

Correlation to NRC National Science Education Standards with Inquiry Curriculum Resource Guide

Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
INQ01.1 Inquiry	Abilities Necessary to do Scientific Inquiry	Identify questions and concepts that guide scientific investigations	<p><i>Car and Ramp</i> A-2 Investigations and Experiments A-3 Speed</p> <p><i>Gravity Drop</i> A-3 Falling Motion</p> <p><i>Light and Optics</i> A-1 Introduction to Light A-3 Rules of Reflection</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance</p> <p><i>Pendulum</i> A-2 Making a Clock</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p>	<p><i>Air Rocket</i> B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion</p> <p><i>Car and Ramp</i> B-2 Investigating Speed B-7 Weight, Gravity, and Friction</p> <p><i>Gravity Drop</i> B-2 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> B-2 Polarization</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p> <p><i>Pendulum</i> B-1 Harmonic Motion</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion</p> <p><i>Ropes and Pulleys</i> B-3 Efficiency</p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall</p> <p><i>Pendulum</i> C-1 Energy Conservation and the Pendulum</p> <p><i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-3 Mass, Motion, and Energy</p>

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INQ01.2 Inquiry	Abilities Necessary to do Scientific Inquiry	Design and conduct scientific investigations	<p><i>Car and Ramp</i> A-2 Investigations and Experiments A-3 Speed</p> <p><i>Electric Circuits</i> A-3 Current and Voltage</p> <p><i>Gravity Drop</i> A-1 Introduction to the Gravity Drop A-3 Falling Motion</p> <p><i>Light and Optics</i> A-1 Introduction to Light A-2 Color A-3 Rules of Reflection</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance A-2 Launch Speed and Distance</p> <p><i>Pendulum</i> A-1 The Pendulum A-2 Making a Clock</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys A-2 What is Work?</p>	<p><i>Air Rocket</i> B-1 The Air Rocket B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion</p> <p><i>Car and Ramp</i> B-2 Investigating Speed B-7 Weight, Gravity, and Friction</p> <p><i>Electric Circuits</i> B-1 Voltage B-2 Current</p> <p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-2 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> B-2 Polarization</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p> <p><i>Pendulum</i> B-1 Harmonic Motion</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion</p> <p><i>Ropes and Pulleys</i> B-1 Forces in Machines B-2 Work and Energy B-3 Efficiency</p> <p><i>Sound and Waves</i> B-1 Sound</p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction</p> <p><i>Electric Circuits</i> C-1 Series Circuits C-2 Parallel Circuits C-3 Compound Circuits</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> C-1 Light and Color</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</p> <p><i>Pendulum</i> C-1 Energy Conservation and the Pendulum</p> <p><i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-3 Mass, Motion, and Energy</p> <p><i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems</p> <p><i>Sound and Waves</i> C-4 Sound</p>

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
INQ01.3 Inquiry	Abilities Necessary to do Scientific Inquiry	Use technology and mathematics to improve investigations and communications	<p><i>Car and Ramp</i> A-1 Time and Distance A-3 Speed A-4 Describing Motion A-5 Gravity</p> <p><i>Gears and Levers</i> A-4 Designing Gear Machines</p> <p><i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion</p> <p><i>Light and Optics</i> A-2 Color</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance A-2 Launch Speed and Distance</p> <p><i>Pendulum</i> A-1 The Pendulum</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys A-2 What is Work?</p> <p><i>Sound and Waves</i> A-1 Sound</p>	<p><i>Air Rocket</i> B-1 The Air Rocket B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion</p> <p><i>Car and Ramp</i> B-1 Time and Distance B-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration B-6 Force, Mass, and Acceleration B-7 Weight, Gravity, and Friction</p> <p><i>Electric Circuits</i> B-3 Ohm's Law</p> <p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law</p> <p><i>Light and Optics</i> B-1 Seeing an Image B-4 Ratios</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range B-2 Launch Speed and Range B-3 Relating Launch Speed and Range</p> <p><i>Pendulum</i> B-1 Harmonic Motion B-2 The Five Second Pendulum</p> <p><i>Rollercoaster</i></p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction C-3 The Physics of the Inclined Plane</p> <p><i>Electric Motor</i> C-2 Optimizing Performance</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall C-2 Measuring Gravity C-3 Interpreting Graphs of Accelerated Motion</p> <p><i>Light and Optics</i> C-6 The Thin Lens Equation</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation C-2 Improving the Range Equation C-3 Accuracy, Precision, and Error</p> <p><i>Pendulum</i> C-2 Newton's Second Law and the Pendulum</p> <p><i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy</p> <p><i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems</p>

