Transitional Colorado Assessment Program (TCAP) Assessment Framework

Grade 5 Science

The assessment frameworks specify the content that will be eligible for assessment in the 2012 and 2013 TCAP by aligning the assessment objectives from the Colorado Model Content Standards (old standards) with the Colorado Academic Standards (new standards). TCAP supports the transition to the Colorado Academic Standards (CAS) during the next two years as a gradual approach to statewide measuring of student achievement of the new standards.

Please remember that the TCAP frameworks, and thus TCAP, are not inclusive of **all** of the CAS. **Districts should, however, still transition to the full range of the new standards as the complete set of CAS will be considered eligible content for inclusion in the new 2014 assessment.**

The frameworks are organized as indicated in the table below:

Standard	Indicates the broad knowledge skills that all students should be acquiring in Colorado schools at grade level. Each standard is assessed every year.		
Benchmark	Tactical descriptions of the knowledge and skills students should acquire by each grade level assessed by the TCAP.		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
Specific knowledge and skills eligible for inclusion on TCAP for each grade level.	Provides the code(s) from the Colorado Academic Standards (CAS) that correspond(s) to the assessment objective.	Provides the text from the CAS which correspond(s) to the assessment objective.	Provides clarifying information.

The following may assist in understanding the revised frameworks:
The Colorado Academic Standards are mastery based. Some assessment objectives are aligned to expectations at 5th grade or below that are embedded throughout the CAS standards. Examples of expectation sentence stems are provided and these assessment objectives are eligible for assessment with the TCAP.

- A CAS may be aligned to multiple assessment objectives. To ensure a reasonable document length per grade, some instances of multiple CAS alignments have been omitted.

- Some assessment objectives, or parts of assessment objectives, do not explicitly align with the CAS but will still be assessed. Where this occurs, it is noted with language such as "this will continue to be assessed." The concepts from these assessment objectives are also compiled in a table at the bottom of each framework for easy reference. The purpose of continuing to assess non-CAS aligned objectives is to ensure the reliability and comparability of the TCAP to prior year's assessments.

- Assessment objectives and parts of assessment objectives that will no longer be assessed have been struck through and are included in the revised frameworks for purposes of comparison to the prior frameworks only.

- Math is an integral part of science. The CAS has separated science related math concepts into distinct content area domains, but students should be able to interpret mathematical presentations of scientific data and trends in graphs, charts and tables.

- In some cases, an assessment objective is aligned to both an entire grade level expectation (GLE) and to a specific evidence outcome (EO) from that GLE. Text from the EO is included in these instances because it provides further clarification and may assist with interpretation of the framework.
- A key to the CAS Alignment Code can be by following this link: http://www.cde.state.co.us/cdeassess/UAS/AdoptedAcademicStandards/CAS_Reference_system.pdf

The revised frameworks directly build off of the work done on the original Colorado Student Assessment Program (CSAP) frameworks and reflect a joint endeavor between the Office of Assessment, Research and Evaluation and the content specialists from the Office of Academic and Instructional Support.

Standard 1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. Students know and are able to:		
Benchmark 1	Design, plan and conduct a variety of simple investigations (for example: formulate a testable question, state a hypothesis, make systematic observations, develop and communicate logical conclusions based on evidence)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify that changing (manipulating) a different variable in a previously given simple experiment will give a new result (response).	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Ask testable questions about… , make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion	
	SC09-GR.2-S.1-GLE.1-N.3	Collaboratively design an experiment, identifying the constants and variables.	
b. Identify that only one variable can be changed (manipulated) in an experiment.	SC09-GR.2-S.1-GLE.1-N.3	Collaboratively design an experiment, identifying the constants and variables.	
	SC09-GR.5-S.1-GLE.1-N.1	Ask testable questions about mixtures, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	
c. Identify and develop a testable question, and state a hypothesis.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Ask testable questions about… , make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion	

Standard 1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. Students know and are able to:		
Benchmark 1	Design, plan and conduct a variety of simple investigations (for example: formulate a testable question, state a hypothesis, make systematic observations, develop and communicate logical conclusions based on evidence)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
Continued … c. Identify and develop a testable question, and state a hypothesis.	SC09-GR.3-S.2-GLE.1-N.1	Ask a testable question about the life cycles of a variety of organisms.	
	SC09-GR.5-S.1-GLE.1-N.1	Ask testable questions about mixtures, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	
d. Relate observations and data to a testable question.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Ask testable questions about …, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion	
	SC09-GR.5-S.1-GLE.1-N.1	Ask testable questions about mixtures, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	
e. Develop and communicate logical conclusions and make predictions based on evidence from an experiment.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Share evidence-based conclusions Develop and communicate an evidence-based scientific explanation Analyze and interpret a variety of data Understand that models are developed to explain and predict phenomena that cannot be directly observed.	

