NEW MEXICO ASSESSMENT OF SCIENCE READINESS

**NM-ASR Proficiency Level Descriptors**

**Grade 5**

**Policy PLDs**

*Policy PLDs define the knowledge and skill level expectations for all grades and content areas for the NM-MSSA and NM-ASR.*

## Level 4. Advanced

Students demonstrate evidence of **thorough** understanding and use of college and career readiness knowledge, skills, and abilities.

## Level 3. Proficient

Students demonstrate evidence of **satisfactory** understanding and use of college and career readiness knowledge, skills, and abilities.

## Level 2. Nearing Proficiency

Students demonstrate evidence of **partial** understanding and use of college and career readiness knowledge, skills, and abilities.

## Level 1. Novice

Students demonstrate evidence of **emerging** understanding and use of college and career readiness knowledge, skills, and abilities.

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**Borderline PLDs**

*Range PLDs describe the knowledge and skills that students just barely within each proficiency level are expected to be able to demonstrate. In line with the nature of the science standards, the statements combine science and engineering practices, disciplinary core ideas, and crosscutting concepts that students are expected to integrate and demonstrate.*

**Advanced**

Students at the borderline of the **Advanced** level in most situations[1] can demonstrate evidence of thorough understanding and use of all three dimensions (science and engineering practices, crosscutting concepts, and disciplinary core ideas) to make sense of phenomena and/or to design solutions to problems in the physical, life, and Earth and space sciences. They also sometimes demonstrate the skills and understandings at the Proficient level rather than the skills and understandings of the Advanced level. Students performing at the borderline of the Advanced level can be expected in most situations[1] to be able to demonstrate knowledge and skills such as in the following examples, as evidence of just barely thorough understanding and use of the NM STEM Ready! Science Standards:

- Develop, use, and analyze a model to describe and explain phenomena using an understanding of matter as tiny particles, describe quantities that should be measured to explain phenomena using an understanding of conservation of matter during physical and chemical changes, describe observations and measurements that can be used to identify materials based on their properties, and plan and conduct an investigation to determine whether a new substance with different properties is formed when two substances are mixed. (PS1)
- Plan and conduct an investigation to provide multiple pieces of evidence about phenomena using an understanding of the effects of balanced and unbalanced forces on the motion of an object, predict the future motion of an object based on complex patterns in observations and measurements, ask detailed questions to describe phenomena using an understanding of cause and effect of electric and magnetic interactions between objects not in contact with each other, thoroughly define a simple design problem that can be solved using magnets, and support an argument with multiple pieces of evidence about phenomena using an understanding that the gravitational force of Earth on objects is directed down. (PS2)
- Construct an explanation supported by multiple pieces of evidence about phenomena using an understanding of the relationship between the speed and energy of an object; provide and analyze evidence that energy can be transferred from place to place; predict and explain outcomes for the changes in energy that occur when objects collide; thoroughly design, test, and refine a device that converts energy from one form to another; and use models to explain phenomena using an understanding that food energy was once energy from the Sun. (PS3)

- Develop models to explain phenomena using an understanding that waves can cause objects to move and that light allows objects to be seen; and compare and explain multiple solutions that use patterns to transfer information. (PS4)
- Develop models to explain phenomena using an understanding of the diversity and commonalities of the life cycles of organisms, construct an argument supported by multiple pieces of evidence about phenomena using an understanding that plants and animals have internal and external structures that support life functions, explain phenomena using an understanding that animals receive, process, and respond to information from their senses, and support an argument with multiple pieces of evidence about phenomena using an understanding that plants get the materials they need for growth chiefly from air and water. (LS1)
- Construct an argument supported by multiple pieces of evidence about phenomena using an understanding that some animals form groups that help members survive; and develop a model to explain phenomena using an understanding of the movement of matter among plants, animals, decomposers, and the environment. (LS2)
- Analyze and interpret data to provide multiple pieces of evidence about phenomena using an understanding that plants and animals have inherited traits and that variation of these traits exists in groups of similar organisms; and support an explanation with multiple pieces of evidence about phenomena using an understanding that traits can be influenced by the environment. (LS3)
- Analyze and interpret fossil data to provide multiple pieces of evidence of organisms and the environments in which they lived; construct an explanation supported by multiple pieces of evidence of phenomena using an understanding that variation among individuals of the same species is a survival advantage and that in a particular habitat some organisms survive well, some survive less well, and some cannot survive at all; and make a claim supported by multiple pieces of evidence about the merit of a solution to a problem caused by changes to the environment and the types of plants and animals that live there. (LS4)
- Explain phenomena using an understanding that patterns in rock formations and fossils in rock layers provide evidence to support an explanation for changes in a landscape over time, support an argument about phenomena using multiple pieces of evidence and an understanding that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth, and represent and explain data in graphical displays to reveal patterns of daily changes in shadows, day and night, and the seasonal appearance of stars. (ESS1)
- Represent data to explain typical seasonal weather conditions, combine and synthesize information to describe climates in different regions of the world, provide multiple pieces of evidence for phenomena using an understanding of the effects of weathering and the rate of erosion, analyze and interpret data from maps to explain patterns of Earth's features, develop a model to explain phenomena using an understanding of how multiple systems on Earth interact,

and describe and graph the percentages of water to provide multiple pieces of evidence about the distribution of water on Earth. (ESS2)

