

NM Public Education Department

SCIENCE: ENVIRONMENTAL SCIENCE

END-OF-COURSE EXAM | GRADE 9-12 | YEAR 17-18

ASSESSMENT BLUEPRINT

Purpose Statement

Environmental Science

The Environmental 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 Environmental Science or related courses. This exam can be given for the following STARS course codes:

1751 - Environmental Science

1752 - AP Environmental Science

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, student graduation requirements, 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><i>The standards identified in this portion of the blueprint are aligned to the New Mexico Grades 9-12 Science Standards:</i></p> <p>http://www.ped.state.nm.us/MathScience/dl08/Standards/G9-12ScienceStandards.pdf</p> <p><i>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.</i></p> <p><i>It is important to note that the standards in the blueprint are only a subset 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.</i></p>	<p>Standards with Test Item Specifications:</p> <ul style="list-style-type: none"> ● <i>This portion of the blueprint identifies the specific skills and knowledge students will have to demonstrate during the exam.</i> ● <i>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.</i> ● <i>Item specifications provide guidelines for the item writer so they know what topics to specifically focus on when authoring items.</i> ● <i>Topics and terms in bold will be emphasized on the exam.</i> <p>Item Types: <i>The item types for this EOC exam are limited to: MC = multiple choice with or without stimulus (e.g., picture, graph, chart)</i></p> <p>Sample Question(s):</p> <p><i>Sample questions have been provided to assist teachers to correlate the questions with the performance standards and the test item specification, when applicable.</i></p> <ul style="list-style-type: none"> ● <i>An * denotes the correct answer</i> ● <i>DOK = Depth of Knowledge</i> ● <i>Some sample questions may be released items from prior EOC exams</i>

Blueprint Specifications Table—Environmental Science

STANDARD/BENCHMARK	Standards with Test Item Specifications:
<p>II.II.I.1 II.II.I.2 II.II.I.3 II.II.I.4</p> <p>Strand II: The Content of Science</p> <p>Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.</p> <p>Benchmark I: Understand how the survival of species depends on biodiversity and on complex interactions, including the cycling of matter and the flow of energy.</p>	<p><u>Ecosystems</u></p> <ol style="list-style-type: none"> 1. Know that an ecosystem is complex and may exhibit fluctuations around a steady state or may evolve over time. 2. Describe how organisms cooperate and compete in ecosystems (e.g., producers, decomposers, herbivores, carnivores, omnivores, predator-prey, symbiosis, mutualism). 3. Understand and describe how available resources limit the amount of life an ecosystem can support. (e.g., energy, water, oxygen, nutrients). 4. Critically analyze how humans modify and change ecosystems. (e.g., harvesting, pollution, population growth, technology). <p>Item Types:</p> <ul style="list-style-type: none"> • <i>MC = multiple choice with or without stimulus</i> <p>Sample Question:</p> <p>Which condition would cause an ecosystem to become <i>unstable</i>?</p> <ol style="list-style-type: none"> A) A slight increase in the number of heterotrophic and autotrophic organisms occurs. B) Biotic and abiotic resources interact. C) A variety of nonliving factors are used by the living factors. D) Only heterotrophic organisms remain after a change in the environment. * <p><i>Standard: II.II.I.2</i> <i>DOK Level: 2</i></p>
<p>II.II.I.5</p>	<p>Standards with Test Item Specifications:</p>

<p>II.II.I.6 II.II.I.9</p> <p>Strand II: The Content of Science</p> <p>Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.</p> <p>Benchmark I: Understand how the survival of species depends on biodiversity and on complex interactions, including the cycling of matter and the flow of energy.</p>	<p><u><i>Energy Flow in the Environment</i></u></p> <p>5. Explain how matter and energy flow through biological systems (e.g., organisms, communities, ecosystems), and how the total amount of matter and energy is conserved but some energy is always released as heat to the environment.</p> <p>6. Describe how energy flows from the sun through plants to herbivores to carnivores and decomposers.</p> <p><u><i>Biodiversity</i></u></p> <p>9. Understand variation within and among species, including:</p> <ul style="list-style-type: none"> • mutations and genetic drift • factors affecting the survival of an organism • natural selection <p>Item Types: <i>MC = multiple choice with or without stimulus</i></p> <p>Sample Question:</p> <p>In an energy pyramid, approximately how much energy is transferred to the level directly above it?</p> <p>A. 0.1% B. 1% C. 10% * D. 100%</p> <p><i>Standard: II.II.I.5</i> <i>DOK Level: 1</i></p>
<p>II.III.II.7 II.III.II.8</p>	<p>Standards with Test Item Specifications:</p>

