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**A Correlation of Interactive Science ©2016 to the
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Minnesota Academic Standards in Science	Interactive Science © 2016
GRADE 6	
1. The Nature of Science and Engineering	
2. The Practice of Engineering	
1. Engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.	
6.1.2.1.1 Identify a common engineered system and evaluate its impact on the daily life of humans. For example: Refrigeration, cell phone, or automobile.	<p>Science and Technology SE/TE: Chapter 4: Technology and Engineering 112 Lesson 4: Engineering 140-145 Explain that engineering is the application of science and technology design things that make life better. Identify some branches of engineering and provide examples of engineered products or systems for each branch. Describe how society has benefited from the work of engineers. Inquiry Warm-Up: What Is engineering? 140 Quick Lab: Designing a Solution 141 Quick Lab: Branches of Engineering 143 Quick Lab: Advances in Transportation 145 TE Only: After the Inquiry Warm-Up: What Is engineering? 145A</p>
6.1.2.1.2 Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others. For example: Seat belts and airbags.	<p>Science and Technology SE/TE: Chapter 4: Technology and Engineering 112 Lesson 2: Technological Design 124-131 Describe what is involved in each step of the technology design process. Inquiry Warm-Up: Why Redesign? 124 Quick Lab: Watch Ideas Take Off 131 TE Only: After the Inquiry Warm-Up: Why Redesign? 131A</p>
6.1.2.1.3 Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.	n/a
6.1.2.1.4 Explain the importance of learning from past failures, in order to inform future designs of similar products or systems. For example: Space shuttle or bridge design.	<p>Science and Technology SE/TE: Chapter 4: Technology and Engineering 112 Lesson 2: Technological Design 124-131 Describe what is involved in each step of the technology design process. Inquiry Warm-Up: Why Redesign? 124 Quick Lab: Watch Ideas Take Off 131 TE Only: After the Inquiry Warm-Up: Why Redesign? 131A</p>

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2. Engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.	
6.1.2.2.1 Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem. For example: Investigate how energy changes from one form to another by designing and constructing a simple roller coaster for a marble.	Science and Technology SE/TE: Chapter 4: Technology and Engineering 112 Quick Lab: Investigating a Technological System 123
3. Interactions Among Science, Technology, Engineering, Mathematics and Society	
1. Designed and natural systems exist in the world. These systems consist of components that act within the system and interact with other systems.	
6.1.3.1.1 Describe a system in terms of its subsystems and parts, as well as its inputs, processes and outputs.	Science and Technology SE/TE: Chapter 3: The Tools of Science 66 Lesson 4: Models as Tools in Science 92-99 Explain why models are used in science. Describe different types of systems and identify characteristics that all systems share. Examine models of natural systems and compare the model to the system itself. Inquiry Warm-Up: Scale Models 92 Quick Lab: Making Models 93 Quick Lab: Systems 95 Quick Lab: Models in Nature 99 TE Only: After the Inquiry Warm-Up: Scale Models 99A
6.1.3.1.2 Distinguish between open and closed systems. For example: Compare mass before and after a chemical reaction that releases a gas in sealed and open plastic bags.	Introduction to Chemistry SE/TE: Chapter 5: Chemical Reactions 158 Lesson 2: Describing Chemical Reactions 170-181 Identify the information included in a chemical equation. Explain how mass is conserved during a chemical reaction. Identify three categories of chemical reactions. Inquiry Warm-Up: Did You Lose Anything? 170 Quick Lab: Information in a Chemical Equation 173 Quick Lab: Is Matter Conserved? 179 Quick Lab: Categories of Chemical Reactions 181 TE Only: After the Inquiry Warm-Up: Did You Lose Anything? 181A
4. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact.	

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6.1.3.4.1 Determine and use appropriate safe procedures, tools, measurements, graphs, and mathematical analyses to describe and investigate natural and designed systems in a physical science context.	<p>Science and Technology SE/TE: Chapter 3: The Tools of Science 66 Lesson 5: Safety in the Science Laboratory 100-105 Explain why preparation is important in carrying out investigations in the lab in the field. Describe what you should do if an accident occurs. Inquiry Warm-Up: Where Is the Safety Equipment in Your School? 100 Quick Lab: Be Prepared 104 Quick Lab: Just In Case 105 TE Only: After the Inquiry Warm-Up: Where Is the Safety Equipment in Your School? 105A</p>
6.1.3.4.2 Demonstrate the conversion of units within the International System of Units (S.I. or metric) and estimate the magnitude of common objects and quantities using metric units.	<p>Science and Technology SE/TE: Chapter 3: The Tools of Science 66 How is mathematics important to the work of scientists? Lesson 1: Measurement—A Common Language 70-79 Explain why scientists use a standard measurement system. Identify the SI units of measure for length, mass, volume, density, time, and temperature. Inquiry Warm-Up: History of Measurement 70 Quick Lab: How Many Shoes? 71 Quick Lab: Measuring Length in Metric 79 TE Only: After the Inquiry Warm-Up: History of Measurement 79A</p>
2. Physical Science	
1. Matter	
1. Pure substances can be identified by properties which are independent of the sample of the substance and the properties can be explained by a model of matter that is composed of small particles.	

