformations to heat</p> <p>Evaluate the energy conversion efficiency of a variety of energy transformations</p> <p>Critically evaluate scientific claims made in popular media or by peers regarding the application of energy transformations, and determine if the evidence presented is appropriate and sufficient to support the claims.</p> <p>Ask testable questions and make a falsifiable hypothesis about the conservation of energy, and use an inquiry approach to find an answer.</p> <p>Share experimental data</p>	<p>Investigations from Unit 9 Heating and Cooling</p> <p>Temperature scales 26.1 Changes in Heat 26.2 Specific Heat 26.3</p>	<p>Course textbook</p> <p>Specific heat equipment including density cubes, calorimeters and thermometers.</p> <p>Phet Online simulators</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit..</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>

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	Atoms bond in different ways to form molecules and compounds that have definite properties	<p>While engaged in tasks that address standards the student demonstrates understanding of important information such as....</p> <p>Develop, communicate, and justify an evidence-based scientific explanation supporting the current models of chemical bonding</p> <p>Predict the type of bonding that will occur among elements based</p> <p>Recognize that the current understanding of molecular structure related to the physical and chemical properties of matter has developed over time and become more sophisticated as new technologies have led to new evidence.</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>Related compounds share some properties that help focus chemists when looking for a substance with particular properties for a specific application. For example, finding new super conductors.</p> <p>Carbon atoms bond in ways that provide the foundation for a wide range of applications. For example, forming chains and rings such as sugars and fats that are essential to life and developing synthetic fibers and oils.</p> <p>Living systems create and use various chemical compounds such as plants making sugars from photosynthesis and chemicals that can be used as medicine, and endocrine glands producing hormones.</p> <p>The student exhibits no major errors or omissions regarding the simpler details and processes such as...</p> <p>Gather, analyze, and interpret data on chemical and physical properties of different compounds such as density, melting point, boiling point, pH, and conductivity</p> <p>Employ data-collection technology to gather, view, analyze, and interpret data about chemical and physical properties of different compounds.</p> <p>Use characteristic physical and chemical properties to develop predictions and supporting claims about compounds' classification as ionic, polar or covalent</p> <p>Describe the role electrons play in atomic bonding</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>How can various substances be classified as ionic or covalent compounds?</p> <p>What role do electrons play in different types of chemical bonds?</p>	<p>Unit 6 Properties of Matter Investigations</p> <p>Density Investigation</p> <p>16.1 Classifying matter</p> <p>16.2 Measuring matter</p> <p>16.3 States of Matter</p> <p>18.1 Atomic Structure</p> <p>18.2 Comparing Atoms</p> <p>18.3 The periodic table of elements</p>	<p>Course textbook</p> <p>Atom structure game</p> <p>Periodic table tiles</p> <p>Phet Online simulators</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit..</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>
	Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy	<p>While engaged in tasks that address standards the student demonstrates understanding of important information such as....</p> <p>Recognize, analyze, interpret, and balance chemical equations (synthesis, decomposition, combustion, and replacement) or nuclear equations (fusion and fission)</p> <p>Predict reactants and products for different types of chemical and nuclear reactions</p> <p>Predict and calculate the amount of products produced in a chemical reaction based on the amount of reactants</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>Products formed in different types of reactions are useful to people. For example, polymerase reactions making nylon.</p> <p>The use of chemicals can have both positive and negative environmental effects. For example, the use of lime to make acidic soils more productive or the use of CFCs causing the ozone hole.</p> <p>When using radioactive substances, there are benefits such as medicine and energy production as well as dangers such as environmental and health concerns.</p> <p>Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate the conservation of mass and energy</p> <p>Critically evaluate chemical and nuclear change models.</p> <p>Identify the strengths and weaknesses of a model which represents complex natural phenomenon.</p> <p>Use an inquiry approach to test predictions about chemical reactions.</p> <p>Share experimental data, and respectfully discuss conflicting results.</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>What patterns of chemical reactions exist?</p> <p>How are chemical reactions distinguished from nuclear reactions?</p>	<p>Unit 7 Changes in Matter Labs including</p> <p>19.1 Chemical bonds</p> <p>19.2 Chemical Formulas</p> <p>20.1 Chemical changes</p> <p>20.3 Conservation of mass</p> <p>21.2 Energy in reactions</p>	<p>Course textbook</p> <p>chemistry lab equipment and chemicals</p> <p>Phet Online simulators</p>	<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit..</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>

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	<p>Matter has definite structure that determines characteristic physical and chemical properties</p>	<p>While engaged in tasks that address standards the student demonstrates understanding of important information such as....</p> <p>Develop, communicate, and justify an evidence-based scientific explanation supporting the current model of an atom</p> <p>Use characteristic physical and chemical properties to develop predictions and supporting claims about elements' positions on the periodic table</p> <p>Recognize that the current understanding of molecular structure related to the physical and chemical properties of matter has developed over time and become more sophisticated as new technologies have led to new evidence.</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>What properties do nanoscale particles have that are different than those of macroscopic samples of the same substance?</p> <p>The unique properties of nanoscale particles provide special benefits and dangers.</p> <p>Gather, analyze and interpret data on chemical and physical properties of elements such as density, melting point, boiling point, and conductivity</p> <p>Develop a model that differentiates atoms and molecules, elements and compounds</p> <p>Ask testable questions about the nature of matter, and use an inquiry approach to investigate it</p> <p>What patterns can be observed in the properties of elements and families in the periodic table?</p> <p>The unique properties of various elements make them useful for specific applications. For example, metalloids and semiconductors are useful in electronic applications.</p> <p>Students should be able to apply their knowledge of the standards in the following context.</p> <p>Consumers can make informed decisions regarding the purchase of household chemicals when they understand chemical properties and their implications. For example, choosing lead based versus non-lead based paints weighs safety concerns against color and durability in applications.</p> <p>Alloys are created by combining metals with other elements to produce materials with useful properties that are not found in nature. For example, iron and carbon make steel.</p>			<p>In formative and summative students will be asked to demonstrate mastery of the standards and skills by:</p> <p>Graphing, collecting and analyzing data related to the concepts taught in the unit.</p> <p>Solving problems using appropriate values in central equations.</p> <p>Relating conceptual ideas related to the standard in writing to novel scenarios</p> <p>Student work will be assessed using a 4 point scale</p> <p>4 Advanced 3 Proficient 2 Partially Proficient 1 MNA (Mastery not achieved)</p>