Colorado Measures of Academic Success High School Science
Performance Level Descriptors (PLDs)

Students demonstrate mastery of science concepts and 21st century skills aligned to the Colorado Academic Standards at various performance levels. The performance level descriptors are organized in a manner that assumes students demonstrating higher levels of command have mastered the concepts and skills within the lower levels. For example, a student at moderate command also masters the concepts and skills of limited command.

Students who Exceeded Expectations demonstrated distinguished command of the Colorado Academic Standards and can typically

- justify and predict the effects of force and mass on an object's motion, discuss conflicting results, and identify force pairs in interacting objects;
- using historical models, justify an evidence-based explanation for the current model of the atom and predict the amount of product formed in a nuclear or chemical reaction;
- justify an evidence-based explanation that demonstrates how ecosystems follow the laws of conservation of matter and energy;
- use evidence to develop a logical argument explaining how specialized tissues are formed, cloning occurs, and how environmental toxins cause genetic mutations;
- explain how genetic changes over time are the result of interactions within populations, heritability, genetic variation, and differential survival and reproduction;
- use data to analyze how forces and energies beyond Earth's have influenced the history of the universe and provide feedback on the validity of alternative explanations;
- analyze evidence to answer questions regarding changes to Earth, including those that result in shifts in climate and natural hazards; and
- predict impacts of resource exploration, development, and consumption and design a plan to reduce resource use.

Students who Met Expectations demonstrated strong command of the Colorado Academic Standards and can typically

- explain how force and mass affect the acceleration of an object;
- identify reactants, predict products, and balance equations in chemical and nuclear reactions;
- analyze evidence to describe energy transformations and conservation;
- evaluate scenarios regarding human population growth and sustainability;
- differentiate between conditions for optimal enzyme and photosynthetic activity;
- model and describe how homeostasis is maintained in cells, organs, and organisms;
- analyze how organisms use passive and active transport;
- explain the processes of DNA replication, transcription, translation, and gene regulation;
- model relationships among organisms demonstrating common ancestry;
- infer the history of the universe, solar system, and Earth using evidence from past events;
- explain the historical development of the theory of plate tectonics; and
- use data to evaluate impacts of resource exploration, development, and consumption, and draw conclusions about sustainable use.

Students who Approached Expectations demonstrated moderate command of the Colorado Academic Standards and can typically

- use evidence to demonstrate how mass and distance affect the force of gravity between objects;
- develop models of atoms, molecules, elements, compounds, pure substances, and mixtures and identify the types of bonds that occur in molecules and compounds;
- use data to measure and compare energy transformations and efficiency;
- model how carbon, nitrogen, phosphorus, and water cycle in an ecosystem;
- recognize the importance of keystone and non-native species in an ecosystem;
- identify the relationship between photosynthesis, cellular respiration, and energy;
- differentiate between and give examples of passive and active transport;
- explain the relationship between genes and proteins and provide examples of how mutations can affect organisms;
- describe how changes in genetic traits lead to population adaptations;
- explain how external forces and energies influence Earth;
- recognize the interactions within Earth's geosphere, atmosphere, hydrosphere, and biosphere, including those that result in shifts in climate and natural hazards; and
- compare and contrast the costs and benefits of using resources provided by Earth and the Sun.

Students who Partially Met Expectations demonstrated limited command of the Colorado Academic Standards and can typically

- use Newton's laws to describe the relationship among forces, masses, and the motion of objects;
- identify the properties of matter and understand that mass and energy are conserved;
- investigate energy transformations and the conservation of energy;
- describe how energy flows through trophic levels;
- identify primary and secondary succession in an ecosystem;
- identify biomolecules, their building blocks, and their functions;
- interpret data to identify transport mechanisms;
- recognize that DNA controls traits;
- identify how genetic traits can be passed down through generations;
- use media and technology to investigate the universe, solar system, and Earth;
- use data to describe the theory of plate tectonics; and
- identify how factors interact to determine climate.