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				B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion Ropes and Pulleys B-1 Forces in Machines B-2 Work and Energy B-3 Efficiency Sound and Waves B-1 Sound	C-2 Compound Pulley System Sound and Waves C-4 Sound

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
INQ01.4 Inquiry	Abilities Necessary to do Scientific Inquiry	Formulate and revise scientific explanations and models using logic and evidence	<p><i>Car and Ramp</i> A-2 Investigations and Experiments A-4 Describing Motion A-5 Gravity</p> <p><i>Gears and Levers</i> A-1 The Lever A-2 Gears</p> <p><i>Gravity Drop</i> A-3 Falling Motion</p> <p><i>Light and Optics</i> A-1 Introduction to Light</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance A-2 Launch Speed and Distance</p> <p><i>Pendulum</i> A-1 The Pendulum</p> <p><i>Rollercoaster</i> A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys A-2 What is Work?</p> <p><i>Sound and Waves</i> A-1 Sound</p>	<p><i>Air Rocket</i> B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion</p> <p><i>Car and Ramp</i> B-2 Investigating Speed B-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration B-6 Force, Mass, and Acceleration B-7 Weight, Gravity, and Friction</p> <p><i>Electric Circuits</i> B-3 Ohm's Law</p> <p><i>Gears and Levers</i> B-1 Levers, Torque and Mechanical Advantage B-2 Gears and Rotating Motion B-4 Machines with Gears and Levers</p> <p><i>Gravity Drop</i> B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law</p> <p><i>Light and Optics</i> B-2 Polarization B-4 Ratios</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range B-2 Launch Speed and Range B-3 Relating Launch Speed and Range</p> <p><i>Pendulum</i></p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction C-3 The Physics of the Inclined Plane</p> <p><i>Electric Circuits</i> C-1 Series Circuits</p> <p><i>Electric Motor</i> C-2 Optimizing Performance</p> <p><i>Gears and Levers</i> C-2 The Center of Gravity and Equilibrium</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall C-2 Measuring Gravity C-3 Interpreting Graphs of Accelerated Motion</p> <p><i>Light and Optics</i> C-1 Light and Color C-5 Geometric Optics C-6 The Thin Lens Equation</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation C-2 Improving the Range Equation</p> <p><i>Pendulum</i> C-1 Energy Conservation and the Pendulum C-2 Newton's Second Law and the Pendulum C-3 The Physical Pendulum</p>

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				B-1 Harmonic Motion B-2 The Five Second Pendulum Rollercoaster B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion Ropes and Pulleys B-1 Forces in Machines B-2 Work and Energy Sound and Waves B-1 Sound	Rollercoaster C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy Ropes and Pulleys C-1 Simple and Complex Pulley Systems Sound and Waves C-1 Standing Waves C-3 Natural Frequency and Resonance C-4 Sound
INQ01.5 Inquiry	Abilities Necessary to do Scientific Inquiry	Recognize and analyze alternative explanations and models		Marble Launcher B-3 Relating Launch Speed and Range Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion	Car and Ramp C-3 The Physics of the Inclined Plane Light and Optics C-1 Light and Color Marble Launcher C-1 Projectile Motion and the Range Equation C-2 Improving the Range Equation
INQ01.6 Inquiry	Abilities Necessary to do Scientific Inquiry	Communicate and defend a scientific argument		Air Rocket B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion Electric Circuits B-2 Current	

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INQ02.1 Inquiry	Understandings About Scientific Inquiry	Scientists usually inquire about how physical, living, or designed systems function. Conceptual principles and knowledge guide scientific inquiries. Historical and current scientific knowledge influence the design and interpretation of investigations...	Ropes and Pulleys A-2 What is Work?	Electric Circuits B-3 Ohm's Law Ropes and Pulleys B-2 Work and Energy	Light and Optics C-1 Light and Color Ropes and Pulleys C-1 Simple and Complex Pulley Systems
INQ02.2 Inquiry	Understandings About Scientific Inquiry	Scientists conduct investigations for a wide variety of reasons. For example, they may wish to discover new aspects of the natural world, explain recently observed phenomena, or test the conclusions of prior investigations or the predictions of current...		Car and Ramp B-8 Equilibrium, Action, and Reaction Light and Optics B-3 Optical Technology Ropes and Pulleys B-1 Forces in Machines	Light and Optics C-2 The Law of Reflection Ropes and Pulleys C-1 Simple and Complex Pulley Systems

