

NATIONAL SCIENCE EDUCATION STANDARDS

Teaching Physics with TOYS, EASYGuide™ Edition

GRADE	CATEGORY	SUB-CATEGORY	STANDARD
K-4	Physical Science	Light, Heat, Electricity, and Magnetism	Electricity in circuits can produce light, heat, sound, and magnetic effects. Electrical circuits require a complete loop through which an electrical current can pass.
K-4	Physical Science	Light, Heat, Electricity, and Magnetism	Heat can be produced in many ways, such as burning, rubbing, or mixing one substance with another. Heat can move from one object to another by conduction.
K-4	Physical Science	Light, Heat, Electricity, and Magnetism	Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by the object.
K-4	Physical Science	Light, Heat, Electricity, and Magnetism	Magnets attract and repel each other and certain kinds of other materials.
K-4	Physical Science	Position and Motion of Objects	An object's motion can be described by tracing and measuring its position over time.
K-4	Physical Science	Position and Motion of Objects	Position of an object can be described by locating it relative to another object or the background.
K-4	Physical Science	Position and Motion of Objects	Sound is produced by vibrating objects. The pitch of the sound can be varied by changing the rate of vibration.
K-4	Physical Science	Position and Motion of Objects	The position and motion of objects can be changed by pushing or pulling. The size of the change is related to the strength of the push or pull.
K-4	Physical Science	Properties of Objects and Materials	Materials can exist in different states- solid, liquid, and gas. Some common materials such as water, can be changed from one state to another by heating or cooling.
K-4	Physical Science	Properties of Objects and Materials	Objects are made of one or more materials, such as paper, wood, and metal. Objects can be described by the properties of the materials from which they are made, and those properties can be used to separate or sort a group of objects or materials.

K-4	Physical Science	Properties of Objects and Materials	Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances. Those properties can be measured using tools, such as rulers, balances, and thermometers.
K-4	Science and Technology	Abilities of Technological Design	Communicate a problem, design, and solution.
K-4	Science and Technology	Abilities of Technological Design	Evaluate a product or design.
K-4	Science and Technology	Abilities of Technological Design	Implementing proposed solutions.
K-4	Science and Technology	Abilities of Technological Design	Propose a solution.
K-4	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Communicate investigations and explanations.
K-4	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Employ simple equipment and tools to gather data and extend the senses.
K-4	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Plan and conduct a simple investigation.
K-4	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Use data to construct a reasonable explanation.
5-8	Physical Science	Motions And Forces	An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.
5-8	Physical Science	Motions And Forces	If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in the speed or direction of an object's motion.
5-8	Physical Science	Motions And Forces	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.
5-8	Physical Science	Transfer Of Energy	Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.
5-8	Physical Science	Transfer Of Energy	Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of the chemical. Energy is transferred in many ways.

5-8	Physical Science	Transfer Of Energy	Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.
5-8	Physical Science	Transfer Of Energy	In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.
5-8	Physical Science	Transfer Of Energy	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.
5-8	Physical Science	Transfer Of Energy	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.
5-8	Science and Technology	Abilities In Technical Design	Communicate the process of technological design.
5-8	Science and Technology	Abilities In Technical Design	Design a solution or product.
5-8	Science and Technology	Abilities In Technical Design	Evaluate completed technological designs or products.
5-8	Science and Technology	Abilities In Technical Design	Implement a proposed design.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Communicate scientific procedures and explanations.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Design and conduct a scientific investigation.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Develop descriptions, explanations, predictions, and models using evidence.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Recognize and analyze alternative explanations and predictions.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Think critically and logically to make the relationships between evidence and explanations.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Use appropriate tools and techniques to gather and analyze, and interpret data.
5-8	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Use mathematics in all aspects of scientific inquiry.

9-12	Physical Science	Conservation of Energy and the Increase In Disorder	All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.
9-12	Physical Science	Conservation of Energy and the Increase In Disorder	Everything tends to become less organized and less orderly over time. Thus, in all energy transfers, the overall effect is that the energy is spread out uniformly.
9-12	Physical Science	Conservation of Energy and the Increase In Disorder	Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.
9-12	Physical Science	Conservation of Energy and the Increase In Disorder	The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiations, and in many other ways.
9-12	Physical Science	Motions and Forces	Between any two charged particles, electric force is vastly greater than the gravitational force.
9-12	Physical Science	Motions and Forces	Electricity and magnetism are two aspects of a single electromagnetic force.
9-12	Physical Science	Motions and Forces	Gravitation is a universal force that each mass exerts on any other mass.
9-12	Physical Science	Motions and Forces	Objects change their motion only when a net force is applied.
9-12	Physical Science	Motions and Forces	The electric force is a universal force that exists between any two charged objects.
9-12	Science and Technology	Abilities of Technological Design	Communicate the Problem, Process, and Solution
9-12	Science and Technology	Abilities of Technological Design	Evaluate the solution and its consequences.
9-12	Science and Technology	Abilities of Technological Design	Implement a proposed solution.
9-12	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Formulate and revise scientific explanations and models using logic and evidence.
9-12	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Recognize and analyze alternative explanations and models.
9-12	Science as Inquiry	Abilities Necessary To Do Scientific Inquiry	Use technology and mathematics to improve investigations and communications.