

Standards National Science Education Standards 5-8

● Indicates standard is focused on ○ Indicates standard is covered in a general way

Standard A: <i>Science As Inquiry</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students develop abilities necessary to do scientific inquiry.								
1	Students identify questions that can be answered through scientific investigations.	○	○	○	○	○	○	○
2	Students design and conduct a scientific investigation.		●	●	●	●	●	●
3	Students use appropriate tools and techniques to gather, analyze, and interpret data.	○	●	●	●	●	●	●
4	Students develop descriptions, explanations, and models using evidence.	○	○	●	●	●	●	●
5	Students think critically and logically to make the relationships between evidence and explanations.	○	○	●	●	●	●	●
6	Students recognize and analyze alternative explanations and predictions.		○	●			●	●
7	Students communicate scientific procedures and explanations.	○	●	●	●	●	●	●
8	Students use mathematics in all aspects of scientific inquiry.	○	○	○	●	○	○	●
Students develop understandings about scientific inquiry.								
1	Students understand different kinds of questions suggest different kinds of scientific investigations.		○	○	○	○	○	○
2	Students understand current scientific knowledge and understanding guide scientific investigations.			○			○	○
3	Students understand mathematics is important in all aspects of scientific inquiry.	○	○	○	●	○	○	●
4	Students understand technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.	●	●	●	●	●	●	●
5	Scientific explanations emphasize evidence, have logically consistent arguments, and use scientific principles, models, and theories.	●	○	●	●	○	●	●
6	Science advances through legitimate skepticism. Asking questions and querying other scientists' explanations is part of scientific inquiry.		○	○			○	●
7	Students understand scientific investigations sometimes result in new ideas and phenomena for study, generate new ideas and phenomena for study, generate new methods or procedures for an investigation, or develop new technologies to improve the collection of data.	○	○	○			○	○

Standard B: <i>Physical Science</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students develop an understanding of properties and changes of properties in matter.								
1	Students understand a substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.			○				
Students should an understanding of motions and forces.								
1	Students understand the motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph.				●			

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Standard B: <i>Physical Science (Continued)</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students should have an understanding of transfer of energy.								
1	Students understand energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.		<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>	
2	Students understand heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.		<input type="radio"/>	<input checked="" type="radio"/>				
3	Students understand light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object--emitted by or scattered from it--must enter the eye.			<input checked="" type="radio"/>			<input checked="" type="radio"/>	<input checked="" type="radio"/>
4	Students understand electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.					<input type="radio"/>	<input type="radio"/>	
6	Students understand the sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.			<input checked="" type="radio"/>			<input type="radio"/>	

Standard E: <i>Science and Technology</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students develop abilities of technological design.								
1	Students identify appropriate problems for technological design.			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
2	Students design a solution or product.			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
3	Students implement a proposed design.			<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
4	Students evaluate completed technological designs or products.			<input checked="" type="radio"/>				<input checked="" type="radio"/>
5	Students communicate the process of technological design.			<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Students develop understandings about science and technology.								
1	Students understand scientific inquiry and technological design have similarities and differences. Scientists propose explanations for questions about the natural world, and engineers propose solutions relating to human problems, needs, and aspirations. Technological solutions are temporary; technologies exist within nature and so they cannot contravene physical or biological principles; technological solutions have side effects; and technologies cost, carry risks, and provide benefits.	<input type="radio"/>			<input type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>
3	Students understand science and technology are reciprocal. Science helps drive technology, as it addresses questions that demand more sophisticated instruments and provides principles for better instrumentation and technique. Technology is essential to science, because it provides instruments and techniques that enable observations of objects and phenomena that are otherwise unobservable due to factors such as quantity, distance, location, size, and speed. Technology also provides tools for investigations, inquiry, and analysis.	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>			<input type="radio"/>
4	Students understand perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance. Engineers often build in back-up systems to provide safety. Risk is part of living in a highly technological world. Reducing risk often results in new technology.			<input type="radio"/>			<input type="radio"/>	<input type="radio"/>

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Standard E: <i>Science and Technology (Continued)</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
5	Students understand technological designs have constraints. Some constraints are unavoidable, for example, properties of materials, or effects of weather and friction; other constraints limit choices in the design, for example, environmental protection, human safety, and aesthetics.			○			○	●
6	Students understand technological solutions have intended benefits and unintended consequences. Some consequences can be predicted, others cannot.			○				○

Standard F: <i>Science in Personal and Social Perspectives</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students develop understanding of science and technology in society.								
2	Students understand societal challenges often inspire questions for scientific research, and social priorities often influence research priorities through the availability of funding for research.				○			○
3	Students understand technology influences society through its products and processes. Technology influences the quality of life and the ways people act and interact. Technological changes are often accompanied by social, political, and economic changes that can be beneficial or detrimental to individuals and to society. Social needs, attitudes, and values influence the direction of technological development.	○			○		○	●
5	Students understand scientists and engineers work in many different settings, including colleges and universities, businesses and industries, specific research institutes, and government agencies.			○	○	○	○	●
7	Students understand science cannot answer all questions and technology cannot solve all human problems or meet all human needs. Students should understand the difference between scientific and other questions. They should appreciate what science and technology can reasonably contribute to society and what they cannot do. For example, new technologies often will decrease some risks and increase others.	○						

Standard G: <i>History and Nature of Science</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
Students develop understanding of science as a human endeavor.								
1	Students understand women and men of various social and ethnic backgrounds--and with diverse interests, talents, qualities, and motivations--engage in the activities of science, engineering, and related fields such as the health professions. Some scientists work in teams, and some work alone, but all communicate extensively with others.							○
2	Students understand science requires different abilities, depending on such factors as the field of study and type of inquiry. Science is very much a human endeavor, and the work of science relies on basic human qualities, such as reasoning, insight, energy, skill, and creativity--as well as on scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.							○
Students develop understanding of nature of science.								
1	Students understand scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models. Although all scientific ideas are tentative and subject to change and improvement in principle, for most major ideas in science, there is much experimental and observational confirmation. Those ideas are not likely to change greatly in the future. Scientists do and have changed their ideas about nature when they encounter new experimental evidence that does not match their existing explanations.	○	○	●	○	○	●	●

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Standard G: <i>History and Nature of Science (Continued)</i>		Inquiry Video	Tutorial	Heat	Motion	Sound	Light	Project
2	Students understand in areas where active research is being pursued and in which there is not a great deal of experimental or observational evidence and understanding, it is normal for scientists to differ with one another about the interpretation of the evidence or theory being considered. Different scientists might publish conflicting experimental results or might draw different conclusions from the same data. Ideally, scientists acknowledge such conflict and work towards finding evidence that will resolve their disagreement.		<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input checked="" type="radio"/>
3	Students understand it is part of scientific inquiry to evaluate the results of scientific investigations, experiments, observations, theoretical models, and the explanations proposed by other scientists. Evaluation includes reviewing the experimental procedures, examining the evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence, and suggesting alternative explanations for the same observations. Although scientists may disagree about explanations of phenomena, about interpretations of data, or about the value of rival theories, they do agree that questioning, response to criticism, and open communication are integral to the process of science. As scientific knowledge evolves, major disagreements are eventually resolved through such interactions between scientists.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>