- Make a claim supported by multiple pieces of evidence about the merit of a design solution that reduces the impacts of a weather-related hazard, combine and synthesize information to explain that energy and fuels are derived from natural resources, how their uses affect the environment, and ways individual communities protect Earth's resources and the environment, and generate and compare multiple solutions to reduce the impacts of several natural Earth processes on humans. (ESS3)
- Define a simple design problem including detailed criteria for success and constraints; generate and compare multiple detailed solutions to a problem; and plan and carry out fair tests to identify more than one way to improve a model or prototype. (ETS1)

**Proficient**

Students at the borderline of the **Proficient** level in most situations[1] can demonstrate evidence of satisfactory understanding and use of all three dimensions (science and engineering practices, crosscutting concepts, and disciplinary core ideas) to make sense of phenomena and/or to design solutions to problems in the physical, life, and Earth and space sciences. They also sometimes demonstrate the skills and understandings at the Nearing Proficiency level rather than the skills and understandings of the Proficient level. Students performing at the borderline of the Proficient level can be expected in most situations[1] to be able to demonstrate knowledge and skills such as in the following examples, as evidence of just barely satisfactory understanding and use of the NM STEM Ready! Science Standards:

- Develop and use a model to describe phenomena using an understanding of matter as tiny particles, measure and graph quantities to describe phenomena using an understanding of conservation of matter during physical or chemical changes, make observations and measurements to identify materials based on their properties, and conduct an investigation to determine whether a new substance with different properties is formed when two substances are mixed. (PS1)
- Plan and conduct an investigation to provide one piece of evidence about phenomena using an understanding of the effects of balanced and unbalanced forces on the motion of an object, predict the future motion of an object based on patterns in observations and measurements, ask questions to describe phenomena using an understanding of cause and effect of electric or magnetic interactions between objects not in contact with each other, define a simple design problem that can be solved using magnets, and support an argument with one piece of evidence about phenomena using an understanding that the gravitational force of Earth on objects is directed down. (PS2)
- Construct an explanation supported by one piece of evidence about phenomena using an understanding of the relationship between the speed and energy of an object; provide evidence

that energy can be transferred from place to place; predict outcomes for the changes in energy that occur when objects collide; design, test, and refine a device that converts energy from one form to another; and use models to describe phenomena using an understanding that food energy was once energy from the Sun. (PS3)

- Develop models to describe phenomena using an understanding that waves can cause objects to move and that light allows objects to be seen; and compare multiple solutions that use patterns to transfer information. (PS4)
- Develop models to describe phenomena using an understanding of the diversity and commonalities of the life cycles of organisms, construct an argument supported by one piece of evidence about phenomena using an understanding that plants and animals have internal and external structures that support life functions, describe phenomena using an understanding that animals receive, process, and respond to information from their senses, and support an argument with one piece of evidence about phenomena using an understanding that plants get the materials they need for growth chiefly from air and water. (LS1)
- Construct an argument supported by one piece of evidence about phenomena using an understanding that some animals form groups that help members survive; and develop a model to describe phenomena using an understanding of the movement of matter among plants, animals, decomposers, and the environment. (LS2)
- Analyze and interpret data to provide one piece of evidence about phenomena using an understanding that plants and animals have inherited traits and that variation of these traits exists in groups of similar organisms; and support an explanation with one piece of evidence about phenomena using an understanding that traits can be influenced by the environment. (LS3)
- Analyze and interpret fossil data to provide one piece of evidence of organisms and the environments in which they lived; construct an explanation supported by one piece of evidence of phenomena using an understanding that variation among individuals of the same species is a survival advantage and that in a particular habitat some organisms survive well, some survive less well, and some cannot survive at all; and make a claim supported by one piece of evidence about the merit of a solution to a problem caused by changes to the environment and the types of plants and animals that live there. (LS4)
- Describe phenomena using an understanding that patterns in rock formations and fossils in rock layers provide evidence to support an explanation for changes in a landscape over time, support an argument about phenomena using one piece of evidence and an understanding that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth, and represent data in graphical displays to reveal patterns of daily changes in shadows, day and night, and the seasonal appearance of stars. (ESS1)
- Represent data to describe typical seasonal weather conditions, combine information to describe climates in different regions of the world, provide one piece of evidence for

phenomena using an understanding of the effects of weathering or the rate of erosion, analyze and interpret data from maps to describe patterns of Earth's features, develop a model to describe phenomena using an understanding of how Earth's systems interact, and describe and graph the percentages of water to provide one piece of evidence about the distribution of water on Earth. (ESS2)

