

Proficiency Level Descriptors – Science 5

Policy

Students who are designated Below Proficient (Level 1) will be able to perform up to the level described by the Proficiency Level Descriptor (PLD). Level 1 is the lowest reported proficiency designation; some student may perform below the provided description.

- Below Proficient – The Level 1 Student is below proficient in applying the science knowledge/skills as specified in the Utah Core State Standards. The Student generally performs significantly below the standard for his or her grade level, is likely able to partially access grade-level content and engage with higher-order thinking skills with extensive support.
- Approaching Proficient – The Level 2 Student is approaching proficient in applying the science knowledge/skills as specified in the Utah Core State Standards. The Student generally performs slightly below the standard for his or her grade level, is likely able to access grade-level content and engage in higher-order thinking skills with some independence and support.
- Proficient - The Level 3 Student is proficient in applying the science knowledge/skills as specified in the Utah Core State Standards. The Student generally performs at the standard for his or her grade level, is able to access grade level content, and engage in higher order thinking skills with some independence and minimal support.
- Highly Proficient - The Level 4 Student is highly proficient in applying the science knowledge/skills as specified in the Utah Core State Standards. The Student generally performs significantly above the standard for his or her grade level, is able to access above grade level content, and engage in higher order thinking skills independently.

Chemical and Physical Changes

Objective I.1 Describe that matter is neither created or destroyed even though it may undergo change.

- Below Proficient – The Level 1 Student - Explains that matter cannot be created or destroyed but that it can be changed. Performs simple experiments that demonstrate a change in matter.
- Approaching Proficient – The Level 2 Student - Compares the total weight of an object to the weight of its individual parts after being

disassembled. Performs an experiment to compare the weight of a quantity of matter before and after melting or freezing. Performs an experiment involving chemical changes in which the total weight of the materials before and after reaction is the same.

- Proficient – The Level 3 Student - Investigates the combined weights of a liquid and a solid after the solid has been dissolved and then recovered from the liquid. Compares weights of a substance before and after a chemical change occurs.
- Highly Proficient – The Level 4 Student - Forms hypotheses about changes in the weights of substances following physical or chemical changes. Designs and conducts experiments to test hypotheses about chemical and physical properties. Uses observations to make and justify predictions about the weight of substances in an investigation.

Objective I.2 – Evaluate evidence that indicates a physical change has occurred.

- Below Proficient – The Level 1 Student – States that the three states of matter are solid, liquid, and gas. Provides an example of each state of matter.
- Approaching Proficient – The Level 2 Student – Lists the physical properties of each state of matter. Draws a simple diagram showing the dispersion of molecules in each state of matter.
- Proficient – The Level 3 Student – Compares changes in substances that indicate a physical change has occurred. Describes the appearance of a substance before and after a physical change.
- Highly Proficient – The Level 4 Student – Creates models and graphs to illustrate and explain how a physical change has occurred.

Objective I.3 – Investigate evidence for changes in matter that occur during a chemical reaction.

- Below Proficient – The Level 1 Students - Identify examples of chemical changes in daily life.
- Approaching Proficient – The Level 2 Student - Identifies the observable evidence of a chemical reaction (temperature change, light production, give off gas, or change colors).
- Proficient – The Level 3 Student - Explains why the measured weight of the remaining products is less than the original reactants when a gas is produced in a chemical change. Compares physical changes to chemical changes. Hypothesizes how changing one of the materials in a chemical reaction will change the results.

- Highly Proficient – The Level 4 Student - Designs and conducts experiments to test hypotheses about chemical changes. Uses observations to make and justify explanations concerning chemical changes. Creates models and graphs to illustrate and explain how a chemical change has occurred.

Processes that Reshape Earth's Surface

Objective II.1 – Describe how weathering and erosion change Earth's surface.

