

**NM** Public Education Department

# SCIENCE: 6th Grade

END-OF-COURSE EXAM | GRADE 6 | YEAR 17-18

ASSESSMENT BLUEPRINT

## **Purpose Statement**

### **6<sup>th</sup> Grade Science**

*The 6<sup>th</sup> Grade Science End-of-Course (EOC) exam is intended to measure student proficiency of the New Mexico Science Standards. This course-level exam is provided to all students who have completed 6<sup>th</sup> Grade Science related courses. This exam can be given for the following STARS course codes:*

**1701 - Earth science**

**1705 - Integrated (General) Science**

**1706 - Earth and Space Science**

**1709 - Elementary Exploratory Science**

**1710 - Elem Science Intervention**

*Intended as a final exam for the course, this is a summative exam covering a range of content, skills, and applications. Scores are reported to the teacher, school, district, and state levels for the purposes of student grades, curriculum review, and NMTeach summative reports.*

***“The EOCs are exams written by New Mexico Teachers for New Mexico Students.”***

*During the 2016-17 school year, teachers were brought together in person or online as part of the blueprint and exam revision process. The NMPED extends our gratitude to all those who contributed to this improvement process. Although we were unable to implement every suggestion due to conflicting viewpoints at times, this blueprint reflects the best collaborative effort among dedicated peers.*

*The NMPED would like to especially recognize the following person(s) who led the revision for this blueprint:*

- *Debbie Dean, Ph.D., Hobbs Municipal Schools, NBCT, Blueprint Lead*

## Explanation of Blueprint Layout & Test Specifications Table

Standard	Standards with Test Item Specifications:
<p>The standards identified in this portion of the blueprint are aligned to the New Mexico Grade 6 Science Standards:</p> <p><a href="http://www.ped.state.nm.us/MathScience/dl08/Standards/G6ScienceStandards.pdf">http://www.ped.state.nm.us/MathScience/dl08/Standards/G6ScienceStandards.pdf</a></p> <p>New Mexico Teachers identified the standards to be measured on the EOC exam using the following criteria: 1) a great deal of instructional time is spent on the standard as identified in the curriculum and/or; 2) the standard is important to subsequent learning.</p> <p>It is important to note that the standards in the blueprint are only a <b>subset</b> of standards to be measured with the understanding that teachers cover more standards during the course of instruction than what has been selected to be measured.</p>	<ul style="list-style-type: none"> <li>● This portion of the blueprint identifies the specific skills and knowledge students will have to demonstrate during the exam.</li> <li>● Although the standard may be broader, the item specifications may place constraint on portions of the standards in order to provide more transparency as to what specifically will be measured relative to the standard.</li> <li>● Item specifications provide guidelines for the item writer so they know what topics to specifically focus on when authoring items.</li> <li>● During the online public comment feedback period for the Grade 6 Science EOC, teachers requested use of “I can” statements.</li> <li>● Topics and terms in <b>bold</b> will be emphasized on the exam.</li> </ul> <p><b>Item Types:</b> The item types for this EOC exam are limited to: MC = multiple choice with or without stimulus (e.g., picture, graph, chart)</p> <p><b>Sample Question(s):</b></p> <p>Sample questions have been provided to assist teachers to correlate the questions with the performance standards and the test item specification, when applicable.</p> <ul style="list-style-type: none"> <li>● An * denotes the correct answer</li> <li>● DOK = Depth of Knowledge</li> <li>● Some sample questions may be items released items from prior EOC exams</li> </ul>

## Blueprint Table—6<sup>th</sup> Grade Science

Standard/Benchmark	Content Standard with Specifications
<p><b>I.1.1.1</b> <b>I.1.1.2</b></p> <p><b>Strand I:</b> Scientific Thinking and Practice</p> <p><b>Standard I:</b> Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.</p> <p><b>Benchmark I:</b> Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.</p>	<p><b>Performance Standards:</b></p> <ol style="list-style-type: none"> <li>1. Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated.</li> <li>2. Examine the reasonableness of data supporting a proposed scientific explanation.</li> </ol> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• I can, with guidance, plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered</li> <li>• I can determine relationships between independent (manipulated) and dependent (responding) variables and relationships in models</li> <li>• I understand the reasoning for using qualitative versus quantitative data</li> </ul>
	<p><b>Item Type:</b> MC with or without stimulus</p>
	<p><b>Practice Question:</b></p> <p>A student conducts an investigation about the basic needs of a plant. She gives three plants different amounts of water and the same amount of soil and light. The student measures the growth of the plants. What is the manipulated variable in this investigation?</p> <p>A. the amount of soil B. the amount of light</p>

