

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
1a.PSMotion Grade 8 Physical Science	Motion	The velocity of an object is the rate of change of its position.	Position is defined relative to some choice of standard reference point and a set of reference directions.		<i>Car and Ramp</i> B-4 Position and Time	
1b.PSMotion Grade 8 Physical Science	Motion	The velocity of an object is the rate of change of its position.	Average speed is the total distance traveled divided by the total time elapsed. The speed of an object along the path traveled can vary.	<i>Car and Ramp</i> A-3 Speed A-4 Describing Motion A-5 Gravity <i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion <i>Rollercoaster</i> A-1 Speed on the Roller Coaster A-2 Height on the Roller Coaster	<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 <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 <i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law <i>Marble Launcher</i> B-2 Launch Speed and Range <i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
1c.PSMotion Grade 8 Physical Science	Motion	The velocity of an object is the rate of change of its position.	How to solve problems involving distance, time, and average speed.	<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>Air Rocket</i> B-1 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</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>	
1e.PSMotion Grade 8 Physical Science	Motion	The velocity of an object is the rate of change of its position.	Changes in velocity can be changes in speed, direction, or both.		<p><i>Gravity Drop</i> B-3 Newton's Second Law</p>	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
1f.PSMotion Grade 8 Physical Science	Motion	The velocity of an object is the rate of change of its position.	How to interpret graphs of position versus time and speed versus time for motion in a single direction.	Gravity Drop A-3 Falling Motion	Car and Ramp B-4 Position and Time B-5 Acceleration Gravity Drop B-2 Speed, Acceleration, and Free Fall	
2a.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	A force has both direction and magnitude.	Ropes and Pulleys A-1 Ropes and Pulleys	Air Rocket B-2 Motion of the Air Rocket B-4 The Rocket and Newton's Laws of Motion Car and Ramp B-6 Force, Mass, and Acceleration Gravity Drop B-1 Introduction to the Gravity Drop B-3 Newton's Second Law Ropes and Pulleys B-1 Forces in Machines B-3 Efficiency	
2c.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	When the forces on an object are balanced, the motion of the object does not change.	Ropes and Pulleys A-1 Ropes and Pulleys	Gravity Drop B-1 Introduction to the Gravity Drop B-3 Newton's Second Law Ropes and Pulleys B-1 Forces in Machines	

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
2d.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	How to identify separately two or more forces acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.		<i>Air Rocket</i> B-4 The Rocket and Newton's Laws of Motion <i>Car and Ramp</i> B-8 Equilibrium, Action, and Reaction	
2e.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	When the forces on an object are unbalanced the object will change its motion (that is, it will speed up, slow down, or change direction).	<i>Ropes and Pulleys</i> A-1 Ropes and Pulleys	<i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law <i>Ropes and Pulleys</i> B-1 Forces in Machines	
2f.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	The greater the mass of an object the more force is needed to achieve the same change in motion.	<i>Ropes and Pulleys</i> A-1 Ropes and Pulleys	<i>Air Rocket</i> B-2 Motion of the Air Rocket B-4 The Rocket and Newton's Laws of Motion <i>Car and Ramp</i> B-6 Force, Mass, and Acceleration <i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law <i>Ropes and Pulleys</i> B-1 Forces in Machines B-3 Efficiency	

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
2g.PSForce Grade 8 Physical Science	Forces	Unbalanced forces cause changes in velocity.	The role of gravity in forming and maintaining planets, stars and the solar system.	<i>Car and Ramp</i> A-5 Gravity <i>Gravity Drop</i> A-2 Speed and the Gravity Drop A-3 Falling Motion	<i>Air Rocket</i> B-5 The Acceleration of a Rocket <i>Car and Ramp</i> B-7 Weight, Gravity, and Friction <i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law <i>Marble Launcher</i> B-1 Launch Angle and Range	
3a.PSMatter Grade 8 Physical Science	Structure of Matter	Elements have distinct properties and atomic structure. All matter is comprised of one or more of over 100 elements.	The structure of the atom and how it is composed of protons, neutrons and electrons.	<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	
3b.PSMatter Grade 8 Physical Science	Structure of Matter	Elements have distinct properties and atomic structure. All matter is comprised of one or more of over 100 elements.	Compounds are formed by combining two or more different elements. Compounds have properties that are different from the constituent elements.	<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	