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<p>6.2.1.1.1 Explain density, dissolving, compression, diffusion and thermal expansion using the particle model of matter.</p>	<p>Science and Technology SE/TE: Chapter 3: The Tools of Science 66 How is mathematics important to the work of scientists? Lesson 1: Measurement—A Common Language 70-79 Identify the SI units of measure for length, mass, volume, density, time, and temperature. Lesson 3: Graphs in Science 88-91 Quick Lab: Density Graphs 91</p> <p>Earth's Structure SE/TE: Chapter 3: Plate Tectonics 72 Lesson 2: Sea-Floor Spreading 80-85 Inquiry Warm-Up: What Is the Effect of a Change in Density? 80 TE Only: After the Inquiry Warm-Up: What Is the Effect of a Change in Density? TE: 85A</p> <p>Water and the Atmosphere SE/TE: Chapter 3: The Atmosphere 70 Lesson 2: Air Pressure 78-83 Identify some properties of air. Describe how barometers can use used to measure air pressure. Explain how altitude affects air pressure and density. Inquiry Warm-Up: Does Air Have Mass? 78 Quick Lab: Properties of Air 79 Quick Lab: Soda Bottle Barometer 81 Quick Lab: Effects of Altitude on the Atmosphere 83 TE Only: After the Inquiry Warm-Up: Does Air Have Mass? 83A</p> <p>Chapter 4: Weather 114 Lesson 4: Air Masses 132-139 Identify the major air masses that affect the weather in North American and describe how they move. Name the main types of fronts. Explain the type of weather that is associated with cyclones and anticyclones. Inquiry Warm-Up: How Do Fluids of Different Densities Move? 132 Quick Lab: Tracking Air Masses 135 Quick Lab: Weather Fronts 137 Quick Lab: Cyclones and Anticyclones 139 TE Only: After the Inquiry Warm-Up: How Do Fluids of Different Densities Move? 139A</p>

SE = Student Edition

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Introduction to Chemistry
TE = Teacher's Edition

SE/TE:
 Chapter 1: Introduction to Matter 1

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2. Substances can undergo physical changes which do not change the composition or the total mass of the substance in a closed system.	
6.2.1.2.1 Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.	<p>Introduction to Chemistry SE/TE: Chapter 6: Acids, Bases, and Solutions 194 Lesson 2: Concentration and Solubility 204-211 Describe how to change concentration. Identify the factors that affect the solubility of substance. Inquiry Warm-Up: Does It Dissolve? 204 Quick Lab: Measuring Concentration 206 Quick Lab: Predicting Rates of Solubility 211 TE Only: After the Inquiry Warm-Up: Does It Dissolve? 211A</p>
6.2.1.2.2 Describe how mass is conserved during a physical change in a closed system. For example: The mass of an ice cube does not change when it melts.	<p>Introduction to Chemistry SE/TE: Chapter 5: Chemical Reactions 158 Lesson 2: Describing Chemical Reactions 170-181 Identify the information included in a chemical equation. Explain how mass is conserved during a chemical reaction. Identify three categories of chemical reactions. Inquiry Warm-Up: Did You Lose Anything? 170 Quick Lab: Information in a Chemical Equation 173 Quick Lab: Is Matter Conserved? 179 Quick Lab: Categories of Chemical Reactions 181 PEA: Chemical Reactions: PE-MS-PS1-5: Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. TE Only: After the Inquiry Warm-Up: Did You Lose Anything? 181A</p>

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6.2.1.2.3 Use the relationship between heat and the motion and arrangement of particles in solids, liquids and gases to explain melting, freezing, condensation and evaporation.	<p>Introduction to Chemistry SE/TE: Chapter 2: Solids, Liquids, and Gases 36 Lesson 2: Changes of State 48-55 Explain what happens to a substance during changes between solid and liquid. Explain what happens to a substance during changes between liquid and gas. Explain what happens to a substance during changes between solid and gas. Inquiry Warm-Up: What Happens when You Breathe on a Mirror? 48 Quick Lab: Melting Ice 50 Quick Lab: Keeping Cool 52 Quick Lab: Observing Sublimation 55 TE Only: After the Inquiry Warm-Up: What Happens when You Breathe on a Mirror? TE: 55A</p>
2. Motion	
1. The motion of an object can be described in terms of speed, direction and change of position.	
6.2.2.1.1 Measure and calculate the speed of an object that is traveling in a straight line.	<p>Forces and Energy SE/TE: Chapter 1: Motion 1 Lesson 2: Speed and Velocity 8-15 Calculate an object's speed. Describe what velocity is. Demonstrate how to graph motion. Inquiry Warm-Up: How Fast and How Far? 8 Quick Lab: Stopping on a Dime 11 Quick Lab: Velocity 13 Quick Lab: Motion Graphs 15 TE Only: After the Inquiry Warm-Up: How Fast and How Far? 15A</p>