	<p>C. the amount of water *</p> <p>D. the amount of growth</p> <p><i>Standard: I.I.I.2</i></p> <p><i>DOK Level: 1</i></p>
<p><b>II.I.I.1</b></p> <p><b>II.I.I.2</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard I (Physical Science):</b> Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.</p> <p><b>Benchmark I:</b> Know the forms and properties of matter and how matter interacts.</p>	<p><b>Performance Standards:</b></p> <ol style="list-style-type: none"> <li>Understand that substances have characteristic properties and identify the properties of various substances (i.e., <b>density</b>, boiling point, solubility, chemical reactivity).</li> <li>Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture).</li> </ol> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>I can identify the characteristics of various states of matter (liquid, solid, gas, plasma)</li> <li>I can distinguish between the different physical and chemical properties of various substances</li> <li>I can use properties to distinguish different substances like minerals</li> </ul> <p><b>Item Type:</b> MC with or without stimulus</p> <p><b>Practice Question:</b></p> <p>What state of matter has no definite shape or volume and its molecules are spread far apart and active?</p> <ol style="list-style-type: none"> <li>gas*</li> <li>plasma</li> <li>liquid</li> <li>solid</li> </ol>

	<p><i>Standard: II.I.I.1</i> <i>DOK Level: 1</i></p>
<p><b>II.I.II.1</b> <b>II.I.II.2</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard I (Physical Science):</b> Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.</p> <p><b>Benchmark II:</b> Explain the physical processes involved in the transfer, change, and conservation of energy.</p>	<p><b>Performance Standards:</b></p> <ol style="list-style-type: none"> <li>1. Identify various types of energy (i.e., heat, light, mechanical, electrical, chemical, nuclear).</li> <li>2. Understand that heat energy can be transferred through conduction, radiation and convection.</li> </ol> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• I can compare and contrast kinetic and potential energy</li> <li>• I can identify the different types of heat energy transfer</li> </ul> <hr/> <p><b>Item Type:</b> MC with or without stimulus</p> <hr/> <p><b>Practice Question:</b></p> <p>Caleb picks up a rock that has been warmed by sunlight. What method of transferring heat energy makes Caleb’s hand feel warm?</p> <ol style="list-style-type: none"> <li>A. conduction *</li> <li>B. subduction</li> <li>C. radiation</li> <li>D. convection</li> </ol> <p><i>Standard: II.I.II.2</i> <i>DOK Level: 2</i></p>

<p><b>II.I.III.1</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard I (Physical Science):</b> Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy</p> <p><b>Benchmark III:</b> Describe and explain forces that produce motion in objects.</p>	<p><b>Performance Standards:</b></p> <p>1. Know that every object exerts gravitational force on every other object dependent on the masses and distance of separation (i.e., motions of celestial objects, tides).</p> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>I can understand gravitational forces are always attractive between any two masses (i.e., the sun, the planets, and moons)</li> </ul> <p><b>Item Type:</b> MC with or without stimulus</p> <p><b>Practice Question:</b></p> <p>Which of the following is the force of attraction between matter?</p> <p>A. electricity B. magnetism C. gravity * D. momentum</p> <p><i>Standard: II.I.III.1</i> <i>DOK Level: 1</i></p>
<p><b>II.II.II.1</b> <b>II.II.II.2</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard II (Life Science):</b> Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.</p>	<p><b>Performance Standards:</b></p> <p>1. Understand that the fossil record provides data for how living organisms have evolved. 2. Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation).</p> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>I can describe how individual fossils in the fossil record provide data on</li> </ul>