- Below Proficient – The Level 1 Student – Given a picture and list of options, identifies which geologic changes occur quickly and which occur slowly. Recognizes geological features that are changed by weathering and erosion.
- Approaching Proficient – The Level 2 Student – Describes how earthquakes, landslides, and volcanoes change Earth's surface quickly. Identifies objects, processes, and forces that weather and erode Earth's surface. Explains how canyons may be formed by streams, rivers, or glaciers.
- Proficient – The Level 3 Student – Explains how weathering and erosion create a variety of geological features on Earth's surface, such as valleys, canyons, buttes, and arches. Using supporting evidence, describes which objects, processes, and forces formed specific geological features.
- Highly Proficient – The Level 4 Student – Analyzes the relationship between time and geological features. Predicts the future appearance of landscapes based on patterns of weathering and erosion evident in the area.

Objective II.2 – Explain how volcanoes, earthquakes, and uplift affect Earth's surface.

- Below Proficient – The Level 1 Student – Given a list of options, identifies which geologic features are created by volcanoes, earthquakes, and uplift.
- Approaching Proficient – The Level 2 Student – Classifies geologic features created by volcanoes (i.e. islands, craters, and domes); earthquakes (i.e. faults and valleys); and uplift (i.e. mountains and canyons). Identifies technology that can predict volcanoes and earthquakes.

- Proficient – The Level 3 Student – Explains and describes how volcanoes, earthquakes, and uplift change landforms. Explains how scientists use technology to predict earthquakes and volcanic activity.
- Highly Proficient – The Level 4 Student – Predicts the future appearance of landscapes based on evidence from earthquake faults and volcanic activity. Evaluates the accuracy of predictions concerning earthquakes and volcanic activity based on data collected using technology. Uses physical evidence to explain why particular geologic features were formed in a certain way.

Objective II.3 – Relate the building up and breaking down of Earth’s surface over time to the various physical land features.

- Below Proficient – The Level 1 Student – Predicts the future appearance of landscapes based on evidence from earthquake faults and volcanic activity. Evaluates the accuracy of predictions concerning earthquakes and volcanic activity based on data collected using technology. Uses physical evidence to explain why particular geologic features were formed in a certain way.
- Approaching Proficient – The Level 2 Student – Uses a provided time line with visual representations to sort the sequence and time required for building and breaking down of geologic features. Identifies that deposition fills bodies of water with sediment.
- Proficient – The Level 3 Student – Explains how layers of exposed rock are the result of natural processes acting over long periods of time. Describes the role of deposition in changing Earth's surface. Predicts how the Earth's surface would appear if there were no mountain uplift, weathering, or erosion.
- Highly Proficient – The Level 4 Student – Analyzes layers of exposed rock to predict the relative ages of different layers. Independently creates a time line depicting the formation of a specified geologic features. Describes positive and negative effects to Earth's surface of deposition.

Magnetism

Objective III.1 – Investigate and compare the behavior of magnetism using magnets.

- Below Proficient – The Level 1 Student – Identifies the differences and similarities of permanent magnets, temporary magnets, and electromagnets.

- Approaching Proficient – The Level 2 Student – Defines "attract" and "repel." Investigates magnets' abilities to push or pull iron objects they are not touching. Creates diagrams of magnets showing attraction and repulsion. Labels poles appropriately.
- Proficient – The Level 3 Student – Compares and contrasts permanent, temporary, and electromagnets. Investigates how magnets will both attract and repel other magnets. Compares permanent magnets and electromagnets.
- Highly Proficient – The Level 4 Student – Describes historic and modern real world uses of magnets. Distinguishes uses of magnets that are supported by sound scientific principles.

Objective III.2 – Describe how the magnetic field of Earth and a magnet are similar.

- Below Proficient – The Level 1 Student – Creates a simple diagram of the Earth and its magnetic field. Explains key features of his or her diagram. Explains why a compass needle points north.
- Approaching Proficient – The Level 2 Student – Experiments with, diagrams, and labels the magnetic field of various types of magnets. Builds a simple compass. Investigates the effects of magnets on the needle of a compass.
- Proficient – The Level 3 Student – Compares and contrasts the magnetic fields of various types of magnets. Compares Earth's magnetic field to the magnetic field of various types of magnet. Explains how a compass works. Explains the effects of magnets on the needle of a compass and compares this to the effects of Earth's magnetic field on the needle of a compass.
- Highly Proficient – The Level 4 Student – Investigates how the strength of a magnet varies with distance from the magnet. Explains why some materials are suitable for use as a compass needle.

