

# **Appendix C**

## CMAS Science and Social Studies Prepared Graduate Competencies and Grade Level Expectations

**Grade 4 Social Studies  
Standards, Prepared Graduate Competencies, and Grade Level Expectations**

1	History
<b>PGC 1</b>	Develop an understanding of how people view, construct, and interpret history
<b>GLE 1</b>	Organize and sequence events to understand the concepts of chronology and cause and effect in the history of Colorado
<b>PGC 2</b>	Analyze key historical periods and patterns of change over time within and across nations and cultures
<b>GLE 2</b>	The historical eras, individuals, groups, ideas and themes in Colorado history and their relationships to key events in the United States
2	Geography
<b>PGC1</b>	Develop spatial understanding, perspectives, and personal connections to the world
<b>GLE 1</b>	Use several types of geographic tools to answer questions about the geography of Colorado
<b>PGC 2</b>	Examine places and regions and the connections among them
<b>GLE 2</b>	Connections within and across human and physical systems are developed
3	Economics (PFL)
<b>PGC 1</b>	Understand the allocation of scarce resources in societies through analysis of individual choice, market interaction, and public policy
<b>GLE 1</b>	People respond to positive and negative incentives
<b>PGC 2</b>	Acquire the knowledge and economic reasoning skills to make sound financial decisions (PFL)
<b>GLE 2</b>	The relationship between choice and opportunity cost (PFL)
4	Civics
<b>PGC 1</b>	Analyze and practice rights, roles, and responsibilities of citizens
<b>GLE 1</b>	Analyze and debate multiple perspectives on an issue
<b>PGC 2</b>	Analyze the origins, structure, and functions of governments and their impacts on societies and citizens
<b>GLE 2</b>	The origins, structure, and functions of the Colorado government

**Grade 7 Social Studies**  
**Standards, Prepared Graduate Competencies, and Grade Level Expectations**

1	History
<b>PGC 1</b>	Develop an understanding of how people view, construct, and interpret history
<b>GLE 1</b>	Seek and evaluate multiple historical sources with different points of view to investigate a historical question and to formulate and defend a thesis with evidence
<b>PGC 2</b>	Analyze key historical periods and patterns of change over time within and across nations and cultures
<b>GLE 2</b>	The historical eras, individuals, groups, ideas and themes within regions of the Eastern Hemisphere and their relationships with one another
2	Geography
<b>PGC1</b>	Develop spatial understanding, perspectives, and personal connections to the world
<b>GLE 1</b>	Use geographic tools to gather data and make geographic inferences and predictions
<b>PGC 2</b>	Examine places and regions and connections among them
<b>GLE 2</b>	Regions have different issues and perspectives
3	Economics (PFL)
<b>PGC 1</b>	Understand the allocation of scarce resources in societies through analysis of individual choice, market interaction, and public policy
<b>GLE 1</b>	Supply and demand influence price and profit in a market economy
<b>PGC 2</b>	Acquire the knowledge and economic reasoning skills to make sound financial decisions (PFL)
<b>GLE 2</b>	The distribution of resources influences economic production and individual choices (PFL)
4	Civics
<b>PGC 1</b>	Analyze and practice rights, roles, and responsibilities of citizens
<b>GLE 1</b>	Compare how various nations define the rights, responsibilities, and roles of citizens
<b>PGC 2</b>	Analyze the origins, structure, and functions of governments and their impacts on society and citizens
<b>GLE 2</b>	Different forms of government and international organizations and their influence in the world community

**Grade 5 Science**  
**Standards, Prepared Graduate Competencies, and Grade Level Expectations**

<b>1</b>	<b>Physical Science</b>
<b>PGC 1</b>	Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions
<b>GLE 1</b>	Mixtures of matter can be separated regardless of how they were created; all weight and mass of the mixture are the same as the sum of weight and mass of its parts
<b>2</b>	<b>Life Science</b>
<b>PGC1</b>	Analyze how various organisms grow, develop and differentiate during their lifetimes based on an interplay between genetics and their environment
<b>GLE 1</b>	All organisms have structures and systems with separate functions
<b>PGC 2</b>	Analyze how the relationship between structure and function in living systems at a variety of organizational levels, and recognize living systems' dependence on natural selection
<b>GLE 2</b>	Human body systems have basic structures, functions, and needs
<b>3</b>	<b>Earth Systems Science</b>
<b>PGC 1</b>	Describe how humans are dependent on the diversity of resources provided by Earth and Sun
<b>GLE 1</b>	Earth and sun provide a diversity of renewable and nonrenewable resources
<b>PGC 2</b>	Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, biosphere interact as a complex system
<b>GLE 2</b>	Earth's surface changes constantly through a variety of processes and forces
<b>GLE 3</b>	Weather conditions change because of the uneven heating of Earth's surface by the Sun's energy. Weather changes are measured by differences in temperature, air pressure, wind, and water in the atmosphere and type of precipitation