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
3f.PSMatter Grade 8 Physical Science	Structure of Matter	Elements have distinct properties and atomic structure. All matter is comprised of one or more of over 100 elements.	How to use the Periodic Table to identify elements in simple compounds.	<i>Atom Building Game</i> A-1 Building Atoms A-2 Atomic Challenge A-3 Building Molecules <i>Periodic Table Tiles</i> A-1 The Periodic Table A-2 Groups of Elements A-3 Chemical Reactions	<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-2 A Tour of the Periodic Table B-3 Chemical Equations	
5a.PSReact Grade 8 Physical Science	Reactions	Chemical reactions are processes in which atoms are rearranged into different combinations of molecules.	Reactant atoms and molecules interact to form products with different chemical properties.	<i>Periodic Table Tiles</i> A-3 Chemical Reactions	<i>Periodic Table Tiles</i> B-3 Chemical Equations	
5b.PSReact Grade 8 Physical Science	Reactions	Chemical reactions are processes in which atoms are rearranged into different combinations of molecules.	The idea of atoms explains the conservation of matter: in chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.	<i>Periodic Table Tiles</i> A-3 Chemical Reactions	<i>Periodic Table Tiles</i> B-3 Chemical Equations	
7a.PSChem Grade 8 Physical Science	Periodic Table	The organization of the Periodic Table is based on the properties of the elements and reflects the structure of atoms.	How to identify regions corresponding to metals, nonmetals and inert gases.	<i>Periodic Table Tiles</i> A-1 The Periodic Table A-2 Groups of Elements	<i>Periodic Table Tiles</i> B-2 A Tour of the Periodic Table	

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
7b.PSChem Grade 8 Physical Science	Periodic Table	The organization of the Periodic Table is based on the properties of the elements and reflects the structure of atoms.	Elements are defined by the number of protons in the nucleus, which is called the atomic number. Different isotopes of an element have a different number of neutrons in the nucleus.	<p><i>Atom Building Game</i> A-1 Building Atoms A-2 Atomic Challenge A-3 Building Molecules</p> <p><i>Periodic Table Tiles</i> A-1 The Periodic Table 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 B-2 A Tour of the Periodic Table</p>	
9a.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Plan and conduct a scientific investigation to test a hypothesis.	<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-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>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>	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
9b.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the other three strands, students should develop their own questions and perform invest	Evaluate the accuracy and reproducibility of data.	<p><i>Car and Ramp</i> A-1 Time and Distance A-2 Investigations and Experiments A-3 Speed A-4 Describing Motion</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>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-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>Gravity Drop</i> B-2 Speed, Acceleration, and Free Fall B-3 Newton's Second Law</p> <p><i>Light and Optics</i> 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> B-1 Energy and the Rollercoaster</p>	

Correlation to California Science Content Standards
Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
					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	
9c.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Distinguish between variable and controlled parameters in a test.	Car and Ramp A-2 Investigations and Experiments Pendulum A-1 The Pendulum Rollercoaster A-1 Speed on the Roller Coaster	Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion Car and Ramp B-2 Investigating Speed Pendulum B-1 Harmonic Motion	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
9d.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Recognize the slope of the linear graph as the constant in the relationship $y=kx$ and apply this to interpret graphs constructed from data.	<p><i>Car and Ramp</i> A-4 Describing Motion</p> <p><i>Gravity Drop</i> 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>Pendulum</i> A-1 The Pendulum</p> <p><i>Rollercoaster</i> A-2 Height on the Roller Coaster</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-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-2 Speed, Acceleration, and Free Fall</p> <p><i>Light and Optics</i> 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> B-1 Energy and the Rollercoaster B-2 Conservation of Energy B-3 Mass and Motion</p> <p><i>Sound and Waves</i></p>	