Electricity

Objective IV.1 – Describe the behavior of static electricity as observed in nature and everyday occurrences.

- Below Proficient – The Level 1 Student – Defines static electricity as stationary electricity. Describes evidence of static electricity in everyday life.
- Approaching Proficient – The Level 2 Student – Lists several examples of static electricity found in everyday life. Identifies lightning as an

example of static electricity found in nature. Describes various ways that static electricity can be produced.

- Proficient – The Level 3 Student – Describes the behavior of charged objects to attract or repel without touching. Investigates how various materials react differently to statically charged objects.
- Highly Proficient – The Level 4 Student – Designs and conducts experiments to test hypotheses about statically charged objects. Uses observations to make and justify explanations concerning behavior of statically charged objects. Creates models and graphs to illustrate and explain behavior of statically charged objects.

Objective IV.2 – Analyze the behavior of current electricity.

- Below Proficient – The Level 1 Student – Identifies a complete circuit. Recognizes that some materials conduct electricity and some do not.
- Approaching Proficient – The Level 2 Student – Diagrams and labels a complete electrical circuit. Identifies materials that conduct electricity and materials that do not conduct electricity.
- Proficient – The Level 3 Student – Uses provided supplies to create a complete electrical circuit including a switch and a load. Predicts the effect of changing one or more component in an electric circuit. Investigates properties of materials that conduct the flow of electricity and materials that insulate the flow of electricity.
- Highly Proficient – The Level 4 Student – Troubleshoots problems with an electrical circuit and determines a solution to make it a working circuit. Predicts the effect of changing one or more of the components in an electric circuit, and explains reasons for these changes.

Inherited Traits

Objective V.1 – Using supporting evidence, show that traits are transferred from a parent organism to its offspring.

- Below Proficient – The Level 1 Student – Sorts like organisms by their physical traits. Identifies similar traits of parent and offspring. Recognizes that some organisms do not initially resemble their parents.
- Approaching Proficient – The Level 2 Student – Retrieves data on a chart showing traits among a given population. Identifies similar traits of parent and offspring. Identifies examples of offspring that don't initially resemble their parents. Recognizes that some traits are inherited and some behaviors are learned or induced by environmental

factors. Recognizes that seeds grown from the same parent plant may produce plants that do not appear identical.

- Proficient – The Level 3 Student – Collects data and charts traits of given populations. Identifies similar traits of parent and offspring. Compares various examples of offspring that don't resemble parents but grow to resemble parents. Contrasts inherited traits with traits that are learned or induced by environmental factors. Investigates variations and similarities in plants grown from seeds of parent plants.
- Highly Proficient – The Level 4 Student – Identifies the potential implications of traits of given populations. Describes the life cycles of organisms whose offspring don't initially resemble parents but grow to resemble parents. Designs and conducts experiments to test hypotheses about specific traits. Uses observations to make and justify explanations concerning whether or not a trait is determined by heredity, learned, or induced by environmental factors.

Objective V.2 – Describe how some characteristics could give a species a survival advantage in a particular environment.

- Below Proficient – The Level 1 Student – Identifies traits that allow an organism to survive in its habitat. Identifies environmental differences that may affect organisms' survival. Identifies traits of a specific organism.
- Approaching Proficient – The Level 2 Student – Identifies traits of similar species for physical abilities and specialized body structures that increase the survival of one species in a specific environment over another species. Describes how a particular physical attribute may provide an advantage for survival in one environment but not in another. Discusses survival traits of a specific plant or animal.
- Proficient – The Level 3 Student – Compares the traits of similar species for instinctual behaviors that increase the survival of one species in a specific environment over another species. Explains how some environments give one species a survival advantage over another.
- Highly Proficient – The Level 4 Student – Synthesizes understanding of physical abilities, instinctual behaviors and specialized body structures to create a theoretical organism well adapted to a given environment. Analyzes the physical attributes of an organism to determine the environment for which it is best suited.