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INQ02.3 Inquiry	Understandings About Scientific Inquiry	Scientists rely on technology to enhance the gathering and manipulation of data. New techniques and tools provide new evidence to guide inquiry and new methods to gather data, thereby contributing to the advance of science. The accuracy and precision of..	<p><i>Car and Ramp</i> A-1 Time and Distance A-2 Investigations and Experiments A-3 Speed A-4 Describing Motion A-5 Gravity</p> <p><i>Electric Circuits</i> A-3 Current and Voltage</p> <p><i>Electric Motor</i> A-5 Measuring Current and Voltage</p> <p><i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance A-2 Launch Speed and Distance</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys A-2 What is Work?</p>	<p><i>Air Rocket</i> B-1 The Air Rocket B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion B-5 The Acceleration of a Rocket</p> <p><i>Car and Ramp</i> B-1 Time and Distance B-2 Investigating Speed B-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration B-6 Force, Mass, and Acceleration</p> <p><i>Electric Circuits</i> B-1 Voltage B-2 Current B-3 Ohm's Law</p> <p><i>Electric Motor</i> B-4 Current, Voltage, and Power</p> <p><i>Gears and Levers</i> B-1 Levers, Torque and Mechanical Advantage</p> <p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law</p> <p><i>Light and Optics</i> B-1 Seeing an Image</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction C-3 The Physics of the Inclined Plane</p> <p><i>Electric Circuits</i> C-1 Series Circuits C-3 Compound Circuits</p> <p><i>Electric Motor</i> C-1 Introduction to the Electric Motor C-2 Optimizing Performance C-3 Generators and Faraday's Law of Induction</p> <p><i>Gears and Levers</i> C-1 Rotational Motion</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall C-2 Measuring Gravity</p> <p><i>Light and Optics</i> C-7 Wave Properties of Light</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation C-3 Accuracy, Precision, and Error</p> <p><i>Pendulum</i> C-1 Energy Conservation and the Pendulum C-3 The Physical Pendulum</p> <p><i>Rollercoaster</i></p>

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				B-2 Launch Speed and Range <i>Pendulum</i> B-1 Harmonic Motion <i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion <i>Ropes and Pulleys</i> B-1 Forces in Machines B-2 Work and Energy B-3 Efficiency <i>Sound and Waves</i> B-4 Natural Frequency and Resonance	C-1 Motion on the Roller Coaster C-3 Mass, Motion, and Energy <i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems C-2 Compound Pulley System <i>Sound and Waves</i> C-2 The Speed of a Wave Pulse C-3 Natural Frequency and Resonance

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INQ02.4 Inquiry	Understandings About Scientific Inquiry	Mathematics is essential in scientific inquiry. Mathematical tools and models guide and improve the posing of questions, gathering data, constructing explanations and communicating results.	<p>Gears and Levers A-1 The Lever A-2 Gears</p> <p>Ropes and Pulleys A-1 Ropes and Pulleys A-2 What is Work?</p>	<p>Gears and Levers B-1 Levers, Torque and Mechanical Advantage B-2 Gears and Rotating Motion B-4 Machines with Gears and Levers</p> <p>Marble Launcher B-2 Launch Speed and Range B-3 Relating Launch Speed and Range</p> <p>Pendulum B-2 The Five Second Pendulum</p> <p>Ropes and Pulleys B-1 Forces in Machines B-2 Work and Energy</p>	<p>Car and Ramp C-1 Uniform Accelerated Motion</p> <p>Gears and Levers C-2 The Center of Gravity and Equilibrium</p> <p>Gravity Drop C-3 Interpreting Graphs of Accelerated Motion</p> <p>Light and Optics C-6 The Thin Lens Equation</p> <p>Marble Launcher C-1 Projectile Motion and the Range Equation C-2 Improving the Range Equation</p> <p>Pendulum C-3 The Physical Pendulum</p> <p>Rollercoaster C-1 Motion on the Roller Coaster</p> <p>Ropes and Pulleys C-1 Simple and Complex Pulley Systems</p> <p>Sound and Waves C-1 Standing Waves</p>

