A Guide to the Colorado Academic Standards

Working Together

To support families and teachers in realizing the goals of the Colorado Academic Standards, this guide provides an overview of the learning expectations for high school physical science and offers some possible learning experiences students may engage in during this school year.

Why Standards?

Created by Coloradans for Colorado students, the Colorado Academic Standards provide a grade-by-grade road map to help ensure students are ultimately successful in college, careers, and life. The standards aim to improve what students learn and how they learn in ten content areas, emphasizing critical-thinking, creativity, problem solving, collaboration, and communication as important life skills in the 21st century.

Science for High Schools (9-12)

The science standards at the middle school and high school grades build upon the foundation for students to work as scientists by asking testable questions, collecting and analyzing different types of evidence, and by providing rationale for their interpretations through reasoning and/or argumentation. Mastery of these standards will result in students deepening their understanding of science through an application and development of scientific knowledge to the solution of practical problems. Students will experience all three "strands" of the science standards during their secondary years: physical science, life science, and earth science.

Where can I learn more?

- Contact your school district regarding local decisions related to standards, curriculum, resources, and instruction.
- Colorado Academic Standards Booklets: http://www.cde.state.co.us/standardsandinstruction/GradeLevelBooks.asp
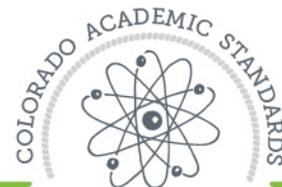- Joanna Bruno, Science Content Specialist at 303-919-3907, Bruno_j@cde.state.co.us

At the end of High School, students can...

Science

Physical Science
High School

COLORADO
Department of Education

www.cde.state.co.us

Colorado PTA
everychild. onevoice.

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Science Learning Expectations for High School Physical Science

Recognize and describe ways in which natural phenomena are governed by Newton's laws of motion; explain limitations of Newton's application to very small or very fast objects.

Explain atomic and molecular structure in relation to the properties of matter; predict outcomes of chemical and nuclear reactions.

Recognize that energy exists in various forms; describe how transformation and conservation of energy occur in processes that are predictable and measurable.

Throughout High School, you may find students...

- Gathering, analyzing and interpreting data and creating graphs related to position, velocity and acceleration of moving objects; developing, communicating and justifying the analysis of forces acting on an object; making predictions about the effects of two interacting objects.

- Using physical and chemical properties of elements (density, melting point, boing point, and conductivity)

to support the elements' position on the periodic table; developing a model that differentiates between atoms and molecules, elements and compounds, and pure substances and mixtures; identifying reactants (a substance that takes part in and undergoes change during a reaction) and predicting products and balancing equations in chemical (synthesis, decomposition, combustion, and replacement) and nuclear reactions (fusion and fission).

- Developing, communicating, and justifying an explanation of current chemical bonding models (Lewis Dot diagrams); using chemical and physical properties to predict and support the classification of compounds (ionic, polar, or covalent); describing the role of electrons in bonding and the relationship to their position in the periodic table.

- Developing, communicating, and justifying an explanation of mechanical energy; using measurements, equations and graphs regarding the quantity of energy in a system or object; using evidence to predict the types of energy associated with objects (mechanical, chemical, electrical, radiant, thermal, nuclear); calculating energy amounts.

- Using evidence to develop and support claims about the conservation of energy in a variety of systems; differentiating among the characteristics of mechanical and electromagnetic waves that determine their energy.