Science
Grade Level Expectations at a Glance

Standard	Grade Level Expectation
Fifth Grade	
1. Physical Science	1. 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
2. Life Science	1. All organisms have structures and systems with separate functions 2. Human body systems have basic structures, functions, and needs
3. Earth Systems Science	1. Earth and sun provide a diversity of renewable and nonrenewable resources 2. Earth's surface changes constantly through a variety of processes and forces 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

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Describe how humans are dependent on the diversity of resources provided by Earth and Sun

Grade Level Expectation: Fifth Grade

Concepts and skills students master:

1. Earth and Sun provide a diversity of renewable and nonrenewable resources

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Develop and communicate a scientific explanation addressing a question of local relevance about resources generated by the sun or Earth (DOK 1-3) b. Analyze and interpret a variety of data to understand the origin, utilization, and concerns associated with natural resources (DOK 1-3)	**Inquiry Questions:** 1. How can the Sun be used as an energy source? 2. How can wind be used as an energy source? 3. What types of energy sources exist on Earth?
	Relevance and Application: 1. Mining operations provide nonrenewable resources. 2. Resources are not distributed evenly and require transportation systems to move them to where they are needed. 3. Towns and laws are often built around resource extraction.

Nature of Science:
1.   Review and analyze scientific explanations about natural resources presented by their peers, and provide feedback to push their peers to be scientifically accurate and base their claims on adequate and reasonable scientific evidence, not opinion.
2.   Earth and Sun provide a variety of renewable and nonrenewable resources. (DOK 1)

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system

Grade Level Expectation: Fifth Grade

Concepts and skills students master:

2. Earth's surface changes constantly through a variety of processes and forces

Evidence Outcomes	21st Century Skills and Readiness Competencies

Students can:

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

b. Develop and communicate an evidence based scientific explanation around one or more factors that change Earth's surface (DOK 2-3)

Inquiry Questions:

1. How does Earth's surface change?
2. How do changes on Earth's surface impact humans?

Relevance and Application:

1. There are benefits and dangers to humans as Earth's surface constantly changes.
2. Communities take into account the effects of the changing Earth in a variety of ways. For example, they might use springs, stilts, drainage techniques, or build off the ground because of frost heaving.
3. Some cities have emergency plans for earthquakes, flooding, eruptions, and tornadoes.
4. The development of technology led to tools that made the establishment of measurement standards – the Richter Scale – possible.

Nature of Science:

1. Ask testable questions about how the earth surface changes. (DOK 2)
2. Utilize a variety of media sources to collect data for analysis regarding Earth processes and the changing surface. (DOK 1-2)
3. Assess and provide feedback on other's scientific explanations about factors that change Earth's surface, pushing for reasoning based on evidence and scientific principles (DOK 2-3)

Sixth Grade	
1. Physical Science	1. All matter is made of atoms, which are far too small to see directly through a light microscope. Elements have unique atoms and thus, unique properties. Atoms themselves are made of even smaller particles 2. Atoms may stick together in well-defined molecules or be packed together in large arrangements. Different arrangements of atoms into groups compose all substances. 3. The physical characteristics and changes of solid, liquid, and gas states can be explained using the particulate model 4. Distinguish among, explain, and apply the relationships among mass, weight, volume, and density
2. Life Science	1. Changes in environmental conditions can affect the survival of individual organisms, populations, and entire species 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
3. Earth Systems Science	1. Complex interrelationships exist between Earth's structure and natural processes that over time are both constructive and destructive 2. Water on Earth is distributed and circulated through oceans, glaciers, rivers, ground water, and the atmosphere 3. Earth's natural resources provide the foundation for human society's physical needs. Many natural resources are nonrenewable on human timescales, while others can be renewed or recycled

Content Area: Science

Standard: 2. Life Science

Prepared Graduates:
Ø Explain and illustrate with examples how living systems interact with the biotic and abiotic environment

Grade Level Expectation: Sixth Grade

Concepts and skills students master:
1. Changes in environmental conditions can affect the survival of individual organisms, populations, and entire species

