

PHYSICS

The Colorado Model Content Standards for Science are inquiry based and apply to Physics. However, both the content and the indicators of student performance will demand an understanding and application of Physics concepts beyond the scope of the 9th and 10th grade integrated science classes.

STANDARD 2: STUDENTS KNOW AND UNDERSTAND COMMON PROPERTIES, FORMS AND CHANGES IN MATTER

Students know and are able to	Indicators of Performance	Resources	Vocabulary
understand that matter has characteristic properties, which are related to its composition and structure	<ul style="list-style-type: none"> • examines, describes, measures classifies, and predicts common properties of substances (e.g., electrical charge, chemical reactivity, acidity, electrical conductivity, radioactivity, relationships in the periodic table) • describes and explains properties and composition of samples of matter using models • separates substances based on their chemical and physical properties (e.g., color, solubility, chemical reactivity, melting point, boiling point); and • uses word and chemical equations to relate observed changes in matter to its composition and structure. 		<i>Vocabulary will be based on the Science Glossary when released by CDE and instructional materials to support frameworks.</i>
understand that energy appears in different forms, and can move (be transferred) and change (be transformed)	<ul style="list-style-type: none"> • identifies, measures, calculates, and analyzes quantitative relationships involved with energy forms (e.g., heat transfer in a system involving mass, specific heat, and change in temperature of matter) • identifies, measures, calculates, and analyzes qualitative and quantitative relationships associated with energy transfer or energy transformation (e.g., changes in temperature, velocity, potential energy, kinetic energy, conduction, convection, radiation, voltage, current). 		
understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged.	<ul style="list-style-type: none"> • identifies, describes, and explains physical and chemical changes involving the conservation of matter and energy (e.g., oscillating pendulum/spring, chemical reactions, nuclear reactions) • observes, measures, and calculates quantities to demonstrate conservation of matter and energy in chemical changes (e.g., acid-base, precipitation, oxidation/reduction reactions), and physical interactions of 		

	<p>matter (e.g., force, work, power)</p> <ul style="list-style-type: none">• describes and predicts chemical changes (e.g., combustion, simple chemical reactions), and physical interactions of matter (e.g., velocity, force, work, power) using word or symbolic equations• describes and explains physical interactions of matter using conceptual models (e.g., conservation laws of matter and energy, particle model for gaseous behavior)• relates their prior knowledge and understanding of properties of matter to observable characteristics of materials and emerging technologies (e.g., semiconductors, superconductors, photovoltaics, ceramics)• models quantitative aspects of chemical and physical interactions (e.g., rates of reactions, stoichiometry, electromagnetic phenomena, statics and dynamics, electrochemistry)• applies knowledge and understanding of chemical and physical interactions to explore factors that influence or govern change (e.g., equilibrium constants, kinetics, thermodynamics)• distinguishes among different types of constancy (e.g., static and dynamic equilibrium, symmetry, uniform/accelerated motion) and different types of change (e.g., qualitative and quantitative trends, cyclic change, chaotic systems).		
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CONTENT STANDARD V: STUDENTS UNDERSTAND THAT THE NATURE OF SCIENCE INVOLVES A PARTICULAR WAY OF BUILDING KNOWLEDGE AND MAKING MEANING OF THE NATURAL WORLD.*

Students know and are able to	Indicators of Performance	Resources	Vocabulary
<p>understand the connections between science, technology, and human activity, and their impact on the world.</p>	<p>Applies an understanding that science is a particular way of knowing based on</p> <ul style="list-style-type: none"> • theories accepted by the consensus of the scientific community, developed after evaluating extensive amounts of data collected and verified by the methods of science by many researchers in various scientific fields • the acknowledgement that scientific investigations sometimes result in unexpected findings that lead to new questions and more investigation • the acknowledgement that theories may need revision as new information becomes available • the acknowledgement that alternative explanations often exist until sufficient data can be collected, critiqued, and consensus reached <p>Compares and contrasts hypothesis and theory by</p> <ul style="list-style-type: none"> • emphasizing a hypothesis is a logical prediction/explanation based on preliminary evidence • recognizing a theory is a conceptual framework based on and supported by extensive research-based evidence which can be used to accurately predict future events <p>Analyzes and evaluates the content of print and visual media</p> <ul style="list-style-type: none"> • for scientific evidence • for bias, or opinion <p>designs a technological solution to address a problem</p> <ul style="list-style-type: none"> • predicts the costs, benefits, limitations • examines social consequences associated with the technological solution <p>Analyzes the scientific principles behind complex technological applications (i.e., compact discs-digitizing information, roller blades-friction, polymers, mechanics, bearings, computers-electronics, digitizing information, magnetic storage)</p>		<p><i>Vocabulary will be based on the Science Glossary when released by CDE and instructional materials to support frameworks.</i></p>

• Colorado Model Content Standards, approved February 8 2007, combined former standard five and six into one standard