Standard 1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. Students know and are able to:		
Benchmark 1	Design, plan and conduct a variety of simple investigations (for example: formulate a testable question, state a hypothesis, make systematic observations, develop and communicate logical conclusions based on evidence)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
Continued… e. Develop and communicate logical conclusions and make predictions based on evidence from an experiment.	SC09-GR.3-S.1-GLE.1-EO.a	Use evidence to develop a scientific explanation regarding the stages of how organisms develop and change over time	
	SC09-GR.5-S.1-GLE.1-N.1	Ask testable questions about mixtures, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	

Standard 1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. Students know and are able to:		
Benchmark 2	Select and use appropriate tools and technology to gather and display (for example: graphs, charts, diagrams) quantitative and qualitative data related to an investigation. (for example: length, volume, and mass measuring instruments, thermometers, watches, magnifiers, microscopes, calculators, and computers)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify the appropriate scientific tools that are used to gather data for an investigation.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Select appropriate tools to conduct an experiment, use them correctly, and report the data in proper units.	

Standard 1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. Students know and are able to:		
Benchmark 2	Select and use appropriate tools and technology to gather and display (for example: graphs, charts, diagrams) quantitative and qualitative data related to an investigation. (for example: length, volume, and mass measuring instruments, thermometers, watches, magnifiers, microscopes, calculators, and computers)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
b. Identify the appropriate metric units for length, temperature, mass and volume.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Select appropriate tools to conduct an experiment, use them correctly, and report the data in proper units.	
c. Represent data and evidence from an experiment in visual form (e.g., data tables, graphs, diagrams).	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Share results of experiments with others and respectfully discuss results that are not expected. Analyze and interpret a variety of data Develop and communicate an evidence-based scientific explanation Create and evaluate models	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 1	Objects have physical properties that can be measured (for example: length, mass, volume and temperature)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Use appropriate tools to measure physical properties of objects.	SC09-GR.5-S.1-GLE.1-N.2	Select appropriate tools to conduct an experiment, use them correctly, and report the data in proper units.	Volume is a mathematical concept in 5th grade that sets the foundation for understanding density in 6th grade and may still be assessed
	MA10-GR.5-S.4-GLE.1	Properties of multiplication and addition provide the foundation for volume, an attribute of solids	
	SC09-GR.6-S.1-GLE.4	Distinguish among, explain, and apply the relationships among mass, weight, volume, and density	
b. Use measurements to make qualitative and quantitative comparisons between physical properties of objects.	SC09-GR.PS-S.1-GLE.1-EO.c	Collect, describe, and record information through discussion, drawings, and charts	Using measurements is embedded throughout the CAS
	SC09-GR.K-S.3-GLE.1-EO.b	Analyze and interpret temperature data between day (when the Sun shines on our area) and night (when the Sun does not shine on our area)	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 2	Measurable physical properties can be compared before and after effecting a change to verify a change has occurred and used to predict the outcome in similar circumstances.		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Use measurements before and after an event to determine whether a change has occurred in a physical property of an object.			Although not explicitly in the CAS, this objective will continue to be assessed.
b. Using given data, predict how a similar event will affect a physical property of a similar object.	SC09-GR.3-S.1-GLE.1-EO.b	Use evidence to develop a scientific explanation around how heating and cooling affects states of matter	Note that a life science CAS alignment exists within this assessment objective.
	SC09-GR.3-S.1-GLE.1-N.1	Ask a testable question about the heating and cooling of a substance, design a method to find the answer, collect data, and form a conclusion.	
	SC09-GR.4-S.2-GLE.3-EO.a	Use evidence to develop a scientific explanation on how organisms adapt to their habitat	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 3	~~Matter is made up of parts that are too small to be seen~~		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Explain that all matter takes up space and has mass.			Students should understand differences between the nature of matter and the nature of energy. This assessment objective will continue to be assessed.
b. ~~Recognize that all matter is made of parts called atoms, which are too small to be seen.~~			Not explicitly in the CAS at 5th grade or below.