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Interpret and analyze data about changes in environmental conditions – such as climate change – and populations that support a claim describing why a specific population might be increasing or decreasing b. Develop, communicate, and justify an evidence-based explanation about how ecosystems interact with and impact the global environment (DOK 1-3)	**Inquiry Questions:** 1. How do ecosystem changes affect biodiversity? 2. How does biodiversity contribute to an ecosystem's equilibrium?
	Relevance and Application: 1. The development and application of technologies intended to aid some populations and ecosystems.

c. Model equilibrium in an ecosystem, including basic inputs and outputs, to predict how a change to that ecosystem such as climate change might impact the organisms, populations, and species within it such as the removal of a top predator or introduction of a new species d. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate how environmental conditions affect the survival of individual organisms (DOK 1-2)	**Nature of Science:** 1. Ask testable questions and make a falsifiable hypothesis about how environmental conditions affect organisms, populations, or entire species and design a method to find the answer. (DOK 2-4) 2. Recognize and describe the ethical traditions of science: value peer review; truthful reporting of methods and outcomes; making work public; and sharing a lens of professional skepticism when reviewing the work of others. 3. Use models and technology tools to show what might happen to individuals, populations, and species as environmental conditions change. (DOK 1-2)

Content Area: Science

Standard: 2. Life Science

Prepared Graduates:
Ø Explain and illustrate with examples how living systems interact with the biotic and abiotic environment

Grade Level Expectation: Sixth Grade

Concepts and skills students master:
1. Changes in environmental conditions can affect the survival of individual organisms, populations, and entire species

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Interpret and analyze data about changes in environmental conditions – such as climate change – and populations that support a claim describing why a specific population might be increasing or decreasing b. Develop, communicate, and justify an evidence-based explanation about how ecosystems interact with and impact the global environment (DOK 1-3)	Inquiry Questions: 1. How do ecosystem changes affect biodiversity? 2. How does biodiversity contribute to an ecosystem's equilibrium?
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c. Model equilibrium in an ecosystem, including basic inputs and outputs, to predict how a change to that ecosystem such as climate change might impact the organisms, populations, and species within it such as the removal of a top predator or introduction of a new species d. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate how environmental conditions affect the survival of individual organisms (DOK 1-2)	**Nature of Science:** 1. Ask testable questions and make a falsifiable hypothesis about how environmental conditions affect organisms, populations, or entire species and design a method to find the answer. (DOK 2-4) 2. Recognize and describe the ethical traditions of science: value peer review; truthful reporting of methods and outcomes; making work public; and sharing a lens of professional skepticism when reviewing the work of others. 3. Use models and technology tools to show what might happen to individuals, populations, and species as environmental conditions change. (DOK 1-2)

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Describe how humans are dependent on the diversity of resources provided by Earth and Sun

Grade Level Expectation: Sixth Grade

Concepts and skills students master:
2. Water on Earth is distributed and circulated through oceans, glaciers, rivers, ground water, and the atmosphere

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Gather and analyze data from a variety of print resources and investigations to account for local and world-wide water circulation and distribution patterns (DOK 1-3) b. Use evidence to model how water is transferred	**Inquiry Questions:** 1. How is water cycled on Earth? 2. How does the lack or abundance of water impact human civilizations and populations? 3. How do your daily decisions impact the quality of water in the water cycle?

throughout the earth (DOK 1-3) c. Identify problems, and propose solutions related to water quality, circulation, and distribution – both locally and worldwide (DOK 1-4) d. Identify the various causes and effects of water pollution in local and world water distributions (DOK 1-2) e. Describe where water goes after it is used in houses or buildings (DOK 1-2)	**Relevance and Application:** 1. Home water quality and consumption affects for health and conservation policies. 2. Water systems affect local, regional, and world population development. 3. Water-use irrigation patterns in Colorado affect economic development in the state.
	Nature of Science: 1. Ask testable questions and make falsifiable hypotheses research about water distribution. (DOK 2) 2. Create and evaluate models; identifying the strengths and weaknesses of the model in representing water circulation and distribution. (DOK 2-3)

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Describe how humans are dependent on the diversity of resources provided by Earth and Sun

Grade Level Expectation: Sixth Grade

Concepts and skills students master:

> 3. Earth's natural resources provide the foundation for human society's physical needs. Many natural resources are nonrenewable on human timescales, while others can be renewed or recycled

