

Bemidji Area Schools
Grade 6 Science Outcomes

Strand	Substrand	Standard "Understand that ...	Benchmark "The student will...	Activity	Assessment
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. <i>For example:</i> Refrigeration, cell phone, or automobile.	Lesson on pros and cons of engineered system	Completion of comparison chart
			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. <i>For example:</i> Seat belts and airbags.	Newton's 1st Law lab	Completion of lab sheet
			6.1.2.1.3 Describe the trade-offs in using manufactured products in terms of features, performance, durability and cost.	Produce comparison Internet investigation	Completion of comparison chart
			6.1.2.1.4 Explain the importance of learning from past failures, in order to inform future designs of similar products or systems. <i>For example:</i> Space shuttle or bridge design.	Bridge engineering unit	DVD & YouTube of failed bridges
	3. Interactions Among Science, Technology, Engineering, Mathematics and Society	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. <i>For example:</i> Investigate how energy changes from one form to another by designing and constructing a simple roller coaster for a marble.	Bridge engineering unit	Design, construct, and test bridges

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1. The Nature of Science and Engineering	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.	6.1.3.1.2 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.	Matter unit	Chemical reaction test
		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.	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.	Lab safety	Safe & appropriate use of tools throughout labs. Science fair projects and various labs.
			6.1.3.4.2 Demonstrate the conversion of units within the International System of Units (SI, or metric) and estimate the magnitude of common objects and quantities using metric units.	Metric measurement unit	Science fair projects and various labs
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.	6.2.1.1.1 Explain density, dissolving, compression, diffusion and thermal expansion using the particle model of matter.	Matter unit	Various demos, labs and discussion

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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.	Matter unit	Physical & chemical changes labs
2. Physical Science	1. Matter	2. Substances can undergo physical changes which do not change the composition or the total mass of the substance in a closed system.	6.2.1.2.2 Describe how mass is conserved during a physical change in a closed system. <i>For example:</i> The mass of an ice cube does not change when it melts.	Matter unit	Ice cube lab
			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.	Matter unit	Phases of matter labs
	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.	Forces & Motion unit	Speed lab
			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	Forces & Motion unit	Acceleration lab
			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.	Forces & Motion unit	Newton's 1st Law lab sheet
			6.2.2.2.2 Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object. <i>For example:</i> Forces acting on a book on a table or a car on the road.	Forces & Motion unit	Card house activity & bridge activity

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			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.	Forces & Motion unit	Magnetism lab
			6.2.2.2.4 Distinguish between mass and weight.	Forces & Motion unit	Mass & weight lab
2. Physical Science	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.	Light & sound unit	Light waves & sound waves diagrams & Slinky lab
			6.2.3.1.2 Explain how the vibration of particles in air and other materials results in the transfer of energy through sound waves.	Light & sound unit	String phones lab
			6.2.3.1.3 Use wave properties of light to explain reflection, refraction and the color spectrum.	Light & sound unit	Mirror & lens labs
		2. Energy can be transformed within a system or transferred to other systems or the environment.	6.2.3.2.1 Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.	Forces & Motion unit	Pendulums lab
			6.2.3.2.2 Trace the changes of energy forms, including thermal, electrical, chemical, mechanical or others as energy is used in devices. <i>For example:</i> A bicycle, light bulb or automobile.	Forces & Motion unit	Review PowerPoint
			6.2.3.2.3 Describe how heat energy is transferred in conduction, convection and radiation.	Forces & Motion unit	Ice cream lab
Common Core Reading	Standards for Literacy in Science	Key Ideas and Details	6.13.1.1 Cite specific textual evidence to support analysis of science and technical texts.		
			6.13.2.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.		

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			6.13.3.3 Follow precisely a multistep procedure when carrying out experiments, designing solutions , taking measurements, or performing technical tasks .		
Common Core Reading	Standards for Literacy in Science	Craft and Structure	6.13.4.4 Determine the meaning of symbols, equations, graphical representations, tabular representations , key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6–8 texts and topics</i> .		
			Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.		
			6.13.6.6 Analyze the author’s purpose in describing phenomena , providing an explanation, describing a procedure, or discussing/ reporting an experiment in a text .		
		Integration of Knowledge and Ideas	6.13.7.7 Compare and integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph table map).		
			6.13.8.8 Distinguish among claims, evidence, reasoning , facts, and reasoned judgment based on research findings, and speculation in a text .		
			Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic .		
			6.13.10.10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently .		
		Range of Reading and Level of Text Complexity			

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Common Core Writing	Standards for Writing in Science	Text Types and Purposes	6.14.1.1 Write arguments focused on <i>discipline-specific content</i> . a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant, accurate data and credible evidence that demonstrate an understanding of the topic or text, using credible sources. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.		

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Common Core Writing	Standards for Writing in Science	Text Types and Purposes	<p>6.14.2.2 Write informative/explanatory texts, as they apply to each discipline and reporting format, including the narration of historical events, of scientific procedures/ experiments, or description of technical processes.</p> <p>a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.</p> <p>b. Develop the topic with relevant, credible, sufficient, and well-chosen facts, definitions, concrete details, quotations, or other information and examples.</p> <p>c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.</p> <p>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.</p> <p>e. Establish and maintain a formal style and objective tone.</p> <p>f. Provide a concluding statement or section that follows from and supports the information or explanation presented.</p>		
		Writing Process: <i>Production and Distribution of Writing</i>	Produce clear and coherent writing in which the development, organization, and style are appropriate to discipline, task, purpose, and audience.		

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Common Core Writing	Standards for Writing in Science	Writing Process: <i>Production and Distribution of Writing</i>	With some guidance and support from peers and adults, use a writing process to develop and strengthen writing as needed by planning, drafting , revising, editing, rewriting, or trying a new approach, focusing on how well purpose, discipline and audience have been addressed		
			6.14.6.6 Use technology, including, but not limited to , the Internet, to produce and publish writing and multi-media texts , and present the relationships between information and ideas <i>clearly and efficiently</i> .		
		Research to Build and Present Knowledge	6.14.7.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.		
			Gather relevant information from multiple data , print, physical (e.g., artifacts, objects, images) , and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.		
			6.14.9.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.		
		Range of Writing	6.14.10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.		