<p><b>Benchmark II:</b> Understand how traits are passed from one generation to the next and how species evolve.</p>	<p>or as to how those animals lived in their environment</p> <ul style="list-style-type: none"> <li>• I can look at slow changing environmental conditions to support the changes we see in species, such as adaptation or extinction</li> <li>• I can identify causes that lead to changes</li> </ul>
	<p><b>Item Type:</b> MC with or without stimulus</p>
	<p><b>Practice Question:</b></p> <p>Scientists can find out what an animal may have eaten in the past by studying what evidence?</p> <p>A. fossils of the animal’s bones B. fossils of the animal’s tracks C. fossils of the animal’s droppings * D. fossils of the animal’s burrows</p> <p><i>Standard: II.II.I.1</i> <i>DOK Level: 1</i></p>
<p><b>II.III.I.1</b> <b>II.III.I.3</b> <b>II.III.I.4</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard III</b> <b>(Earth and Space Science Standard):</b> Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth’s systems.</p>	<p><b>Performance Standards:</b></p> <p>1. Describe the objects in the universe, including:</p> <ul style="list-style-type: none"> <li>• billions of galaxies, each containing billions of stars</li> <li>• different sizes, temperatures, and colors of stars in the Milky Way galaxy.</li> </ul> <p>3. Identify the components of the solar system, and describe their defining characteristics and motions in space, including:</p> <ul style="list-style-type: none"> <li>• sun as a medium sized star</li> <li>• sun’s composition (i.e., hydrogen, helium) and energy production</li> <li>• nine planets, their moons, asteroids</li> </ul> <p>4. Know that the regular and predictable motions of the Earth-moon-sun system explain phenomena on Earth, including:</p> <ul style="list-style-type: none"> <li>• Earth’s motion in relation to a year, a day, the seasons, the phases of the</li> </ul>

<p><b>Benchmark I:</b> Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system</p> <p><b>Reporting Category:</b> Astronomy</p>	<p>moon, eclipses, tides, and shadows</p> <ul style="list-style-type: none"> <li>moon's orbit around Earth once in 28 days in relation to the phases of the moon.</li> </ul> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>I can describe the objects in the universe (different sizes, temperatures, and colors of stars in the Milky Way galaxy)</li> <li>I can identify the components of the solar system and describe their defining characteristics and motions in space (sun's composition and energy production; planets, their moons; asteroids)</li> <li>I know the regular and predictable motions of the earth-moon-sun system explain phenomena on Earth (seasons, phases of the moon, eclipses, tides, shadows, Earth and moons orbit)</li> </ul>
	<p><b>Item Type:</b> MC with or without stimulus</p>
	<p><b>Practice Question:</b></p> <p>There are two stars which are different sizes, have the same temperature, and are the same distance from Earth. Which star would be more luminous?</p> <p>A. the bigger star *</p> <p>B. the smaller star</p> <p>C. the imaginary star</p> <p>D. the blue star</p> <p><i>Standard: II.III.I.1</i> <i>DOK Level: 2</i></p>

<p><b>II.III.II.1</b> <b>II.III.II.2</b> <b>II.III.II.3</b></p> <p><b>Strand II:</b> Content of Science</p> <p><b>Standard III</b> <b>(Earth and Space Science Standard):</b> Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth’s systems.</p> <p><b>Benchmark II:</b> Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth’s systems.</p> <p><b>Reporting Category:</b> Structure of Earth</p>	<p><b>Performance Standards:</b></p> <ol style="list-style-type: none"> <li>1. Know that Earth is composed of layers that include a crust, mantle, and core.</li> <li>2. Know that Earth’s crust is divided into plates that move very slowly, in response to movements in the mantle.</li> <li>3. Know that sedimentary, igneous, and metamorphic rocks contain evidence of the materials, temperatures, and forces that created them.</li> </ol> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• I understand the Earth is composed of layers (crust, mantle, core) and the order of their formation</li> <li>• I can identify the attributes of each layer</li> <li>• I know Earth’s crust is divided into plates that move in response to movements in the mantle. This is called plate tectonics.</li> <li>• I can describe the process of the Rock Cycle and which products are created during the cycle</li> </ul> <p><b>Item Type:</b> MC with or without stimulus</p> <p><b>Practice Questions:</b></p> <p>Which layer of Earth is the thickest and makes up most of Earth's volume?</p> <p>A. crust B. mantle* C. outer core D. inner core</p> <p><i>Standard: II.III.II.1</i> <i>DOK Level: 1</i></p>
<p><b>II.III.II.4</b> <b>II.III.II.5</b></p>	<p><b>Performance Standards:</b></p> <ol style="list-style-type: none"> <li>4. Describe the composition (i.e., nitrogen, oxygen, water vapor) and strata of</li> </ol>