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 4	Matter exists in physical states (solid, liquid, gas) and can change from one state to another		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify the physical states of matter and describe the physical properties of each (*for example, a liquid has a definite volume but takes the shape of its container*).	SC09-GR.3-S.1-GLE.1-EO.c	Identify the state of any sample of matter.	
b. Identify the physical state of a given material, and recognize that changes in the physical state of matter do not change the composition of the substance.	SC09-GR.3-S.1-GLE.1	Matter exists in different states such as solids, liquids, and gases and can change from one state to another by heating and cooling	
	SC09-GR.3-S.1-GLE.1-EO.b	Use evidence to develop a scientific explanation around how heating and cooling affects states of matter	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 4	Matter exists in physical states (solid, liquid, gas) and can change from one state to another		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
c. Describe how the processes of melting, freezing, evaporation, and condensation change matter from one physical state to another.	SC09-GR.3-S.1-GLE.1-EO.a	Analyze and interpret observations about matter as it freezes and melts, and boils and condenses	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 5	There are different types and sources of energy (for example: light, heat, motion)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify various types of energy and common sources of these types of energy.	SC09-GR.4-S.1-GLE.1	Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical	
	SC09-GR.4-S.1-GLE.1-EO.a	Identify and describe the variety of energy sources	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 6	Electricity in circuits can produce light, heat, sound and magnetic effects		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Recognize that an electrical circuit must be complete to function.	SC09-GR.4-S.1-GLE.1-EO.b	Show that electricity in circuits requires a complete loop through which current can pass	
	SC09-GR.4-S.1-GLE.1-EO.c	Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced	
b. Give examples of devices that use electrical energy to produce light, heat, sound, and magnetic effects.	SC09-GR.4-S.1-GLE.1-EO.c	Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 7	There are different types of forces (for example: gravity and magnetism)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe that a force is a push or a pull on an object, ~~and identify that gravity, magnetism, and friction are examples of forces.~~	SC09-GR.2-S.1-GLE.1	Changes in speed or direction of motion are caused by forces such as pushes and pulls.	
b. Recognize that the effects of forces on objects can be seen (but the force itself cannot be directly seen).	SC09-GR.2-S.1-GLE.1-EO.a	Identify and predict how the direction or speed of an object may change due to an outside force	
	SC09-GR.2-S.1-GLE.1-EO.b	Analyze and interpret observable data about the impact of forces on the motion of objects	