Correlation to California Science Content Standards
Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
					B-1 Sound	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
9e.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Construct appropriate graphs from data and develop quantitative statements about the relationship between variables.	<p><i>Car and Ramp</i> A-4 Describing Motion</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>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-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</p> <p><i>Light and Optics</i> 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>	

Correlation to California Science Content Standards
Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
					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 <i>Sound and Waves</i> B-1 Sound	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
9f.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Apply simple mathematical relationships to determine one quantity given the other two (including speed = distance/time, density = mass/volume, force = pressure x area, volume = area x height).	<p><i>Car and Ramp</i> A-3 Speed 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-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 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-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>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-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 B-3 Relating Launch Speed and Range</p> <p><i>Pendulum</i> B-2 The Five Second Pendulum</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster</p>	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
					B-2 Conservation of Energy B-3 Mass and Motion Ropes and Pulleys B-1 Forces in Machines B-2 Work and Energy	
9g.Gen Grade 8 Physical Science	Investigation and Experimentation	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept, and to address the content the other three strands, students should develop their own questions and perform invest	Distinguish between linear and non-linear relationships on a graph of data.		Car and Ramp B-4 Position and Time B-5 Acceleration Electric Circuits B-3 Ohm's Law Light and Optics B-4 Ratios Pendulum B-2 The Five Second Pendulum	

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.a Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.	<p><i>Car and Ramp</i> A-1 Time and Distance A-3 Speed A-4 Describing Motion</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</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</p> <p><i>Light and Optics</i> B-1 Seeing an Image</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range 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-2 Work and Energy B-3 Efficiency</p>	<p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion C-3 The Physics of the Inclined Plane</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</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>

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.b Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Identify and communicate sources of unavoidable experimental error.	<p><i>Car and Ramp</i> A-1 Time and Distance A-3 Speed A-4 Describing Motion</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</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</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-4 Ratios</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-2 Conservation of Energy</p> <p><i>Ropes and Pulleys</i> B-1 Forces in Machines B-2 Work and Energy</p>	<p><i>Car and Ramp</i> C-1 Uniform Accelerated 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-6 The Thin Lens Equation</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</p> <p><i>Pendulum</i> C-2 Newton's Second Law and the Pendulum</p> <p><i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems</p>

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.c Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.		<p><i>Car and Ramp</i> B-3 Using a Scientific Model to Predict Speed</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-4 Ratios</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range</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-6 The Thin Lens Equation</p> <p><i>Pendulum</i> C-2 Newton's Second Law and the Pendulum</p>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.d Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Formulate explanations by 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>Light and Optics</i> A-1 Introduction to Light 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-2 Making a Clock</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>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-3 Using a Scientific Model to Predict Speed B-4 Position and Time B-5 Acceleration</p> <p><i>Electric Circuits</i> B-3 Ohm's Law</p> <p><i>Light and Optics</i> B-2 Polarization</p> <p><i>Pendulum</i> B-1 Harmonic Motion</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster 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>Light and Optics</i> C-1 Light and Color</p> <p><i>Marble Launcher</i> C-2 Improving 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>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.e Investigation and Experimentatio n	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Solve scientific problems by using quadratic equations and simple trigonometric, exponential, and logarithmic functions.	<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>

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.f Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Distinguish between hypothesis and theory as scientific terms.	<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>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>Marble Launcher</i> B-1 Launch Angle and Range B-3 Relating Launch Speed 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 C-3 The Physics of the Inclined Plane</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 C-2 Improving the Range Equation</p> <p><i>Pendulum</i> C-1 Energy Conservation and the Pendulum</p> <p><i>Rollercoaster</i> C-3 Mass, Motion, and Energy</p>

