RANGE ACHIEVEMENT LEVEL DESCRIPTORS (ALDS)

Middle School ISAT Science Range ALDs

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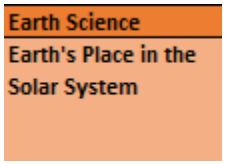
INTRODUCTION

This document breaks down the Middle School Science Idaho Content Standards that are assessed in Grade 8 on the Idaho Standards Achievement Test (ISAT) into a range of Achievement Level Descriptors (ALDs). The range ALDs are organized into a hierarchy of Sections and Categories as defined below.

Within each section, the Science and Engineering Practice (SEP) is in bold to show the major differences between each level. The Disciplinary Core Ideas (DCI) and Crosscutting Concepts (CCC) largely stay the same between level descriptors of the same category.

Section: Each section organizes the range ALDs into the major science domains identified in the Idaho Science Standards; Earth Science, Life Science, and Physical Science. The color-coded Section Title appears as a header above the range ALD tables.



Category: The categories in each table group are related to each major science domain, for example, Earth's Place in the Solar System is related to Earth Science. The descriptors next to this category describe what students should know and be able to do throughout the entire range of a achievement level.

Achievement Level Descriptor Definitions

- **Level 4 (Advanced):** The student has **exceeded** the Middle School expectations and **demonstrates advanced use** of science and engineering practices, and crosscutting concepts. The student has a **deep understanding** of the fundamental practices within the scientific disciplines that are used to explain the natural world and design solutions to address real-life situations.
- **Level 3 (Proficient):** The student has **met** the Middle School expectations and **has the ability to use** science and engineering practices, and crosscutting concepts. The student **understands** the fundamental practices within the scientific disciplines that are used to explain the natural world and design solutions to address real-life situations.

- **Level 2 (Basic):** The student has **nearly met** the Middle School expectations and **is developing the ability to use** science and engineering practices, and crosscutting concepts. The student has a **partial understanding** of the fundamental practices within the scientific disciplines that are used to explain the natural world and design solutions to address real-life situations.
- **Level 1 (Below Basic):** The student has **not met** the Middle School expectations and **has difficulty using** science and engineering practices, and crosscutting concepts. The student has an **incomplete understanding** of the fundamental practices within the scientific disciplines that are used to explain the natural world and design solutions to address real-life situations.

EARTH SCIENCE

Students that are a level ____ may be able to do things like...	1	2	3	4
Earth's Place in the Solar System	**Identify components of a model that measures and collects evidence to explain** the similarities and differences in the patterned motions of the Sun-Earth-Moon system, the role of gravity in the motion of galaxies and the solar system, or the relative occurrence of events in the Earth's and solar system's history.	**Identify data from tables and other graphical displays by developing and/or using a simple model that can be used as pieces of evidence to explain** the patterned motions of the Sun-Earth-Moon system, the role of gravity in the motion of galaxies and the solar system, or the relative occurrences of events in the Earth's and solar system's history.	**Explain** the patterned motions of the Sun-Earth-Moon system, the role of gravity in the motion of galaxies and the solar system, or the relative occurrence of events in the Earth's and solar system's history **by developing and/or using a model or by using graphical displays of data.**	**Explain** the patterned motions of the Sun-Earth-Moon system, the role of gravity in the motion of galaxies and the solar system, or the relative occurrence of events in the Earth's and solar system's history **by evaluating and/or revising a model based on constraints and data limitations.**
Earth's Systems	**Identify** the patterns in the flow or cycles of energy and matter throughout Earth's systems, including the sun and Earth's interior as primary energy sources **by making measurements and/or observations from graphical data to help identify the components of a model; and explain** that Earth's processes have changed the Earth's surface at varying spatial and time scales **by identifying evidence.**	**Explain** patterns **using a model or using an investigation or using bar graphs, pictographs, and other various graphical data** that supports how energy and matter flow or cycle throughout Earth's systems, including the sun and Earth's interior as primary energy sources; **and explain** that Earth's processes have changed the earth's surface at varying spatial and time scales **by organizing evidence.**	**Develop, use and/or revise a model** that shows patterns in the flow or cycles of energy and matter throughout Earth's systems, including the sun and Earth's interior as primary energy sources **by analyzing data from an investigation; and construct an explanation** for how Earth's processes have changed the Earth's surface at varying spatial and time scales **by interpreting evidence**.	**Generate data that supports an explanation** that shows patterns in how energy and matter flow or cycle throughout Earth's systems, including the sun and Earth's interior as primary energy sources **by evaluating and revising a model; and evaluate the impact of new data by predicting** how the Earth's processes will change the earth's surface at varying spatial and time scales if a new variable is introduced.