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INQ02.5 Inquiry	Understandings About Scientific Inquiry	Scientific explanations must adhere to criteria such as: a proposed explanation must be logically consistent; it must abide by the rules of evidence; it must be open to questions and possible modification; and it must be based on historical and current...	<p><i>Car and Ramp</i> A-2 Investigations and Experiments A-4 Describing Motion A-5 Gravity</p> <p><i>Electric Circuits</i> A-3 Current and Voltage</p> <p><i>Light and Optics</i> A-1 Introduction to Light A-3 Rules of Reflection</p> <p><i>Marble Launcher</i> A-1 Launch Angle and Distance A-2 Launch Speed and Distance</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys A-2 What is Work?</p>	<p><i>Car and Ramp</i> B-2 Investigating Speed B-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration</p> <p><i>Electric Circuits</i> B-1 Voltage B-2 Current B-3 Ohm's Law</p> <p><i>Gravity Drop</i> B-2 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> B-2 Polarization</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p> <p><i>Pendulum</i> B-2 The Five Second Pendulum</p> <p><i>Rollercoaster</i> B-2 Conservation of Energy B-3 Mass and Motion</p> <p><i>Ropes and Pulleys</i> B-1 Forces in Machines B-2 Work and Energy</p> <p><i>Sound and Waves</i> B-1 Sound</p>	<p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-3 The Physics of the Inclined Plane</p> <p><i>Electric Circuits</i> C-3 Compound Circuits</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> C-1 Light and Color C-5 Geometric Optics C-6 The Thin Lens Equation</p> <p><i>Marble Launcher</i> C-2 Improving the Range Equation</p> <p><i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy</p> <p><i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems</p> <p><i>Sound and Waves</i> C-4 Sound</p>

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INQ02.6 Inquiry	Understandings About Scientific Inquiry	Results of scientific inquiry- new knowledge and methods- emerge from different types of investigations and public communication among scientists. In communicating and defending the results of scientific inquiry, arguments must be logical and demonstrate...		<p><i>Light and Optics</i> B-2 Polarization</p> <p><i>Marble Launcher</i> B-3 Relating Launch Speed and Range</p> <p><i>Pendulum</i> B-2 The Five Second Pendulum</p>	<p><i>Gravity Drop</i> C-3 Interpreting Graphs of Accelerated Motion</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</p>
PS01.1 Physical Science	Structure of Atoms	Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as mass and electrical charge...	<p><i>Atom Building Game</i> A-1 Building Atoms A-2 Atomic Challenge A-3 Building Molecules</p> <p><i>Light and Optics</i> A-1 Introduction to Light</p> <p><i>Periodic Table Tiles</i> A-2 Groups of Elements</p>	<p><i>Atom Building Game</i> B-1 Comparing Atoms B-2 Nuclear Reactions Game B-3 Bonding and Molecules</p> <p><i>Periodic Table Tiles</i> B-1 Chemical Formulas</p>	<p><i>Atom Building Game</i> C-1 Electrons and the Periodic Table C-2 Photons and Lasers C-3 Valence Electrons and Molecules</p> <p><i>Light and Optics</i> C-1 Light and Color</p> <p><i>Periodic Table Tiles</i> C-1 Electrons and the Periodic Table</p>

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PS01.2 Physical Science	Structure of Atoms	The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.	<p><i>Atom Building Game</i></p> <p>A-1 Building Atoms A-2 Atomic Challenge A-3 Building Molecules</p> <p><i>Light and Optics</i></p> <p>A-1 Introduction to Light</p> <p><i>Periodic Table Tiles</i></p> <p>A-1 The Periodic Table A-2 Groups of Elements</p>	<p><i>Atom Building Game</i></p> <p>B-1 Comparing Atoms B-2 Nuclear Reactions Game B-3 Bonding and Molecules</p> <p><i>Periodic Table Tiles</i></p> <p>B-1 Chemical Formulas B-2 A Tour of the Periodic Table</p>	<p><i>Atom Building Game</i></p> <p>C-1 Electrons and the Periodic Table C-2 Photons and Lasers C-3 Valence Electrons and Molecules</p> <p><i>Light and Optics</i></p> <p>C-1 Light and Color</p> <p><i>Periodic Table Tiles</i></p> <p>C-1 Electrons and the Periodic Table</p>
PS01.3 Physical Science	Structure of Atoms	The nuclear forces that hold the nucleus of an atom together, at nuclear distances, are usually stronger than the electric forces that would make it fly apart. Fission is the splitting of a large nucleus, Fusion is the joining of two nuclei...	<p><i>Atom Building Game</i></p> <p>A-2 Atomic Challenge</p>	<p><i>Atom Building Game</i></p> <p>B-1 Comparing Atoms B-2 Nuclear Reactions Game</p>	