**Grade 8 Science**  
**Standards, Prepared Graduate Competencies, and Grade Level Expectations**

1	Physical Science
<b>PGC 1</b>	Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects
<b>GLE 1</b>	Identify and calculate the direction and magnitude of forces that act on an object, and explain the results in the object's change of motion
<b>PGC 2</b>	Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable
<b>GLE 2</b>	There are different forms of energy, and those forms of energy can be changed from one form to another— but total energy is conserved
<b>GLE 4</b>	Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties
<b>PGC 3</b>	Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions
<b>GLE 3</b>	Distinguish between physical and chemical changes, noting that mass is conserved during any change
2	Life Science
<b>PGC1</b>	Explain and illustrate with examples how living systems interact with the biotic and abiotic environment
<b>GLE 1</b>	Human activities can deliberately or inadvertently alter ecosystems and their resiliency
<b>PGC 2</b>	Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment
<b>GLE 2</b>	Organisms reproduce and transmit genetic information (genes) to offspring, which influences individuals' traits in the next generation
3	Earth Systems Science
<b>PGC 1</b>	Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system
<b>GLE 1</b>	Weather is a result of complex interactions of Earth's atmosphere, land and water, that are driven by energy from the sun, and can be predicted and described through complex models
<b>GLE 2</b>	Earth has a variety of climates defined by average temperature, precipitation, humidity, air pressure, and wind that have changed over time in a particular location
<b>PGC 2</b>	Describe and interpret how Earth's geologic history and place in space are relevant to our understanding of the processes that have shaped our planet
<b>GLE 3</b>	The solar system is comprised of various objects that orbit the Sun and are classified based on their characteristics
<b>GLE 4</b>	The relative positions and motions of Earth, Moon, and Sun can be used to explain observable effects such as seasons, eclipses, and Moon phases

**High School Science  
Standards, Prepared Graduate Competencies, and Grade Level Expectations**

1	Physical Science
<b>PGC 1</b>	Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects
<b>GLE 1</b>	Newton's laws of motion and gravitation describe the relationships among forces acting on and between objects, their masses, and changes in their motion – but have limitations
<b>PGC 2</b>	Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions
<b>GLE 2</b>	Matter has definite structure that determines characteristic physical and chemical properties
<b>GLE 3</b>	Matter can change form through chemical or nuclear reactions abiding by the laws of conservation of mass and energy
<b>GLE 4</b>	Atoms bond in different ways to form molecules and compounds that have definite properties
<b>PGC 3</b>	Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable
<b>GLE 5</b>	Energy exists in many forms such as mechanical, chemical, electrical, radiant, thermal, and nuclear, that can be quantified and experimentally determined
<b>GLE 6</b>	When energy changes form, it is neither created nor destroyed; however, because some is necessarily lost as heat, the amount of energy available to do work decreases
2	Life Science
<b>PGC1</b>	Explain and illustrate with examples how living systems interact with the biotic and abiotic environment
<b>GLE 1</b>	Matter tends to be cycled within an ecosystem, while energy is transformed and eventually exits an ecosystem
<b>GLE 2</b>	The size and persistence of populations depend on their interactions with each other and on the abiotic factors in an ecosystem
<b>PGC 2</b>	Analyze the relationships between structure and function in living systems at a variety of organizational levels, and recognize living systems' dependence on natural selection
<b>GLE 3</b>	Cellular metabolic activities are carried out by biomolecules produced by organisms
<b>GLE 4</b>	The energy for life primarily derives from the interrelated processes of photosynthesis and cellular respiration. Photosynthesis transforms the sun's light energy into the chemical energy of molecular bonds. Cellular respiration allows cells to utilize chemical energy when these bonds are broken.
<b>GLE 5</b>	Cells use passive and active transport of substances across membranes to maintain relatively stable intracellular environments
<b>GLE 6</b>	Cells, tissues, organs, and organ systems maintain relatively stable internal environments, even in the face of changing external environments
<b>PGC3</b>	Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment
<b>GLE 7</b>	Physical and behavioral characteristics of an organism are influenced to varying degrees by heritable genes, many of which encode instructions for the production of proteins

<b>GLE 8</b>	Multicellularity makes possible a division of labor at the cellular level through the expression of select genes, but not the entire genome.
<b>PGC4</b>	Explain how biological evolution accounts for the unity and diversity of living organisms
<b>GLE 9</b>	Evolution occurs as the heritable characteristics of populations change across generations and can lead populations to become better adapted to their environment
<b>3</b>	<b>Earth Systems Science</b>
<b>PGC 1</b>	Describe and interpret how Earth’s geologic history and place in space are relevant to our understanding of the processes that have shaped our planet
<b>GLE 1</b>	The history of the universe, solar system and Earth can be inferred from evidence left from past events
<b>GLE 2</b>	As part of the solar system, Earth interacts with various extraterrestrial forces and energies such as gravity, solar phenomena, electromagnetic radiation, and impact events that influence the planet’s geosphere, atmosphere, and biosphere in a variety of ways
<b>PGC 2</b>	Evaluate evidence that Earth’s geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system
<b>GLE 3</b>	The theory of plate tectonics helps explain geological, physical, and geographical features of Earth
<b>GLE 4</b>	Climate is the result of energy transfer among interactions of the atmosphere, hydrosphere, geosphere, and biosphere
<b>GLE 6</b>	The interaction of Earth's surface with water, air, gravity, and biological activity causes physical and chemical changes
<b>GLE 7</b>	Natural hazards have local, national and global impacts such as volcanoes, earthquakes, tsunamis, hurricanes, and thunderstorms
<b>PGC 3</b>	Describe how humans are dependent on the diversity of resources provided by Earth and Sun
<b>GLE 5</b>	There are costs, benefits, and consequences of exploration, development, and consumption of renewable and nonrenewable resources