

Middle School Bullseye Science
Physical Science
Grade 8

Standard	Matter and Its Interactions	I	II	III	IV	Vocabulary	Big Idea	Real World Instructional Example
								Students will:
MS-PS1-1	Develop models to describe the atomic composition of simple molecules and extended structures.					protons, electrons, neutrons, molecules, atomic composition, nucleus	Structure & Properties of Matter	Develop a model (3D ball, stick structure, or digital representation) of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds.
MS-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.					substance, chemical reaction, properties, density, melting point, boiling point, solubility, flammability, odor	Chemical Reactions	Conduct an investigation on the analysis of the following reactions: burning sugar, burning steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.
MS-PS1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.					synthetic, materials	Materials Science	Create five social media posts about where synthetic materials come from and how to help the environment.
MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or					particle, motion, temperature, kinetic energy, thermal energy, states	Kinetic Theory of Matter	Using ice, identify changes in ice as heat is added.
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. [atoms, chemical reaction, mass, Law of Conservation of Matter	Structure of the atom, Law of Conservation of Mass	Using alka-seltzer and water, determine masses before and after.
MS-PS1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.					endothermic, exothermic	Kinetic Theory of Matter	Combine chemicals to produce endothermic and exothermic reactions.
Standard	Motion And Stability: Forces and Interactions	I	II	III	IV	Vocabulary	Big Idea	Real World Instructional Example
								Students will:
MS-PS2-1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.					force, action, reaction, motion, collision, momentum	Newton's 3rd Law	Predict the outcome of car collisions (taking into account all forces) when cars' mass and force change.
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.					forces, balanced forces, unbalanced forces, Newton's 1st Law, Newton's 2nd	Newton's Laws of Motion	Use spring scales and wooden blocks to measure forces involved in Newton's 3rd Law.
MS-PS2-3	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.					electricity, magnet, attract, repel, electromagnet	Magnets/electricity	Measure the distance over which a magnetic field acts on magnetic objects. Describe the effect of non-magnetic materials on magnetic forces.
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting					gravitation, attraction, mass, distance, planetary orbits	Gravity	Use washers, a balance and spring scale to identify ratio of mass and weight.
MS-PS2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.					magnets, electricity, force, exert	Magnetism	Evaluate the forces when metal shavings are dropped on a piece of white paper. How did they fall?
Standard	Energy	I	II	III	IV	Vocabulary	Big Idea	Real World Instructional Example
								Students will:
MS-PS3-1	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. [kinetic energy, mass, speed, graph, velocity	Definitions of Kinetic Energy 2nd Law of Motion	Drop objects from the same height and see how fast they fall, add a ramp and see what happens (match box cars), foam roller coasters, look at Pinewood derby cars and where to put the weight
MS-PS3-2	Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.					potential energy, distance,	Potential energy	Complete an investigation to collect data about how much potential energy an object has as it moves.
MS-PS3-3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.					thermal energy, energy transfer, device, temperature	Thermal energy transfer	Design, construct, and test insulators and conductors
MS-PS3-4	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.					energy, matter, mass, kinetic energy, temperature, thermal energy, particles	Kinetic Theory of Matter	"Heat, Temperature, and Conduction" activity - middleschoolchemistry.com
MS-PS3-5	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.					kinetic energy, energy transfer	Kinetic Theory of Matter	Students worked in pairs to create a physical roller coaster from foam tubing, pvc pipe, and duct tape as they explored energy transfer

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Standard	Waves & Their Applications in Technologies for Information Transfer	I	II	III	IV	Vocabulary	Big Idea	Real World Instructional Example
MS-PS4-1	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [wave, amplitude, wave anatomy, frequency	Wave Properties	Draw wave diagram, calculate wave speed
MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.					reflection, absorption, transmission, light waves, mechanical waves,	Waves and their interactions	Produce a wave with coiled spring and measure wave speed
MS-PS4-3	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.					digital, analog (fiber optic, wifi)	Digital/analog signals	Analyze images from light passing through convex lenses

Middle School Bullseye Science
Physical Science
Grade 8

Standard	Engineering Design	I	II	III	IV	Big Idea	Real World Instructional Example
MS-ETS1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.					Defining and Delimiting Engineering Problems	Students will work in pairs to create a physical roller coaster from foam tubing, PVC, and duct tape to explore energy transfer.
MS-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.					Developing Possible Solutions	
MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.					Optimizing the Design Solution	
MS-ETS1-4	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.						

Middle School Bullseye Science
Physical Science
Grade 8

Standard	Literacy	I	II	III	IV	Real World Instructional Example
RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.					Using textbooks and various science related informative text to determine text-based answers. Use textbook or research documents to support your point/opinion.
RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.					Determine the main idea or purpose of a lab. Develop a concluding statement for a science experiment.
RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.					Use Close Reading Strategies to understand procedures and steps in experiments and labs.
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.					Use Close Reading Strategies to determine terms within a technical text. (leveled readers, textbooks, Wonderopolis)
RST.6-8.5	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.					Use Close Reading Strategies to analyze how an author organizes a piece of text. (leveled readers, textbooks, Wonderopolis)
RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.					Use Close Reading Strategies to analyze the author's purpose in a technical text.
RST.6-8.7	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, or table).					Use Close Reading Strategies to analyze text and a visual representation such as a chart or diagram (leveled readers, textbooks, Wonderopolis)
RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.					Use Close Reading Strategies to pull out facts within a given text. (leveled readers, textbooks, Wonderopolis)
RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.					Use Close Reading Strategies to compare and contrast a piece of text with information gained from experiments, simulations, or a media source.
RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.					

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Grade 8

Standard	Writing	I	II	III	IV	Real World Instructional Example
						Students will:
WHST.6-8.1	Write arguments focused on discipline-specific content.					Construct an argument supported by evidence.
WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.					Write about a given topic.
WHST.6-8.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.					
WHST.6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.					
WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.					
WHST.6-8.7	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.					
WHST.6-8.8	Gather relevant information from multiple print 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.					Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
WHST.6-8.9	Draw evidence from informational texts to support analysis reflection, and research.					
WHST.6-8.10	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.					Science Journal