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PS01.4 Physical Science	Structure of Atoms	Radioactive isotopes are unstable and undergo spontaneous nuclear reactions, emitting particles and/or wavelike radiation. The decay of any one nucleus cannot be predicted...		<i>Atom Building Game</i> B-2 Nuclear Reactions Game	
PS02.1 Physical Science	Structure and Properties of Matter	Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus. These outer electrons govern the chemical properties of the element.	<i>Atom Building Game</i> A-1 Building Atoms A-2 Atomic Challenge A-3 Building Molecules <i>Light and Optics</i> A-1 Introduction to Light <i>Periodic Table Tiles</i> A-2 Groups of Elements	<i>Atom Building Game</i> B-1 Comparing Atoms B-2 Nuclear Reactions Game B-3 Bonding and Molecules <i>Periodic Table Tiles</i> B-1 Chemical Formulas	<i>Atom Building Game</i> C-1 Electrons and the Periodic Table C-2 Photons and Lasers C-3 Valence Electrons and Molecules <i>Light and Optics</i> C-1 Light and Color <i>Periodic Table Tiles</i> C-1 Electrons and the Periodic Table

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PS02.2 Physical Science	Structure and Properties of Matter	An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar...	<i>Periodic Table Tiles</i> A-3 Chemical Reactions	<i>Periodic Table Tiles</i> B-3 Chemical Equations	<i>Periodic Table Tiles</i> C-1 Electrons and the Periodic Table
PS02.3 Physical Science	Structure and Properties of Matter	Bonds between atoms are created when electrons are paired up by being transferred or shared. A substance composed of a single kind of atom is called an element...	<i>Atom Building Game</i> A-3 Building Molecules <i>Periodic Table Tiles</i> A-2 Groups of Elements	<i>Atom Building Game</i> B-3 Bonding and Molecules <i>Periodic Table Tiles</i> B-1 Chemical Formulas B-3 Chemical Equations	<i>Atom Building Game</i> C-1 Electrons and the Periodic Table C-3 Valence Electrons and Molecules <i>Periodic Table Tiles</i> C-1 Electrons and the Periodic Table

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PS03.1 Physical Science	Chemical Reactions	Chemical reactions occur all around us, for example in health care, cooking, cosmetics, and automobiles. Complex chemical reactions involving carbon-based molecules take place constantly in every cell in our bodies.	<i>Periodic Table Tiles</i> A-3 Chemical Reactions		<i>Periodic Table Tiles</i> C-1 Electrons and the Periodic Table C-3 Classifying Reactions
PS03.4 Physical Science	Chemical Reactions	Chemical reactions can take place in time periods ranging from the few femtoseconds (10-15 seconds) required for an atom to move a fraction of a chemical bond distance to geologic time scales of billions of years. Reaction rates depend...			<i>Periodic Table Tiles</i> C-3 Classifying Reactions

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS03.5 Physical Science	Chemical Reactions	Catalysts, such as metal surfaces, accelerate chemical reactions. Chemical reactions in living systems are catalyzed by protein molecules called enzymes.			<i>Periodic Table Tiles</i> C-3 Classifying Reactions

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS04.1 Physical Science	Motion and Forces	Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the...	<p><i>Car and Ramp</i> A-3 Speed A-4 Describing Motion A-5 Gravity</p> <p><i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion</p> <p><i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster</p> <p><i>Ropes and Pulleys</i> A-1 Ropes and Pulleys</p>	<p><i>Air Rocket</i> B-1 The Air Rocket B-2 Motion of the Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion B-5 The Acceleration of a Rocket</p> <p><i>Car and Ramp</i> B-2 Investigating Speed B-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration B-6 Force, Mass, and Acceleration B-8 Equilibrium, Action, and Reaction</p> <p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law</p> <p><i>Marble Launcher</i> B-2 Launch Speed and Range</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion</p> <p><i>Ropes and Pulleys</i> B-1 Forces in Machines B-3 Efficiency</p>	<p><i>Air Rocket</i> C-3 Acceleration and G-forces C-5 Conservation of Momentum</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-2 Newton's Second Law and Friction</p> <p><i>Electric Motor</i> C-2 Optimizing Performance</p> <p><i>Gravity Drop</i> C-1 Speed, Acceleration, and Free Fall C-2 Measuring Gravity C-3 Interpreting Graphs of Accelerated Motion</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation C-2 Improving the Range Equation C-3 Accuracy, Precision, and Error</p> <p><i>Pendulum</i> C-2 Newton's Second Law and the Pendulum</p> <p><i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy</p> <p><i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems C-2 Compound Pulley System</p> <p><i>Sound and Waves</i> C-2 The Speed of a Wave Pulse</p>