- Make a claim supported by one piece of evidence about the merit of a design solution that reduces the impacts of a weather-related hazard, combine information to describe how energy and fuels are derived from natural resources, how their uses affect the environment, and ways individual communities protect Earth's resources and the environment, and generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. (ESS3)
- Define a simple design problem including criteria for success and constraints; generate and compare multiple solutions to a problem; and plan and carry out fair tests to identify one way to improve a model or prototype. (ETS1)

**Nearing Proficiency**

Students at the borderline of the **Nearing Proficiency** level in most situations[1] can demonstrate evidence of partial understanding and use of all three dimensions (science and engineering practices, crosscutting concepts, and disciplinary core ideas) to make sense of phenomena and/or to design solutions to problems in the physical, life, and Earth and space sciences. They also sometimes demonstrate the skills and understandings at the Novice level rather than the skills and understandings of the Nearing Proficient level. Students performing at the borderline of the Nearing Proficiency level can be expected in most situations[1] to be able to demonstrate knowledge and skills such as in the following examples, as evidence of just barely partial understanding and use of the NM STEM Ready! Science Standards:

- Use a model to describe phenomena using an understanding of matter as tiny particles, graph quantities to describe phenomena using an understanding of conservation of matter during physical or chemical changes, make observations to identify materials based on their properties, and use data to determine whether a new substance with different properties is formed when two substances are mixed. (PS1)
- Conduct an investigation to provide one piece of evidence about phenomena using an understanding of the effects of balanced or unbalanced forces on the motion of an object, predict the future motion of an object based on simple patterns in observations and measurements, ask questions using an understanding of cause and effect of electric or magnetic interactions between objects not in contact with each other, partially define a simple design problem that can be solved using magnets, and make a claim about phenomena using an understanding that the gravitational force of Earth on objects is directed down. (PS2)

- Describe phenomena using an understanding of the relationship between the speed and energy of an object, explain that energy can be transferred from place to place, describe the changes in energy that occur when objects collide, describe elements of a device that converts energy from one form to another, and describe phenomena using an understanding that food energy was once energy from the Sun. (PS3)
- Use models to describe phenomena using an understanding that waves can cause objects to move or that light allows objects to be seen; and describe a solution that uses patterns to transfer information. (PS4)
- Use models to describe phenomena using an understanding of the diversity and commonalities of the life cycles of organisms, make a claim about phenomena using an understanding that plants and animals have internal and external structures that support life functions, describe phenomena using an understanding that animals receive or process or respond to information from their senses, and make a claim about phenomena using an understanding that plants get the materials they need for growth chiefly from air and water. (LS1)
- Make a claim about phenomena using an understanding that some animals form groups that help members survive; and use a model to describe phenomena using an understanding of the movement of matter among plants, animals, decomposers, and the environment. (LS2)
- Use data to describe phenomena using an understanding that plants and animals have inherited traits OR that variation of these traits exists in groups of similar organisms; and make a claim about phenomena using an understanding that traits can be influenced by the environment. (LS3)
- Use fossil data to describe organisms and the environments in which they lived; describe phenomena using an understanding that variation among individuals of the same species is a survival advantage or that in a particular habitat some organisms survive well, some survive less well, and some cannot survive at all; and describe a solution to a problem caused by changes to the environment and the types of plants and animals that live there. (LS4)
- Describe phenomena using an understanding that patterns in rock formations or fossils in rock layers provide evidence to support changes in a landscape over time, describe phenomena using an understanding that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth, and use data in graphical displays to reveal patterns of daily changes in shadows or day and night or the seasonal appearance of stars. (ESS1)
- Use data to describe typical seasonal weather conditions, describe climates in different regions of the world, describe phenomena using an understanding of the effects of weathering or the rate of erosion, use maps to describe patterns of Earth's features, use a model to describe phenomena using an understanding of how Earth's systems interact, and provide a description of the distribution of water on Earth. (ESS2)
- Describe a design solution or component of a design solution that reduces the impacts of a weather-related hazard, use information to determine that energy and fuels are derived from

natural resources or how their uses affect the environment or ways individual communities protect Earth's resources and the environment, and describe a solution or component of a solution to reduce the impacts of natural Earth processes on humans. (ESS3)

- Define a simple design problem including at least one criteria for success or one constraint; generate a solution to a problem or compare two solutions to a problem; and use results of a fair test to identify one way to improve a model or prototype. (ETS1)

**Novice**

Students at the **Novice** level demonstrate evidence of emerging understanding and use of all three dimensions (science and engineering practices, crosscutting concepts, and disciplinary core ideas) to make sense of phenomena and/or to design solutions to problems in the physical, life, and Earth and space sciences.

[1]Most situations refers to the following. Students at level X can be expected to be able to demonstrate knowledge and skills for most but not all:

- Combinations of disciplinary core ideas, practices, and crosscutting concepts
- Science phenomena, in which students are required to apply their knowledge of science content and mastery of crosscutting concepts and practices