Grade 8 Alaska Science Assessment Achievement Level Descriptors (ALDs)

The achievement level descriptors describe what a typical student scoring at each achievement level can do. A student who scores at a level would be expected to also be able to demonstrate the skills described in previous levels. A student would not necessarily demonstrate all the skills listed at a particular achievement level on a particular test in order to score at that level.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	**Approaching Proficient** **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	**Proficient** **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	**Advanced** **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Life Science: *Students use science and engineering practices, crosscutting concepts, and an understanding of life science disciplinary core ideas to make sense of phenomena and solve problems.*	**A student at this level:** can make observations to use as evidence that an object is a living or nonliving thing.	**A student at this level:** can conduct an investigation to determine whether the existence of cells can be a distinguishing characteristic of living things.	**A student at this level:** can conduct an investigation to provide evidence that tissues and organs are made of cells with specialized functions.	**A student at this level:** can use arguments based on scientific reasoning and evidence from multiple sources to support the idea that a body is a system of interacting subsystems composed of specialized cells.
	can identify evidence supporting the claim that some animal behaviors can affect the survival of another species.	can use patterns to predict how a certain animal characteristic will likely affect the reproductive success of multiple other species.	can develop a model showing how characteristic behaviors, structures of organisms, human influence, and genetic and/or environmental factors can affect organisms' growth and reproductive success.	can analyze the validity and reliability of given evidence to solve problems related to biological, genetic, and environmental factors affecting organisms.
	can ask questions that could guide an investigation into the differences between how plants and animals obtain food.	can use a scientific model to describe how food molecules are rearranged through chemical reactions to form new molecules and can show the cycling of matter and the flow of energy in an organism.	can construct a scientific explanation based on evidence for the role of photosynthesis and chemical reactions with food molecules in the cycling of matter and flow of energy into and out of ecosystems.	can develop a model to track the cycling of matter and flow of energy into, out of, and within the systems of a plant.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	Approaching Proficient **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	Proficient **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	Advanced **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Life Science: (cont)	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of life science disciplinary core ideas to make sense of phenomena and solve problems.	can understand the process of sense receptors responding to stimuli.	can construct an explanation, based on cause-and-effect evidence, of sensory receptors sending signals to the brain as a result of stimuli.	can develop and use a model to show sensory receptors responding to stimuli by sending messages to the brain for immediate behavior or storage as memories.	can synthesize information that provides evidence of causal relationships between information received by sensory receptors and behavior, at various timescales.
	can describe how a change in resource availability can result in changes in a population of organisms.	can analyze and interpret patterns and make connections between resource availability and organism abundance.	can make sense of phenomena related to resource availability and patterns of interactions among organisms, organism abundance, and nonliving parts of an ecosystem.	can use reasoning and evidence of interactions within an ecosystem to predict future interactions based on patterns.
	can make observations of biodiversity and ecosystem services.	can identify patterns of biodiversity and ecosystem services.	can explain relationships within ecosystems for maintaining biodiversity and ecosystem services.	can evaluate competing design solutions for maintaining biodiversity and ecosystem services.
	can identify examples of producers, consumers, and/or decomposers within an ecosystem and what effects they have in that system.	can complete a model of how matter and energy are transferred between producers, consumers, and decomposers within an ecosystem.	can construct an evidence-based argument describing the conservation of matter within and flow of energy into and out of an ecosystem.	can develop and use a model to explain the transfer of matter (atoms) and energy between living and nonliving parts of an ecosystem at various levels within the system.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	Approaching Proficient **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	Proficient **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	Advanced **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Life Science: (cont)	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of life science disciplinary core ideas to make sense of phenomena and solve problems.	can recognize that structural changes to genes (i.e., mutations) may result in observable changes in organisms.	can use a model (e.g., Punnett square) to show that more genetic variation occurs in organisms that reproduce sexually compared to organisms that reproduce asexually.	can use evidence related to a phenomenon to predict the differences in genetic variation (including the effects of mutation) resulting from sexual and asexual reproduction.	can use a model of a protein to explain how changes to protein structure (as a result of a mutation or mutations) can lead to changes in its function that may cause beneficial, neutral, or harmful changes in the structures or functions of organisms.
	can identify a similar anatomical feature shared by organisms that suggests they are likely to be more closely related than other organisms that do not share the similar anatomical feature.	can construct an argument based on evidence that some organisms share a pattern of anatomical features that make them more likely to be related through evolution.	can apply scientific ideas and evidence to construct an explanation for the anatomical similarities and differences between modern and/or fossilized organisms that describes evolution over time.	can connect multiple sources of evidence comparing organisms, both modern and fossilized, to support an argument for evolution.
	can recognize that some organisms have traits that will make them better able to survive and reproduce in a specific environment.	can use evidence to show that some traits have advantages that make it more probable that an organism will be able to survive and reproduce in a specific environment.	can evaluate different evidence-based explanations about genetic variation and natural selection within a population of organisms to determine the probability of survival and reproduction in a specific environment.	can analyze data to trace patterns of particular traits in a population over time and make claims about how changes were likely the result of particular historical phenomena that changed their environment.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	Approaching Proficient **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	Proficient **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	Advanced **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Physical Science:	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of physical science disciplinary core ideas to make sense of phenomena and solve problems.	can use simple models of different atoms and molecules as support for why different substances have different properties.	can plan experiments to identify different substances based on their characteristic physical properties (e.g., density, melting point) and recognize that the total number of atoms does not change.	can analyze data to identify changes in the physical and chemical properties of substances before and after an interaction to make a claim about whether a chemical reaction occurred and to show that the total number of atoms has not changed.	can use simple models to provide evidence for an argument that a change in the properties of substances can be related to the rearrangement of atoms in a chemical reaction.
	can make sense of a phenomenon where a collision occurs by describing how a force was exerted by one object on another object.	can use evidence to model the components within a system that are involved in a collision between two objects.	can address a given problem involving a collision of two objects by applying Newton's third law to detail a process or system that helps solve the problem.	can evaluate data on two designs for solving a problem involving a collision of two objects to determine which design better meets the criteria and constraints of the situation.
	can use information from a model to recognize that an object subjected to balanced forces does not change its motion and that an object subjected to unbalanced forces does change its motion.	can use mathematical thinking to explain how changes in an object's motion can be due to the degree of balanced or unbalanced forces acting on the object as well as the mass of the object.	can conduct an investigation involving the change in motion of an object and gather evidence identifying various factors affecting the object's motion (emphasis on Newton's first and second laws).	can plan an investigation to provide evidence that the change in an object's motion depends on specific variables, such as the initial motion of the object, the total forces acting on the object, and the mass of the object.
	can identify the relative magnitude and direction of the forces between objects in a given system.	can identify evidence from a given phenomenon to support the idea that gravitational forces are attractive and mass dependent.	can construct an argument based on evidence that gravitational interactions are attractive and dependent on the masses of the interacting objects.	can evaluate evidence on how well it supports the idea that gravitational forces are attractive and mass dependent, identify strengths and weaknesses of the evidence, and include possible alternative interpretations of it.