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS04.2 Physical Science	Motion and Forces	Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.	<p><i>Car and Ramp</i> A-5 Gravity</p> <p><i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion</p>	<p><i>Air Rocket</i> B-5 The Acceleration of a Rocket</p> <p><i>Car and Ramp</i> B-7 Weight, Gravity, and Friction</p> <p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p>	<p><i>Car and Ramp</i> C-3 The Physics of the Inclined Plane</p> <p><i>Gravity Drop</i> C-2 Measuring Gravity C-3 Interpreting Graphs of Accelerated Motion</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</p>
PS04.5 Physical Science	Motion and Forces	Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. These effects help students to understand electric motors and generators.	<p><i>Electric Motor</i> A-3 How a Motor Works A-4 Designing Motors A-5 Measuring Current and Voltage</p>	<p><i>Electric Motor</i> B-2 Electromagnets B-3 The Electric Motor B-4 Current, Voltage, and Power</p>	<p><i>Electric Motor</i> C-1 Introduction to the Electric Motor C-2 Optimizing Performance</p>

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS05.1 Physical Science	Conservation of Energy and the Increase in Disorder	The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiations, and in many other ways. However, it can never be destroyed. As these transfers...			<i>Air Rocket</i> C-4 Energy and Power
PS05.2 Physical Science	Conservation of Energy and the Increase in Disorder	All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.	<i>Rollercoaster</i> A-2 Height on the Roller Coaster	<i>Air Rocket</i> B-3 Pressure and Speed <i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy <i>Ropes and Pulleys</i> B-2 Work and Energy	<i>Air Rocket</i> C-4 Energy and Power <i>Pendulum</i> C-1 Energy Conservation and the Pendulum <i>Rollercoaster</i> C-1 Motion on the Roller Coaster <i>Ropes and Pulleys</i> C-2 Compound Pulley System

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS06.1 Physical Science	Interactions of Energy and Matter	Waves, including sound and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter.	<p><i>Light and Optics</i></p> <p>A-2 Color</p> <p><i>Sound and Waves</i></p> <p>A-1 Sound</p> <p>A-2 Musical Sounds</p> <p>A-3 Making Waves</p>	<p><i>Light and Optics</i></p> <p>B-2 Polarization</p> <p><i>Sound and Waves</i></p> <p>B-1 Sound</p> <p>B-2 Musical Sounds</p> <p>B-3 Standing Waves on a String</p> <p>B-4 Natural Frequency and Resonance</p> <p>B-5 Resonant Sounds</p>	<p><i>Light and Optics</i></p> <p>C-1 Light and Color</p> <p>C-7 Wave Properties of Light</p> <p><i>Sound and Waves</i></p> <p>C-1 Standing Waves</p> <p>C-2 The Speed of a Wave Pulse</p> <p>C-3 Natural Frequency and Resonance</p> <p>C-5 Interference and Diffraction of Sound</p>
PS06.2 Physical Science	Interactions of Energy and Matter	Electromagnetic waves result when a charged object is accelerated or decelerated. Electromagnetic waves include radio waves (the longest wavelength), microwaves, infrared radiation (radiant heat), visible light, ultraviolet radiation...	<p><i>Light and Optics</i></p> <p>A-2 Color</p>		<p><i>Sound and Waves</i></p> <p>C-1 Standing Waves</p>

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Standard #: Content Area	Topic	Fundamental Concept	Investigation Level A	Investigation Level B	Investigation Level C
PS06.3 Physical Science	Interactions of Energy and Matter	Each kind of atom or molecule can gain or lose energy only in particular discrete amounts and thus can absorb and emit light only at wavelengths corresponding to these amounts. These wavelengths can be used to identify the substance.	<i>Light and Optics</i> A-1 Introduction to Light		<i>Atom Building Game</i> C-2 Photons and Lasers <i>Light and Optics</i> C-1 Light and Color