<p><b>Strand II:</b> Content of Science</p> <p><b>Standard III (Earth and Space Science Standard):</b> Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth’s systems.</p> <p><b>Benchmark II:</b> Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth’s systems.</p> <p><b>Reporting Category:</b> Weather and Climate</p>	<p>Earth’s atmosphere, and differences between the atmosphere of Earth and those of other planets.</p> <p>5. Understand factors that create and influence weather and climate, including:</p> <ul style="list-style-type: none"> <li>• <b>heat, air movement, pressure, humidity, oceans</b></li> <li>• <b>how clouds form by condensation of water vapor</b></li> <li>• how weather patterns are related to atmospheric pressure</li> <li>• global patterns of atmospheric movement (e.g., El Niño)</li> <li>• <b>factors that can impact Earth’s climate (e.g., volcanic eruptions, impacts of asteroids, glaciers)</b></li> </ul> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• I can identify the composition of the Earth’s atmosphere</li> <li>• I can identify gases found in the Earth’s atmosphere</li> <li>• I can identify factors that influence weather changes</li> </ul>
	<p><b>Item Type:</b> MC with or without stimulus</p>
	<p><b>Practice Question:</b></p> <p>What gas makes up most of the Earth’s atmosphere?</p> <p>A. hydrogen B. oxygen C. carbon D. nitrogen *</p> <p><i>Standard: II.III.II.4</i> <i>DOK Level: 1</i></p>
<p><b>II.III.II.7</b> <b>II.III.II.8</b></p> <p><b>Strand II:</b> Content of Science</p>	<p><b>Performance Standards:</b></p> <p>7. Know that landforms are created and change through a combination of constructive and destructive forces, including:</p> <ul style="list-style-type: none"> <li>• weathering of rock and soil, transportation, deposition of sediment,</li> </ul>

<p><b>Standard III</b>  <b>(Earth and space science):</b> Understand the structure of Earth, the solar system, and the universe; the interconnections among them; and the processes and interactions of Earth’s systems.</p> <p><b>Benchmark II:</b>  Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their structures.</p> <p><b>Reporting Category:</b> Changes to Earth</p>	<ul style="list-style-type: none"> <li>and tectonic activity</li> <li>• similarities and differences between current and past processes on Earth’s surface (e.g., erosion, plate tectonics, changes in atmospheric composition)</li> <li>• impact of volcanoes and faults on New Mexico geology.</li> </ul> <p>8. Understand the history of Earth and how information about it comes from layers of sedimentary rock, including:</p> <ul style="list-style-type: none"> <li>• sediments and fossils as a record of a very slowly changing world</li> <li>• evidence of asteroid impact, volcanic and glacial activity.</li> </ul> <p><b>Specifications:</b></p> <ul style="list-style-type: none"> <li>• I can identify the Law of Superposition</li> <li>• I can understand that the Earth’s landforms change</li> </ul>
	<p><b>Item Type:</b>  MC with or without stimulus</p>
	<p><b>Practice Question:</b></p> <p>What is the <b>result</b> of two continental plates colliding?</p> <ul style="list-style-type: none"> <li>A. ocean trenches</li> <li>B. mountain building*</li> <li>C. plate tectonics</li> <li>D. lava</li> </ul> <p><i>Standard: II.III.II.7</i>  <i>DOK Level: 1</i></p>

6 <sup>th</sup> Grade Science EoC Reporting Category Alignment Framework					
Reporting Category	Standard	Count by DOK			Grand Total
		1	2	3	
Scientific Thinking & Practice	I.I.I.1	2	1		3
	I.I.I.2	1	1	1	3
Physical Science	II.I.I.1	1	1		2
	II.I.I.2	1	1		2
	II.I.II.1		1		1
	II.I.II.2		1		1
	II.I.III.1	1			1
Life Science	II.II.I.1	1			1
	II.II.II.2	1	1		2
Astronomy	II.III.I.1		1		1
	II.III.I.3	1	1		2
	II.III.I.4		1		1
Structure of Earth	II.III.II.1	1			1
	II.III.II.2	1	1		2
	II.III.II.3	1	1		2
Weather and Climate	II.III.II.4	1	1		2
	II.III.II.5	1		1	2
Changes to Earth	II.III.II.7	1	1	1	3
	II.III.II.8		2		2
	Grand Total	15	16	3	34