Correlation to California Science Content Standards

Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.g Investigation and Experimentatio n	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Recognize the usefulness and limitations of models and theories as scientific representations of reality.	<p><i>Car and Ramp</i> A-4 Describing Motion</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>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-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> B-1 Harmonic Motion</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-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> <p><i>Rollercoaster</i></p>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
					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	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
InqHS.01.j Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Recognize the issues of statistical variability and the need for controlled tests.	Car and Ramp A-1 Time and Distance A-2 Investigations and Experiments Light and Optics A-3 Rules of Reflection Pendulum A-1 The Pendulum Rollercoaster A-1 Speed on the Roller Coaster	Air Rocket B-3 Pressure and Speed B-4 The Rocket and Newton's Laws of Motion Car and Ramp B-1 Time and Distance B-2 Investigating Speed Gravity Drop B-1 Introduction to the Gravity Drop B-3 Newton's Second Law Marble Launcher B-1 Launch Angle and Range B-2 Launch Speed and Range Pendulum B-1 Harmonic Motion Rollercoaster B-3 Mass and Motion Ropes and Pulleys B-3 Efficiency	Air Rocket C-3 Acceleration and G-forces Gravity Drop C-2 Measuring Gravity Marble Launcher C-3 Accuracy, Precision, and Error Pendulum C-1 Energy Conservation and the Pendulum

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.m Investigation and Experimentatio n	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources...		<i>Light and Optics</i> B-2 Polarization	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
InqHS.01.n Investigation and Experimentation	Standard	Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop questions and perform investigations.	Know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent and that the theory is sometimes wrong.	<p><i>Car and Ramp</i> A-2 Investigations and Experiments</p> <p><i>Pendulum</i> A-2 Making a Clock</p> <p><i>Rollercoaster</i> A-1 Speed 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-3 Using a Scientific Model to Predict Speed B-7 Weight, Gravity, and Friction</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-4 Ratios</p> <p><i>Marble Launcher</i> B-1 Launch Angle and Range B-3 Relating Launch Speed and Range</p> <p><i>Rollercoaster</i> B-1 Energy and the Rollercoaster B-3 Mass and Motion</p> <p><i>Ropes and Pulleys</i> 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-3 The Physics of the Inclined Plane</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-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-2 Newton's Second Law and the Pendulum</p> <p><i>Sound and Waves</i> C-4 Sound</p>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.01.a Physics	Motion and Forces	Newton's law predicts the motion of most objects.	Students know how to solve problems that involve constant speed and average speed.	<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>Air Rocket</i> B-1 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</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>Air Rocket</i> C-3 Acceleration and G-forces</p> <p><i>Car and Ramp</i> C-1 Uniform Accelerated Motion</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>Rollercoaster</i> C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy</p> <p><i>Sound and Waves</i> C-2 The Speed of a Wave Pulse</p>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.01.b Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law).	<i>Ropes and Pulleys</i> A-1 Ropes and Pulleys	<i>Air Rocket</i> B-2 Motion of the Air Rocket B-4 The Rocket and Newton's Laws of Motion <i>Car and Ramp</i> B-6 Force, Mass, and Acceleration <i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law <i>Ropes and Pulleys</i> B-1 Forces in Machines	<i>Car and Ramp</i> C-2 Newton's Second Law and Friction <i>Gravity Drop</i> C-2 Measuring Gravity <i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems
PhysHS.01.c Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know how to apply the law $F=ma$ to solve one-dimensional motion problems that involve constant forces (Newton's second law).		<i>Air Rocket</i> B-4 The Rocket and Newton's Laws of Motion <i>Car and Ramp</i> B-6 Force, Mass, and Acceleration <i>Gravity Drop</i> B-3 Newton's Second Law	<i>Car and Ramp</i> C-2 Newton's Second Law and Friction <i>Gravity Drop</i> C-2 Measuring Gravity <i>Pendulum</i> C-2 Newton's Second Law and the Pendulum
PhysHS.01.d Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law).		<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 <i>Car and Ramp</i> B-8 Equilibrium, Action, and Reaction	<i>Air Rocket</i> C-5 Conservation of Momentum <i>Car and Ramp</i> C-2 Newton's Second Law and Friction

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.01.e Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know the relationship between the universal law of gravitation and the effect of gravity on an object at the surface of the Earth.	<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>
PhysHS.01.f Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know applying a force to an object perpendicular to the direction of its motion causes the object to change direction but not speed(e.g.,Earth's gravitational force causes a satellite in a circular orbit to change direction but not speed).		<p><i>Gravity Drop</i> B-1 Introduction to the Gravity Drop</p>	