Students that are a level ____ may be able to do things like...	1	2	3	4
Earth and Human Activity	**Identify scientific questions using collected and/or graphically represented evidence** regarding the dependency of humans on the environment for different resources; **and identify evidence that can help design a simple solution** that minimizes the effect of humans on the environment or **identify the observed patterns** that emerge between natural hazards and their related geological forces.	**Ask questions about data or apply scientific ideas** about the uneven distribution of natural resources and human dependence on the environment for those resources to design a simple solution that minimizes the effect of humans on the environment; **and to explain** the history of natural hazards and their related geological forces.	**Ask questions and/or design a solution** that could minimize the effect of humans on the environment **by analyzing and interpreting sets of data** regarding the uneven distribution of natural resources and human dependence on the environment for those resources; **and explain the observable patterns seen in the data** from the history of natural hazards and their related geological forces.	**Evaluate and revise a question that can modify a design solution** that minimizes the effect of humans on the environment **by analyzing and interpreting sets of data** regarding the uneven distribution of natural resources and human dependence on the environment for those resources; **and explain** the effect of humans on the environment; **and predict** future patterns of natural hazards when considering the impact of humans on the environment.

LIFE SCIENCE

Students that are a level ____ may be able to do things like...	1	2	3	4
From Molecules to Organisms: Structure and Processes	**Organize information from an investigation to support an argument using evidence or identify the components of a model to explain** that all living things are made up of cells that work together to form more complex structures and systems; both plants and animals convert energy into food sources but the process to do so is different; characteristic animal behaviors and specialized plant structures affect the probability of reproduction.	**Support an argument using evidence by gathering and organizing information from an investigation or explain by using a model** that all living things are made up of cells that work together to form more complex structures and systems; both plants and animals convert energy into food sources but the process to do so is different; characteristic animal behaviors and specialized plant structures affect the probability of reproduction.	**Engage in an argument using evidence by gathering and synthesizing data from an investigation or explain by developing and/or using a model** that all living things are made up of cells that work together to form more complex structures and systems; both plants and animals convert energy into food sources but the process to do so is different; characteristic animal behaviors and specialized plant structures affect the probability of reproduction.	**Evaluate and revise a model or explanation using investigative data as evidence to support an argument** that all living things are made up of cells that work together to form more complex structures and systems; both plants and animals convert energy into food sources but the process to do so is different; characteristic animal behaviors and specialized plant structures affect the probability of reproduction.

Students that are a level ____ may be able to do things like...	1	2	3	4
Ecosystems: Interactions, Energy, and Dynamics	**Explain** the dynamic relationships and interactions between the diverse types of living and nonliving parts of an ecosystem including the flow of energy and the cycling of matter among organisms and abiotic components of an ecosystems **by identifying components of a model; and support a solution** to mitigate disruptions to any part of an ecosystem by human access to natural resources **by organizing multiple graphical displays of data.**	**Explain** the dynamic relationships and interactions between the diverse types of living and nonliving parts of an ecosystem including the flow of energy and the cycling of matter among organisms and abiotic components of an ecosystems **by using a model; and support a solution** to mitigate disruptions to any part of an ecosystem by human access to natural resources **by organizing and identifying patterns from multiple graphical displays of data.**	**Explain and predict** the dynamic relationships and interactions between the diverse types of living and nonliving parts of an ecosystem including the flow of energy and the cycling of matter among organisms and abiotic components of an ecosystems **by developing and/or using a model; and design and support a solution** to mitigate disruptions to any part of an ecosystem by human access to natural resources **by analyzing and interpreting multiple graphical displays of data.**	**Explain and support** that the dynamic relationships and interactions between the diverse types of living and nonliving parts of an ecosystem, including the flow of energy and the cycling of matter among producers, consumers, and decomposers when a variable in the system is changed **by analyzing and/or revising a model; and design a solution** to mitigate disruptions to any part of an ecosystem by human access to natural resources **by evaluating limitations of data when analyzing and interpreting multiple graphical displays of data.**

Students that are a level ____ may be able to do things like...	1	2	3	4
Heredity: Inheritance and Variation of Traits	**Describe the relationship among variables by identifying the components of a model** that shows why sexual/asexual reproduction may have different results of genetic variation in offspring, and that complex and microscopic structural changes to genes (mutations) can be analyzed to determine how they affect the structure and function of an organism.	**Describe the relationship among variables by using a model** that shows why sexual/asexual reproduction may have different results of genetic variation in offspring, and that complex and microscopic structural changes to genes (mutations) can be analyzed to determine how they affect the structure and function of an organism.	**Describe the relationship among variables by developing and/or using a model** that shows why sexual/asexual reproduction may have different results of genetic variation in offspring, and that complex and microscopic structural changes to genes (mutations) can be analyzed to determine how they affect the structure and function of an organism.	**Describe the relationship among variables by evaluating and revising a model** that shows sexual/asexual reproduction may have different results of genetic variation in offspring or predicts what changes would occur in the function of an organisms if there is a mutation in the organism's genes.
Biological Evolution: Unity and Diversity	**Explain** why species can change over time and communicate the similarities or differences found in past and present organisms or fossil records of past environmental conditions **by identifying the patterns in large data sets; and construct an explanation using data** about how humans influence the biodiversity of an area, and natural or artificial selection can give some organisms an advantage in survival and reproduction.	**Explain** why species can change over time and communicate the similarities or differences found in past and present organisms or fossil records of past environmental conditions **by organizing and identifying the patterns in large data sets; and construct an explanation by gathering and using data** about how humans influence the biodiversity of an area, and natural or artificial selection can give some organisms an advantage in survival and reproduction.	**Explain** why species can change over time and communicate the similarities or differences found in past and present organisms or fossil records of past environmental conditions **by analyzing and interpreting the patterns in large data sets; and construct an explanation by gathering and synthesizing data** about how humans influence the biodiversity of an area, and natural or artificial selection can give some organisms an advantage in survival and reproduction.	**Analyze and evaluate an explanation using large data sets** that show the similarities or differences found in past and present organisms or fossil records of past environmental conditions; **and form an explanation by applying concepts of statistics and probability (variability) and synthesizing the data** that as humans influence the biodiversity of an area, natural or artificial selection can give some organisms an advantage in survival and reproduction.