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6.2.2.1.2 For an object traveling in a straight line, graph the object's position as a function of time, and its speed as a function of time. Explain how these graphs describe the object's motion	<p>Forces and Energy SE/TE: Chapter 1: Motion 1 Lesson 2: Speed and Velocity 8-15 Calculate an object's speed. Describe what velocity is. Demonstrate how to graph motion. Inquiry Warm-Up: How Fast and How Far? 8 Quick Lab: Stopping on a Dime 11 Quick Lab: Velocity 13 Quick Lab: Motion Graphs 15 TE Only: After the Inquiry Warm-Up: How Fast and How Far? 15A</p> <p>Forces and Energy: PEA: Energy: PE-MS-PS32-1: Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.</p>
2. Forces have magnitude and direction and affect the motion of objects.	
6.2.2.2.1 Recognize that when the forces acting on an object are balanced, the object remains at rest or continues to move at a constant speed in a straight line, and that unbalanced forces cause a change in the speed or direction of the motion of an object.	<p>Forces and Energy SE/TE: Chapter 2: Forces 28 Ho do objects react to forces? Lesson 1: The Nature of Force 32-35 Describe what a force is. Describe how balanced and unbalanced forces are related to an object's motion. Inquiry Warm-Up: Is the Force with You? 32 Quick Lab: What Is Force? 33 Quick Lab: Modeling Unbalanced Forces 35 TE Only: After the Inquiry Warm-Up: Is the Force with You? 35A</p>

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6.2.2.2 Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object. For example: Forces acting on a book on a table or a car on the road.	<p>Forces and Energy SE/TE: Chapter 2: Forces 28 Lesson 3: Newton's Laws of Motion 44-51 State Newton's first law of motion. State Newton's second law of motion. State Newton's third law of motion. Inquiry Warm-Up: What Changes Motion? 44 Quick Lab: Around and Around 45 Quick Lab: Newton's Second Law 47 Quick Lab: Interpreting Illustrations 51 TE Only: After the Inquiry Warm-Up: What Changes Motion? 51A</p> <p>Lesson 4: Momentum 52-55 Explain how momentum is determined and conserved. Inquiry Warm-Up: How Pushy Is a Straw? 52 Quick Lab: Colliding Cars 55 TE Only: After the Inquiry Warm-Up: How Pushy Is a Straw? 55A</p> <p>Forces and Energy: PEA: Forces and Interactions: PE-MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.</p>
6.2.2.2.3 Recognize that some forces between objects act when the objects are in direct contact and others, such as magnetic, electrical, and gravitational forces can act from a distance.	<p>Forces and Energy SE/TE: Chapter 2: Forces 28 Lesson 2: Friction and Gravity 36-43 Describe friction and identify factors that determine the friction between two objects. Identify the factors that affect the gravitational force between two objects. Inquiry Warm-Up: Observing Friction 36 Quick Lab: Sticky Sneakers 40 Quick Lab: Calculating 43 TE Only: After the Inquiry Warm-Up: Observing Friction 43A</p>

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6.2.2.2.4 Distinguish between mass and weight.	<p>Introduction to Chemistry SE/TE: Chapter 1: Introduction to Matter 1 Lesson 3: Measuring Matter 14-19 Describe the units used to measure mass and volume. Explain how to determine the density of a material. Inquiry Warm-Up: Which Has More Mass? 14 Quick Lab: Calculating Volume 17 Quick Lab: Making Sense of Density 19 TE Only: After the Inquiry Warm-Up: Which Has More Mass? TE: 19A</p>
3. Energy	
1. Waves involve the transfer of energy without the transfer of matter.	
6.2.3.1.1 Describe properties of waves, including speed, wavelength, frequency and amplitude.	<p>Sound and Light SE/TE: Chapter 1: Characteristics of Waves 1 What are the properties of waves? Lesson 1: What Are Waves? 4-9 Explain what causes mechanical waves. List and describe three types of mechanical waves. Inquiry Warm-Up: What Are Waves? 4 Quick Lab: What Causes Mechanical Waves? 6 Quick Lab: Three Types of Waves 9 TE Only: After the Inquiry Warm-Up: What Are Waves? 9A STEMQuest: Design to Stop a Thief</p> <p>Lesson 2: Properties of Waves 10-15 Describe the basic properties of waves. Explain how a wave's speed is related to its wavelength and frequency. Inquiry Warm-Up: What Do Waves Look Like? 10 Quick Lab: Properties of Waves 13 Quick Lab: What Affects the Speed of a Wave? 15 TE Only: After the Inquiry Warm-Up: What Do Waves Look Like? 15A</p>