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.01.i Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know how to solve two-dimensional trajectory problems.	<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>Pendulum</i> B-1 Harmonic Motion</p>	<p><i>Car and Ramp</i> C-2 Newton's Second Law and Friction 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>
PhysHS.01.j Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know how to resolve two-dimensional vectors into their components and calculate the magnitude and direction of a vector from its components.			<p><i>Car and Ramp</i> C-3 The Physics of the Inclined Plane</p> <p><i>Marble Launcher</i> C-1 Projectile Motion and the Range Equation</p>

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.01.k Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know how to solve two-dimensional problems involving balanced forces (statics).	Ropes and Pulleys A-1 Ropes and Pulleys	Air Rocket B-4 The Rocket and Newton's Laws of Motion Car and Ramp B-8 Equilibrium, Action, and Reaction Gravity Drop B-1 Introduction to the Gravity Drop B-3 Newton's Second Law Ropes and Pulleys B-1 Forces in Machines	Air Rocket C-5 Conservation of Momentum Car and Ramp C-2 Newton's Second Law and Friction Gravity Drop C-2 Measuring Gravity Ropes and Pulleys C-1 Simple and Complex Pulley Systems
PhysHS.01. Physics	Motion and Force	Newton's law predicts the motion of most objects.	Students know how to solve problems involving the forces between two electric charges at a distance (Coulomb's law) or the forces between two masses at a distance (universal gravitation).		Gravity Drop B-1 Introduction to the Gravity Drop	
PhysHS.02.a Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to calculate kinetic energy by using the formula $E = (1/2)mv^2$.		Air Rocket B-3 Pressure and Speed Rollercoaster B-1 Energy and the Rollercoaster B-2 Conservation of Energy Ropes and Pulleys B-2 Work and Energy	Air Rocket C-4 Energy and Power C-5 Conservation of Momentum Rollercoaster C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy Ropes and Pulleys C-2 Compound Pulley System

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.02.b Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) = mgh (h is the change in the elevation).		<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 C-5 Conservation of Momentum <i>Rollercoaster</i> C-1 Motion on the Roller Coaster C-2 Rotational Kinetic Energy C-3 Mass, Motion, and Energy <i>Ropes and Pulleys</i> C-2 Compound Pulley System
PhysHS.02.c Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to solve problems involving conservation of energy in simple systems, such as falling objects.	<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
PhysHS.02.d Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to calculate momentum as the product mv .			<i>Air Rocket</i> C-5 Conservation of Momentum

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.02.e Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know momentum is separately conserved quantity different from energy.			<i>Air Rocket</i> C-5 Conservation of Momentum
PhysHS.02.f Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know an unbalanced force on an object produces a change in its momentum.	<i>Ropes and Pulleys</i> A-1 Ropes and Pulleys	<i>Gravity Drop</i> B-1 Introduction to the Gravity Drop B-3 Newton's Second Law <i>Ropes and Pulleys</i> B-1 Forces in Machines	<i>Air Rocket</i> C-5 Conservation of Momentum <i>Gravity Drop</i> C-2 Measuring Gravity <i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems
PhysHS.02.g Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to solve problems involving elastic and inelastic collisions in one-dimension by using the principles of conservation of momentum and energy.			<i>Air Rocket</i> C-5 Conservation of Momentum

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.02.h Physics	Conservation of Energy and Momentum	The laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.	Students know how to solve problems involving conservation of energy in simple systems with various sources of potential energy, such as capacitors and springs.	Rollercoaster A-2 Height on the Roller Coaster	Air Rocket B-3 Pressure and Speed Rollercoaster B-1 Energy and the Rollercoaster B-2 Conservation of Energy Ropes and Pulleys B-2 Work and Energy	Air Rocket C-4 Energy and Power Pendulum C-1 Energy Conservation and the Pendulum Rollercoaster C-1 Motion on the Roller Coaster Ropes and Pulleys C-2 Compound Pulley System
PhysHS.03.a Physics	Heat and Thermodynamics	Energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.	Students know heat flow and work are two forms of energy transfer between systems.		Pendulum B-1 Harmonic Motion Ropes and Pulleys B-3 Efficiency	Air Rocket C-4 Energy and Power
PhysHS.03.b Physics	Heat and Thermodynamics	Energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.	Students know that the work done by a heat engine that is working in a cycle is the difference between the heat flow into the engine at high temperature and the heat flow out at a lower temperature and that this is in an example of the law of conservation		Air Rocket B-3 Pressure and Speed Rollercoaster B-1 Energy and the Rollercoaster B-2 Conservation of Energy Ropes and Pulleys B-2 Work and Energy	Air Rocket C-4 Energy and Power Pendulum C-1 Energy Conservation and the Pendulum Rollercoaster C-1 Motion on the Roller Coaster Ropes and Pulleys C-2 Compound Pulley System