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a.　Research and evaluate data and information to learn about the types and availability of various natural resources, and use this knowledge to make evidence-based decisions (DOK 2-3) b.　Identify and evaluate	**Inquiry Questions:** 1.　What resources are found and used in our community? 2.　How can natural resources be identified and classified? 3.　How can we make responsible choices about the resources we use on a daily basis?

types and availability of renewable and nonrenewable resources (DOK 1-2)

c.   Use direct and indirect evidence to determine the types of resources and their applications used in communities (DOK 1-2)

d.   Research and critically evaluate data and information about the advantages and disadvantages of using fossil fuels and alternative energy sources (DOK 2-3)

Relevance and Application:
1.   Natural resources come from a variety of locations and have to be mined or harvested, depending on the type.
2.   A resource can be used in a variety of ways, depending on the product being made. For example plastics, textiles, medications, and fertilizers are produced from petroleum.
3.   Resources in Colorado directly affect the state economy and society by providing employment and sources of revenue.

Nature of Science:
1.   Recognize and describe the ethical traditions of science: value peer review; truthful reporting of methods and outcomes; making work public; and sharing a lens of professional skepticism when reviewing the work of others.

Science
Grade Level Expectations at a Glance

Standard	Grade Level Expectation
Seventh Grade	
1. Physical Science	1. Mixtures of substances can be separated based on their properties such as solubility, boiling points, magnetic properties, and densities
2. Life Science	1. Individual organisms with certain traits are more likely than others to survive and have offspring in a specific environment
	2. The human body is composed of atoms, molecules, cells, tissues, organs, and organ systems that have specific functions and interactions
	3. Cells are the smallest unit of life that can function independently and perform all the necessary functions of life
	4. Photosynthesis and cellular respiration are important processes by which energy is acquired and utilized by organisms
	5. Multiple lines of evidence show the evolution of organisms over geologic time
3. Earth Systems Science	1. Major geologic events such as earthquakes, volcanic eruptions, mid-ocean ridges, and mountain formation are associated with plate boundaries and attributed to plate motions
	2. Geologic time, history, and changing life forms are indicated by fossils and successive sedimentation, folding, faulting, and uplifting of layers of sedimentary rock

Content Area: Science

Standard: 1. Physical Science

Prepared Graduates:
Ø Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions

Grade Level Expectation: Seventh Grade

Concepts and skills students master:
1. Mixtures of substances can be separated based on their properties such as solubility, boiling points, magnetic properties, and densities

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Identify properties of substances in a mixture that could be used to separate those substances from each other (DOK 1) b. Develop and design a scientific investigation to separate the components of a mixture (DOK 2-4)	**Inquiry Questions:** 1. What techniques can be used to separate mixtures of substances based their properties? 2. Which properties are the most useful in trying to separate mixtures of substances? 3. How much difference must there be among the properties of substances for the properties to be useful in separating the substances?

Relevance and Application:
1.   Materials are sorted based on their properties in a variety of applications. For example, water filtration systems rely on the solubility, density, and physical sizes of substances and recycling facilities use the properties of materials to separate substances in single-stream recycling systems.
2.   Mining and oil refining processes use properties to separate materials.
3.   The kidneys use properties to filter wastes from the blood.

Nature of Science:
1.   Ask testable questions and make a falsifiable hypothesis about using properties in perform separations, and design a method to find an answer. (DOK 2-4)
2.   Evaluate and critique experimental procedures designed to separate mixtures. (DOK 2-3)
3.   Share experimental data, and respectfully discuss inconsistent results. (DOK 2-3)
4.   Describe several ways in which scientists would study mixtures, and suggest ways that this has contributed to our understanding of materials. (DOK 1-2)

Science
Grade Level Expectations at a Glance

Standard	Grade Level Expectation
Eighth Grade	
1. Physical Science	1. 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 2. There are different forms of energy, and those forms of energy can be changed from one form to another – but total energy is conserved 3. Distinguish between physical and chemical changes, noting that mass is conserved during any change 4. Recognize that waves such as electromagnetic, sound, seismic, and water have common characteristics and unique properties
2. Life Science	1. Human activities can deliberately or inadvertently alter ecosystems and their resiliency 2. Organisms reproduce and transmit genetic information (genes) to offspring, which influences individuals' traits in the next generation
3. Earth Systems Science	1. 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 2. 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