	Needs Support Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.	Approaching Proficient Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.	Proficient Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.	Advanced Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.
Physical Science: (cont)	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of physical science disciplinary core ideas to make sense of phenomena and solve problems.	can recognize that energy increases if either the mass or the speed of an object increases and that energy decreases if either the mass or the speed of the object decreases.	can interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	can construct graphical displays or other models to communicate the idea that the mass and speed of an object affect its kinetic energy.	can design a solution to a problem identified by analyzing data from multiple sources that show the relationships of kinetic energy to the mass and speed of an object.
	can identify when thermal energy is added to or removed from a system.	can use a model to explain when thermal energy is added to or removed from a system.	can use a model that predicts and/or describes when thermal energy is added to or removed from a system.	can develop and use a model to show changes in the thermal energy in a system.
	can identify that the interactions of two objects at a distance can cause a transfer of energy between the objects.	can analyze and interpret data to provide evidence that as the relative position of two objects changes, the potential energy of the system changes (e.g., an object higher off the ground has more gravitational potential energy).	can develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	can plan and conduct an investigation to make sense of a given phenomenon involving two objects interacting at a distance (electric, magnetic, or gravitational interactions).
	can identify examples of mechanical waves, which need to be transmitted through a medium.	can use mathematical representations to describe a simple model for waves (repeating pattern) that includes how the amplitude of a wave is related to the energy in a wave.	can describe a simple model for waves (repeating pattern) that includes evidence for how the amplitude of a wave is related to the energy in a wave.	can develop a model to compare mechanical and electromagnetic waves and explain similarities and differences in how energy is transferred by each type of wave.