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.03.d Physics	Heat and Thermodynamics	Energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.	Students know that most processes tend to decrease the order of a system over time and that energy levels are eventually distributed uniformly.		<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
PhysHS.03.f Physics	Heat and Thermodynamics	Energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.	Students know that statement "Entropy tends to increase" is a law of statistical probability that governs all closed systems (second law of thermodynamics).		<i>Car and Ramp</i> B-8 Equilibrium, Action, and Reaction	
PhysHS.03.g Physics	Heat and Thermodynamics	Energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.	Students know how to solve problems involving heat flow, work, and efficiency in heat engine and know that all real engines lose some heat to their surroundings.	<i>Ropes and Pulleys</i> A-2 What is Work?	<i>Air Rocket</i> B-3 Pressure and Speed <i>Ropes and Pulleys</i> B-2 Work and Energy B-3 Efficiency	<i>Air Rocket</i> C-4 Energy and Power <i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems C-2 Compound Pulley System
PhysHS.04.a Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know waves carry energy from one place to another.		<i>Sound and Waves</i> B-3 Standing Waves on a String	<i>Sound and Waves</i> C-1 Standing Waves

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.04.b Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know how to identify transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves).	<i>Sound and Waves</i> A-3 Making Waves	<i>Light and Optics</i> B-2 Polarization <i>Sound and Waves</i> B-3 Standing Waves on a String B-4 Natural Frequency and Resonance	<i>Sound and Waves</i> C-1 Standing Waves C-2 The Speed of a Wave Pulse
PhysHS.04.c Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know how to solve problems involving wavelength, frequency, and wave speed.	<i>Sound and Waves</i> A-1 Sound A-2 Musical Sounds A-3 Making Waves	<i>Sound and Waves</i> B-1 Sound B-3 Standing Waves on a String B-4 Natural Frequency and Resonance	<i>Sound and Waves</i> C-1 Standing Waves C-2 The Speed of a Wave Pulse C-3 Natural Frequency and Resonance
PhysHS.04.d Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.		<i>Sound and Waves</i> B-2 Musical Sounds B-3 Standing Waves on a String B-5 Resonant Sounds	<i>Sound and Waves</i> C-5 Interference and Diffraction of Sound
PhysHS.04.e Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in a vacuum is approximately 3×10^8 m/s (186,000 miles/second).	<i>Light and Optics</i> A-2 Color		

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.04.f Physics	Waves	Waves have characteristic properties that do not depend on the type of wave.	Students know how to identify the characteristic properties of waves: interference (beats), diffraction, refraction, Doppler effect, and polarization.	<i>Light and Optics</i> A-2 Color <i>Sound and Waves</i> A-2 Musical Sounds	<i>Light and Optics</i> B-2 Polarization <i>Sound and Waves</i> B-2 Musical Sounds B-5 Resonant Sounds	<i>Light and Optics</i> C-7 Wave Properties of Light <i>Sound and Waves</i> C-5 Interference and Diffraction of Sound
PhysHS.05.a Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know how to predict the voltage or current in simple direct current(DC) electric circuits constructed from batteries, wires, resistors, and capacitors.	<i>Electric Circuits</i> A-1 What is a Circuit? A-2 Types of Circuits A-3 Current and Voltage <i>Electric Motor</i> A-5 Measuring Current and Voltage	<i>Electric Circuits</i> B-1 Voltage B-2 Current B-3 Ohm's Law <i>Electric Motor</i> B-4 Current, Voltage, and Power	<i>Electric Circuits</i> C-1 Series Circuits C-2 Parallel Circuits C-3 Compound Circuits <i>Electric Motor</i> C-1 Introduction to the Electric Motor
PhysHS.05.b Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know how to solve problems involving Ohm's law.		<i>Electric Circuits</i> B-3 Ohm's Law	<i>Electric Circuits</i> C-1 Series Circuits C-2 Parallel Circuits C-3 Compound Circuits
PhysHS.05.c Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula $Power = IR$.		<i>Electric Circuits</i> B-3 Ohm's Law	<i>Electric Circuits</i> C-1 Series Circuits C-3 Compound Circuits