PHYSICAL SCIENCE

Students that are a level ____ may be able to do things like...	1	2	3	4
Matter and Its Interactions	**Explain** the conservation of mass when two substances react **by identifying the components a model; and construct an explanation by interpreting data and using evidence** that supports that the properties of matter are a function of the composition of atoms and molecules that make up matter, as well as the thermal energy.	**Explain** the conservation of mass when two substances react **by using a model**; **and construct an explanation by gathering and interpreting data and using evidence** that supports that the properties of matter are a function of the composition of atoms and molecules that make up matter, as well as the thermal energy.	**Explain** the conservation of mass when two substances react **by developing and/or using a model; and construct an explanation by analyzing data and using evidence** that supports that the properties of matter are a function of the composition of atoms and molecules that make up matter, as well as the thermal energy.	**Explain** the conservation of mass when two substances react **by evaluating and revising a model; and predict** how changes to the molecular structure or thermal energy of matter can affect its properties by using data and evidence.
Motion and Stability: Forces and Interactions	**Identify questions, conduct an investigation, and identify data**, regarding the relationship between mass, force, and motion, and the attractive and repulsive forces that act at a distance (electric, magnetic, and gravitational forces.)	**Identify questions, conduct an investigation, and organize and use data to make a claim** regarding the relationship between mass, force, and motion, and the attractive and repulsive forces that act at a distance (electric, magnetic, and gravitational forces.)	**Ask questions, plan and conduct an investigation, and analyze and interpret data to make and support a claim** regarding the relationship between mass, force, and motion, and the attractive and repulsive forces that act at a distance (electric, magnetic, and gravitational forces.)	**Ask questions, conduct, evaluate, and revise an investigation, and analyze and evaluate data to make and support a claim** regarding the relationship between mass, force, and motion, and the attractive and repulsive forces that act at a distance (electric, magnetic, and gravitational forces.)

Students that are a level ____ may be able to do things like...	1	2	3	4
Energy	**Identify components of a model** that investigates how kinetic and potential energy interact, transform, or transfer to another object; **and collect and record data for an investigation** that provides data regarding the temperature and total energy of a system and its dependency on a variety of factors, including the types and states of matter, as well as the amount of matter involved.	**Describe** kinetic and potential energy interact, transform, or transfer to another object **by using a given model; and collect and record data** regarding the temperature and total energy of a system and its dependence on a variety of factors, including the types and states of matter, as well as the amount of matter involved.	**Describe** how kinetic and potential energy interact, transform, or transfer to another object **by developing and using a model or investigation; and provide evidence by analyzing data from an investigation** that the temperature and total energy of a system is dependent on a variety of factors, including the types and states of matter, as well as the amount of matter involved.	**Predict changes** to the interaction of kinetic and potential energy, including how energy is transformed, or transferred to another object **by evaluating and/or revising a model; and provide evidence** that the temperature and total energy of a system is dependent on a variety of factors, including the types and states of matter, as well as the amount of matter involved **by applying concepts of statistics and probability.**
Waves and their Applications in Technologies for Information Transfer	**Describe** the patterns observed between wave characteristics and wave energy **by identifying the mathematical components in a model; and show** that waves are reflected, absorbed, or transmitted through various materials **by selecting a claim with evidence.**	**Describe** the patterns observed between wave characteristics and wave energy **by using given mathematical representations in a model; and show** that waves are reflected, absorbed, or transmitted through various materials **by supporting a claim with evidence.**	**Describe** the patterns observed between wave characteristics and wave energy **by developing and using mathematical representations in a model; and show** that waves are reflected, absorbed, or transmitted through various materials **by constructing a claim supported by evidence.**	**Predict** patterns between wave characteristics and wave energy **by evaluating and revising a mathematical model; and provide evidence to support a claim** that waves are reflected, absorbed, or transmitted through various materials **by integrating qualitative, quantitative, and technical data.**