Standard 2	Physical Science: Students know and understand common properties, forms, and changes in matter and energy. *(Focus: Physics and Chemistry)* Students know and can demonstrate understanding that:		
Benchmark 8	Changes in speed or direction of motion are caused by forces		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Explain that more than one force may be acting on an object at the same time.	SC09-GR.2-S.1-GLE.1-EO.a	Identify and predict how the direction or speed of an object may change due to an outside force	
	SC09-GR.2-S.1-GLE.1-EO.b	Analyze and interpret observable data about the impact of forces on the motion of objects	
b. Evaluate the changes in speed or direction of motion caused by unbalanced forces acting on an object.	SC09-GR.2-S.1-GLE.1-EO.a	Identify and predict how the direction or speed of an object may change due to an outside force	
	SC09-GR.2-S.1-GLE.1-EO.b	Analyze and interpret observable data about the impact of forces on the motion of objects	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 1	Each plant or animal has different structures and behaviors that serve different functions in growth, survival, and reproduction.		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify and describe different plant structures that serve different functions in growth, survival and reproduction.	SC09-GR.5-S.2-GLE.1-EO.a	Develop and communicate an evidence-based scientific explanation of the role of different organs or structures that are important for an organism's survival – in both plants and animals	
	SC09-GR.5-S.2-GLE.1-EO.b	Analyze and interpret data to generate evidence that all organisms have structures that are required for survival in both plants and animals	
b. Identify and describe different animal structures and behaviors that serve different functions in growth, survival and reproduction.	SC09-GR.4-S.2-GLE.3-EO.b	Identify the components that make a habitat type unique	
	SC09-GR.5-S.2-GLE.1	All organisms have structures and systems with separate functions	
	SC09-GR.5-S.2-GLE.1-EO.a	Develop and communicate an evidence-based scientific explanation of the role of different organs or structures that are important for an organism's survival – in both plants and animals	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 2	Green plants need energy from sunlight and various raw materials to live, and animals consume plants and other organisms to live.		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify the basic needs of plants.	SC09-GR.4-S.2-GLE.1-EO.a	Use evidence to develop a scientific explanation of what plants and animals need to survive	
	SC09-GR.4-S.2-GLE.3-EO.a	Use evidence to develop a scientific explanation on how organisms adapt to their habitat	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 2	Green plants need energy from sunlight and various raw materials to live, and animals consume plants and other organisms to live.		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
b. Describe how animals use food (focus on growth and energy).	SC09-GR.6-S.2-GLE.2	Organisms interact with each other and their environment in various ways that create a flow of energy and cycling of matter in an ecosystem	Note that Comprehensive Health CAS alignments exist within this assessment objective.
	SC09-GR.6-S.2-GLE.2-N.3	Create and evaluate models that show how interactions create a flow of energy and a cycling of matter in an ecosystem.	
	CH09-GR.4-S.2-GLE.1-RA.1	Healthy foods provide nutrients that in turn provide you energy for daily activities.	
	CH09-GR.4-S.2-GLE.1-RA.2	Nutrients are necessary for good health and proper growth and development	
	CH09-GR.5-S.2-GLE.1-RA.2	As the body matures, the amount of food and key nutrients change to support healthy systems and growth	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 3	Human body systems have basic structures, functions and needs (for example: digestive, respiratory, circulatory, skeletal, muscular).		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify organ systems and the major organs.	SC09-GR.5-S.2-GLE.2	Human body systems have basic structures, functions, and needs	
	SC09-GR.5-S.2-GLE.2-EO.c	Assess further scientific explanations regarding basic human body system functions	
b. Describe the function of various human body systems.	SC09-GR.5-S.2-GLE.2	Human body systems have basic structures, functions, and needs	
	SC09-GR.5-S.2-GLE.2-EO.b	Analyze and interpret data to generate evidence that human systems are interdependent	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 4	There is interaction and interdependence between and among nonliving and living components of ecosystems (for example: food webs, symbiotic and parasitic relationships, dependence on rainfall, pollination).		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify and describe the influence of nonliving components on living components of an ecosystem.	SC09-GR.2-S.2-GLE.1	Organisms depend on their habitat's nonliving parts to satisfy their needs	
	SC09-GR.4-S.2-GLE.3	There is interaction and interdependence between and among living and nonliving components of ecosystems	
	SC09-GR.4-S.2-GLE.3-EO.a	Use evidence to develop a scientific explanation on how organisms adapt to their habitat	
b. Identify and describe the interaction of organisms in an ecosystem.	SC09-GR.4-S.2-GLE.3	There is interaction and interdependence between and among living and nonliving components of ecosystems	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 5	Life cycles vary from organism to organism (for example: frog, chicken, butterfly, radish, bean plant).		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify organisms that go through similar life stages.	SC09-GR.3-S.2-GLE.1-EO.a	Use evidence to develop a scientific explanation regarding the stages of how organisms develop and change over time	
b. ~~Sequence the stages of growth of plants and animals.~~			Not explicitly in the CAS at 5th grade or below.

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 6	Fossils can be compared to one another and to living organisms according to their similarities and differences		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe evidence that shows life has changed over time.	SC09-GR.4-S.2-GLE.2-EO.a.2	Use evidence to develop a scientific explanation for: 2. What conclusions can be drawn from similarities between fossil evidence and living organisms	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 7	There are similarities and differences in appearance among individuals of the same population (for example: size, color, shape)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe ways that plants or animals of the same population and life stage look different.	SC09-GR.4-S.2-GLE.1	All living things share similar characteristics, but they also have differences that can be described and classified	
	SC09-GR.4-S.2-GLE.1-EO.c	Analyze and interpret data representing variation in a trait	