Correlation to California Science Content Standards Curriculum Resource Guide

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.05.f Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.	<i>Electric Motor</i> A-1 Magnets A-2 Magnetic Materials A-3 How a Motor Works A-4 Designing Motors A-5 Measuring Current and Voltage	<i>Electric Motor</i> B-1 Permanent Magnets B-2 Electromagnets B-3 The Electric Motor B-4 Current, Voltage, and Power	<i>Electric Motor</i> C-1 Introduction to the Electric Motor C-2 Optimizing Performance C-3 Generators and Faraday's Law of Induction
PhysHS.05.h Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.	<i>Electric Motor</i> A-3 How a Motor Works A-4 Designing Motors A-5 Measuring Current and Voltage	<i>Electric Motor</i> B-2 Electromagnets B-3 The Electric Motor B-4 Current, Voltage, and Power B-5 Generators	<i>Electric Motor</i> C-1 Introduction to the Electric Motor C-2 Optimizing Performance C-3 Generators and Faraday's Law of Induction
PhysHS.05.j Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know electric and magnetic fields contain energy and act as vector force fields.	<i>Electric Motor</i> A-1 Magnets A-2 Magnetic Materials A-3 How a Motor Works A-4 Designing Motors A-5 Measuring Current and Voltage	<i>Electric Motor</i> B-1 Permanent Magnets B-3 The Electric Motor B-4 Current, Voltage, and Power	<i>Electric Motor</i> C-1 Introduction to the Electric Motor C-2 Optimizing Performance
PhysHS.05.l Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know how to calculate the electric field resulting from a point charge.	<i>Ropes and Pulleys</i> A-2 What is Work?	<i>Ropes and Pulleys</i> B-2 Work and Energy	<i>Air Rocket</i> C-4 Energy and Power <i>Ropes and Pulleys</i> C-1 Simple and Complex Pulley Systems

**Correlation to California Science Content Standards
Curriculum Resource Guide**

Standard #: Subject	Topic	Standard	Benchmark	Investigation Level A	Investigation Level B	Investigation Level C
PhysHS.05.n Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know the magnitude of the force on a moving particle in a magnetic field is $qvB \sin(a)$, where a is the angle between v and B , and the students use the right-hand rule to find the direction of this force.	Electric Motor A-1 Magnets A-2 Magnetic Materials A-3 How a Motor Works A-4 Designing Motors A-5 Measuring Current and Voltage	Electric Motor B-1 Permanent Magnets B-3 The Electric Motor B-4 Current, Voltage, and Power	Electric Motor C-1 Introduction to the Electric Motor C-2 Optimizing Performance
PhysHS.05.o Physics	Electric and Magnetic Phenomena	Electric and magnetic phenomena are related and have many practical applications.	Students know how to apply the concepts of electrical and gravitational potential energy to solve problems involving conservation of energy.	Rollercoaster A-2 Height on the Roller Coaster	Air Rocket B-3 Pressure and Speed Rollercoaster B-1 Energy and the Rollercoaster B-2 Conservation of Energy Ropes and Pulleys B-2 Work and Energy	Air Rocket C-4 Energy and Power Pendulum C-1 Energy Conservation and the Pendulum Rollercoaster C-1 Motion on the Roller Coaster Ropes and Pulleys C-2 Compound Pulley System