3. The solar system is comprised of various objects that orbit the Sun and are classified based on their characteristics

4. The relative positions and motions of Earth, Moon, and Sun can be used to explain observable effects such as seasons, eclipses, and Moon phases

Content Area: Science

Standard: 2. Life Science

Prepared Graduates:
Ø Explain and illustrate with examples how living systems interact with the biotic and abiotic environment

Grade Level Expectation: Eighth Grade

Concepts and skills students master:

1. Human activities can deliberately or inadvertently alter ecosystems and their resiliency

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Develop, communicate, and justify an evidence-based scientific example of how humans can alter ecosystems (DOK 1-3) b. Analyze and interpret data about human impact on local ecosystems (DOK 1-3) c. Recognize and infer bias in print and digital resources while researching an environmental issue (DOK 1-3) d. Use technology resources such as online encyclopedias, online databases, and credible websites to locate, organize, analyze, evaluate, and synthesize information about	**Inquiry Questions:** 1. Do humans have a unique responsibility to the ecosystems in which they live? 2. How can a young person be a steward of an ecosystem? **Relevance and Application:** 1. Human activities such as cutting down forests and polluting water or covering deserts with fields of solar panels are constantly changing various cycles and habitats in the natural world. 2. There are laws that preserve and protect wilderness areas such as national parks and other natural areas but such laws also limit the utilization of the natural resources in those areas.

human impact on local ecosystems (DOK 1-2) e. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate an environmental issue (DOK 1-2)	**Nature of Science:** 1. Critically evaluate scientific claims in popular media and peer generated explanations regarding interactions in ecosystems, and determine if the evidence presented is appropriate and sufficient to support the claims.

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system

Grade Level Expectation: Eighth Grade

Concepts and skills students master:
1. 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

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can:	Inquiry Questions:
a. Differentiate between basic and severe weather conditions, and develop an appropriate action plan for personal safety and the safety of others (DOK 1-3)	1. Why does weather vary from day to day?
	2. What are the strengths and limitations of different types of weather models?
b. Observe and gather data for various weather conditions and compare to historical data for that date	3. What are the variables that make predicting weather challenging?
	4. How do weather patterns relate to climate?

and location (DOK 1-2)	**Relevance and Application:**
c. Use models to develop and communicate a weather prediction (DOK 1-2)	1. Weather stations, buoys, satellites, radar, and computer modeling are examples of technology used to help forecast weather.
	2. Weather prediction is based on the interaction of many variables.
	3. Weather prediction can save lives, protect property, and conserve resources.
	Nature of Science:
	1. Evaluate of the accuracy of various tools used in forecasting weather. (DOK 2-3)
	2. Use the historical context and impact of early weather research and consider the potential implications for current weather studies on science and our society. (DOK 1-3)

Content Area: Science

Standard: 3. Earth Systems Science

Prepared Graduates:
Ø Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system

Grade Level Expectation: Eighth Grade

Concepts and skills students master:
2. 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

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can:	Inquiry Questions:
a. Develop, communicate and justify an evidence-based scientific explanation to account for Earth's different climates (DOK 1-3)	1. How does the climate in one area compare and contrast with another area?
	2. Why are there different climates on Earth?
	3. How has Earth's climate changed over time?
b. Research and evaluate direct and indirect evidence to explain how climates vary from one location to another on Earth (DOK 2-3)	4. What evidence supports and/or contradicts human influence on climate change?
	5. What is the difference between weather and climate?
c. Examine, evaluate,	

and question information from a variety of sources and media to investigate how climates vary from one location to another on Earth (DOK 2-3)	**Relevance and Application:** 1. Data tables, charts, and graphs allow people to compare and contrast various climates around the globe. 2. Computer models help people understand past, present, and future climates.
	Nature of Science: 1. Ask testable questions and make a falsifiable hypothesis about earth's climate and use an inquiry based approach to find an answer. (DOK 1-4) 2. Describe various techniques that scientists use to study climate, and suggest ways that each technique can be used to better understand various climates and changes in climate. (DOK 1-2)