Standard 3	Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. *(Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology)* Students know and can demonstrate understanding that:		
Benchmark 8	There are similarities and differences between organisms (for example: plants vs. animals, vertebrate vs. invertebrate)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Classify organisms based on characteristics.	SC09-GR.4-S.2-GLE.1-EO.b	Use evidence to develop a scientific explanation for similarities and/or differences among different organisms (species)	
	SC09-GR.4-S.2-GLE.1-EO.c	All living things share similar characteristics, but they also have differences that can be described and classified	
	SC09-GR.4-S.2-GLE.1-EO.c	Evaluate and provide feedback on evidence used by others to justify how they classified organisms.	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 1	Fossils are evidence of past life		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe how fossil evidence reveals environmental characteristics and changes over time.	SC09-GR.4-S.2-GLE.2	Comparing fossils to each other or to living organisms reveals features of prehistoric environments and provides information about organisms today	
b. Predict or infer how fossils are formed from previously living organisms.	SC09-GR.4-S.2-GLE.2-IQ.2	What conditions would most likely lead to something becoming a fossil?	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 2	Natural processes change Earth's surface (for example: weathering, erosion, mountain building, volcanic activity, earthquakes and floods)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify and describe the concepts of weathering, erosion, and deposition and the resulting physical features (canyons, mountains, etc).	SC09-GR.5-S.3-GLE.2-EO.a	Analyze and interpret data identifying ways Earth's surface is constantly changing through a variety of processes and forces such as plate tectonics, erosion, deposition, solar influences, climate, and human activity	
	SC09-GR.5-S.3-GLE.2-EO.b	Develop and communicate an evidence based scientific explanation around one or more factors that change Earth's surface	
b. Explain the contribution of volcanic and earthquake activity to the changes in Earth's surface.	SC09-GR.5-S.3-GLE.2-EO.a	Analyze and interpret data identifying ways Earth's surface is constantly changing through a variety of processes and forces such as plate tectonics, erosion, deposition, solar influences, climate, and human activity	
	SC09-GR.5-S.3-GLE.2-EO.b	Develop and communicate an evidence based scientific explanation around one or more factors that change Earth's surface	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 3	Many of Earth's resources can be conserved, recycled and depleted		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Explain the depletion of resources and the benefit for conserving, recycling (landfills, water).	SC09-GR.4-S.1-GLE.1-N.4	Create plans to decrease electrical energy use for one week and evaluate the results.	
	SC09-GR.5-S.3-GLE.1-EO.b	Analyze and interpret a variety of data to understand the origin, utilization, and concerns associated with nature resources.	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 4	Weather is different from climate		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Compare and contrast weather and climate.			Although not explicitly in the CAS, this objective may still be assessed

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 5	Most of Earth's surface is covered by water, most of the water is saltwater in the oceans, and that freshwater is found in rivers, lakes, underground sources and glaciers		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Recognize that the majority of Earth's surface is covered by water (salt and fresh water).	SC09-GR.3-S.1-GLE.1-RA.1	Water is distributed on Earth in different forms such as vapor, ice or glaciers, rivers, and freshwater or saltwater oceans.	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 6	Water exists on Earth in different states (solid, liquid, gas) and changes from one state to another (for example: evaporation, condensation and precipitation).		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe the physical states of water in nature and how it can change from one form to another.	SC09-GR.5-S.3-GLE.3	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	
	SC09-GR.5-S.3-GLE.3-EO.a	Analyze and interpret observations about matter as it freezes and melts, and boils and condenses	
	SC09-GR.3-S.1-GLE.1-RA.1	Water is distributed on Earth in different forms such as vapor, ice or glaciers, rivers, and freshwater or saltwater oceans.	
	SC09-GR.3-S.1-GLE.1-RA.2	There is only a certain amount of water available for human use.	
b. Identify the different parts of the water cycle.	SC09-GR.5-S.3-GLE.3	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	The water cycle is a 6th grade expectation in the CAS, but elementary students should still know how water is transferred between the oceans, the atmosphere and the land as this concept may still be assessed.