	Needs Support Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.	Approaching Proficient Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.	Proficient Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.	Advanced Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.
Physical Science: (cont)	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of physical science disciplinary core ideas to make sense of phenomena and solve problems.	can identify examples of waves interacting with materials by being reflected, absorbed, or transmitted.	can use a given model to make sense of given phenomena involving reflection, absorption, or transmission properties of different materials for light and mechanical waves.	can develop and use a model about phenomena involving light and/or mechanical waves to describe the differences between how light and mechanical waves interact with different materials.	can design a solution to a problem by using an understanding of waves and their applications in technologies for information transfer.
	can identify models of simple molecules.	can make sense of models of molecules of varying complexity.	can develop models of molecules that vary in complexity.	can develop and use a model to explain molecules of varying complexity.
	can identify the positive and negative characteristics of natural resources.	can identify the positive and negative characteristics of natural resources and synthetic materials.	can collect information that supports the idea that synthetic materials come from the use of natural resources and analyze the effects of use and development of synthetics on society.	can design a solution to a problem by using an understanding of the positive and negative effects of natural and synthetic resources.
	can recognize different factors that influence the strength of fields that exist between forces.	can make sense of data from different factors that exist between forces.	can ask questions and analyze data to provide evidence that different factors influence the strength of fields that exist between forces (electric and magnetic fields).	can plan and conduct an investigation that shows how different factors show the strengths of fields between forces.
	can recognize devices that either minimize or maximize energy transfer (thermal).	can use a given model to identify when kinetic energy changes and/or when energy is transferred to or from an object.	can plan an investigation to determine the relationships among energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of a sample.	can plan and develop a model to show relationships among energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of a sample.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	Approaching Proficient **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	Proficient **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	Advanced **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Earth and Space Science:	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of earth and space science disciplinary core ideas to make sense of phenomena and solve problems.	can use evidence to describe how Earth's rotation can cause the day/night cycle in Alaska.	can use a model of the Earth-Moon-Sun system to explain patterns in lunar phases.	can develop and use an Earth-Moon-Sun model to explain solar and lunar eclipses.	can develop and use an Earth-Moon-Sun model to explain and predict solar and lunar eclipses.
	can use a model of the Earth-Sun system to compare the seasons of the northern and southern hemispheres.	can use a model of the Earth-Sun system to explain how seasons occur.	can develop and use a model of the Earth-Sun system, including Earth's tilt, to describe the cyclic patterns of seasons (emphasis on examples of seasonal severity in Alaska).	can develop and use a model of the Earth-Sun system, including Earth's atmospheric circulation and tilt, to describe the cyclic patterns of seasons (emphasis on how community locations can affect seasonal severity in Alaska).
	can recognize that gravity causes a pattern of smaller/less massive objects orbiting around larger/more massive objects.	can make sense of a model that shows gravity as an attractive force between solar system and galaxy objects that increases as the masses of the interacting objects increase or decreases as the distance between the objects increases.	can ask scientific questions to clarify the role of gravity in the motions within galaxies and the solar system.	can use computational thinking to develop and refine a qualitative or quantitative model that describes the role of gravity in the formation of the solar system and in the motions within galaxies and the solar system.

	Needs Support **Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.**	Approaching Proficient **Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.**	Proficient **Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.**	Advanced **Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.**
Earth and Space Science: (cont)	**A student at this level:**	**A student at this level:**	**A student at this level:**	**A student at this level:**
Students use science and engineering practices, crosscutting concepts, and an understanding of earth and space science disciplinary core ideas to make sense of phenomena and solve problems.	can organize given data on solar system objects (e.g., surface features, object layers) from various Earth- and space-based instruments to allow for analysis and interpretation.	can use quantitative analyses to describe similarities and differences among solar system objects by describing features of those objects at different scales.	can use patterns in given data at varying scales to make conclusions about the identifying characteristics of different categories of solar system objects (e.g., planets, meteoroids, asteroids, comets) based on their features, compositions, and locations within the solar system.	can describe how advances in solar system science have been made possible by improved engineering (e.g., knowledge of the evolution of the solar system from lunar exploration and space probes) and new developments in engineering made possible by advances in science (e.g., space-based telescopes using different wavelengths).
	can describe how newer rock layers sit on top of older rock layers, allowing for a relative ordering in time of the formation of the layers (assuming no disturbance of the layers).	can construct an explanation of how the fossil record can provide relative dates of change over time based on the appearance or disappearance of organisms (e.g., within fossil layers).	can obtain, evaluate, and synthesize information about local geological features to use as evidence to construct an explanation about the relative order of events and relative ages of rock layers and the fossil record.	can make sense of a major event in Earth's history by constructing an argument supported by evidence from specific changes in fossils and geologic features over time (e.g., volcanic eruptions, glaciations, asteroid impacts).
	can identify examples of how humans can positively and negatively impact the environment.	can identify patterns through mapping the history of natural hazards in a region and understanding related geological forces.	can construct an explanation based on evidence for how the availability of natural resources, the occurrence of natural hazards, and changes in climate have been influenced by human activity in Alaska.	can analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

	Needs Support Student may partially meet the standards but needs support to master the knowledge and skills of current grade-level content.	Approaching Proficient Student partially meets the standards and may have gaps in knowledge and skills but is approaching mastery of some grade-level content.	Proficient Student meets the standards and demonstrates mastery of the knowledge and skills of most grade-level content.	Advanced Student meets the standards and demonstrates mastery of the knowledge and skills on a range of complex grade-level content.
Earth and Space Science: (cont) *Students use science and engineering practices, crosscutting concepts, and an understanding of earth and space science disciplinary core ideas to make sense of phenomena and solve problems.*	**A student at this level:** can describe how oceanic or atmospheric circulation determines regional climates.	**A student at this level:** can use a model to describe how the unequal heating and rotation of Earth causes patterns of either atmospheric circulation or oceanic circulation.	**A student at this level:** can develop and use a model to describe how the unequal heating and rotation of Earth causes patterns of oceanic and atmospheric circulation that determine regional climates.	**A student at this level:** can develop and use a model to describe how the same unequal heating and rotation of Earth that causes regional climates also causes global patterns in climates.