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 7	There are basic components of the Solar System (for example: Sun, planets, moons)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Compare and contrast the Solar System's components (the Sun, planets, moons).	SC09-GR.4-S.3-GLE.1-EO.a	Gather, analyze, and interpret data about components of the solar system	
	SC09-GR.4-S.3-GLE.1-EO.b	Utilize direct and indirect evidence to investigate the components of the solar system	

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 8	The Earth and Sun provide a diversity of resources (for example: soils, fuels, minerals, medicines and food)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe types of natural energy resources (renewable, nonrenewable) and their uses on Earth.	SC09-GR.5-S.3-GLE.1-EO.a	Develop and communicate a scientific explanation addressing a question of local relevance about resources generated by the sun or Earth	
	SC09-GR.5-S.3-GLE.1-N.2	Earth and Sun provide a variety of renewable and nonrenewable resources.	
b. Identify Earth's different natural resources and their uses.			

Standard 4	Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. *(Focus: Geology, Meteorology, Astronomy, Oceanography)* Students know and can demonstrate understanding that:		
Benchmark 9	The rotation of Earth on its axis, in relation to the Sun, produces the day-and-night cycle and the orbit of Earth around the Sun completes one year		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Describe the events that occur as a result of the motions of the earth (day/night, year, revolution vs. rotation, orbit).	SC09-GR.4-S.3-GLE.1	Earth is part of the solar system, which includes the Sun, Moon, and other bodies that orbit the Sun in predictable patterns that lead to observable paths of objects in the sky as seen from Earth	Concepts of interaction between earth and Sun are implicit throughout this GLE
	SC09-GR.4-S.3-GLE.1-EO.a	Gather, analyze, and interpret data about components of the solar system	
	SC09-GR.4-S.3-GLE.1-EO.c	Gather, analyze, and interpret data about the Sunrise and Sunset, and Moon movements and phases	

Standard 5	Students understand that the nature of science involves a particular way of building knowledge and making meaning of the natural world. Students know and can demonstrate understanding that:		
Benchmark 1	When a science experiment is repeated with the same conditions, the experiment generally works the same way		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Predict the results of experiments when they are repeated.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Ask testable questions about …, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	
	SC09-GR.2-S.1-GLE.1-EO.b	Analyze and interpret observable data about the impact of forces on the motion of objects.	
	SC09-GR.2-S.1-GLE.1-N.3	Collaboratively design an experiment, identifying the constants and variables.	
	SC09-GR.5-S.2-GLE.2-N.2	Critically evaluate models of the human body, identifying the strengths and weaknesses of the model in representing complex natural phenomena.	
b. Recognize that the results of an experiment should be verified through repetition.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Ask testable questions about …, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion.	

Standard 5	Students understand that the nature of science involves a particular way of building knowledge and making meaning of the natural world. Students know and can demonstrate understanding that:		
Benchmark 2	Models are used to represent events and objects (for example: comparing a map of the school to the actual school; a model of the Earth to Earth itself)		
Assessment Objective	**CAS Alignment Code**	**CAS Expectation Text**	**Comment**
a. Identify that basic models are used to understand scientific processes and/or objects that may be difficult to study.	Expectations for students to understand the process of science is embedded throughout the Colorado Academic Standards and is not a standalone expectation. Examples of sentence stems from the Colorado Academic Standards that would relate to this framework objective are provided.	Understand that models are developed to explain and predict phenomena that cannot be directly observed.	
	SC09-GR.3-S.3-GLE.1-N.2	Use models to demonstrate the rock cycle or other ways Earth's materials are broken down or combined.	
	SC09-GR.4-S.3-GLE.1-N.2	Critically evaluate models of the solar system, identifying the strengths and weaknesses of the model in representing what happens in the real solar system.	
	SC09-GR.5-S.2-GLE.1-EO.c	Create and evaluate models of plant and/or animal systems or parts	
	SC09-GR.5-S.2-GLE.2-N.2	Critically evaluate models of the human body, identifying the strengths and weaknesses of the model in representing complex natural phenomena.	

Note: Some assessment objectives or parts of assessment objectives are not contained within the Colorado Academic Standards at or below this grade level but will continue to be assessed with the TCAP in 5th grade. The concepts from these objectives are reflected in the table below.

Grade 5 Science	Relevant Assessment Objective(s)
Volume	2.1a
Changes in physical properties of objects	2.2a
Nature of matter	2.3a
Compare and contrast weather and climate	4.4a
Transference of water between land, ocean and atmosphere	4.6b