<p>Strand II: The Content of Science</p> <p>Standard III (Earth and Space Science): 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>Benchmark II: Examine the scientific theories of the origin, structure, energy, and evolution of Earth and its atmosphere, and their interconnections</p>	<p><u><i>Energy in Earth’s System</i></u></p> <p>7. Describe convection as the mechanism for moving heat energy from deep within Earth to the surface and discuss how this process results in plate tectonics, including:</p> <ul style="list-style-type: none"> • geological manifestations (e.g., earthquakes, volcanoes, mountain building) that occur at plate boundaries • impact of plate motions on societies and the environment (e.g., earthquakes, volcanoes). <p>8. Describe the patterns and relationships in the circulation of air and water driven by the sun’s radiant energy, including:</p> <ul style="list-style-type: none"> • patterns in weather systems related to the transfer of energy • differences between climate and weather • global climate, global warming, and the greenhouse effect • El Niño, La Niña, and other climatic trends
	<p>Item Types:</p> <ul style="list-style-type: none"> • <i>MC = multiple choice with or without stimulus</i>
	<p>Sample Question:</p> <p>What causes currents in the atmosphere?</p> <p>A) Ocean waves and water movement B) Solar heating of the upper atmosphere C) Pressure from the ozone layer D) Warm air rising and cold air sinking *</p> <p><i>Standard: II.III.II.8</i> <i>DOK Level: 1</i></p>

<p>II.III.II.9 II.III.II.10 II.III.II.11 II.III.II.12</p> <p>Strand II: The Content of Science</p> <p>Standard III (Earth and Space Science): 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>Benchmark II: Examine the scientific theories of the origin, structure, energy, and evolution of Earth and its atmosphere, and their interconnections.</p>	<p>Standards with Test Item Specifications:</p> <p><u>Geochemical Cycles</u></p> <p>9. Know that Earth’s system contains a fixed amount of natural resources that cycle among land, water, the atmosphere, and living things (e.g., carbon and nitrogen cycles, rock cycle, water cycle, ground water, aquifers).</p> <p>10. Describe the composition and structure of Earth’s materials, including:</p> <ul style="list-style-type: none"> • the major rock types (i.e., sedimentary, igneous, metamorphic) and their formation • natural resources (e.g., minerals, petroleum) and their formation. <p>11. Explain how layers of the atmosphere (e.g., ozone, ionosphere) change naturally and artificially.</p> <p>12. Explain how the availability of ground water through aquifers can fluctuate based on multiple factors (i.e., rate of use, rate of replenishment, surface changes, and changes in temperature).</p> <hr/> <p>Item Types:</p> <ul style="list-style-type: none"> • <i>MC = multiple choice with or without stimulus</i> <hr/> <p>Sample Question:</p> <p>Approximately 99.7% of all water on Earth is found in oceans, seas, ice and the atmosphere. Based on this information, which statement is most accurate?</p> <p>A) Less than 0.3% of Earth’s water is drinkable.* B) Humans are not dependent on ocean water. C) The water cycle returns all usable water to the sea. D) The Earth’s fresh water supply is infinite.</p>
---	--

	<p><i>Standard: II.III.II.9</i> <i>DOK Level: 2</i></p>
<p>II.I.II.1 II.I.II.3</p> <p>Strand II: The Content of Science</p> <p>Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.</p> <p>Benchmark II: Understand the transformation and transmission of energy and how energy and matter interact.</p>	<p>Standards with Test Item Specifications:</p> <p><u><i>Energy Transformation and Transfer</i></u></p> <ol style="list-style-type: none"> 1. Identify different forms of energy, including kinetic, gravitational (potential), chemical, thermal, nuclear, and electromagnetic. 3. Understand that energy can change from one form to another and know that energy is conserved in these changes. <p>Item Types:</p> <ul style="list-style-type: none"> • <i>MC = multiple choice with or without stimulus</i> <p>Sample Question:</p> <p>What is a problem with depending on fossil fuels as a primary energy source?</p> <ol style="list-style-type: none"> A) They are overabundant and in high demand. B) They are easy to mine but difficult to profit from. C) They are too deep. D) They are nonrenewable and in high demand. * <p><i>Standard: II.I.II.1</i> <i>DOK Level: 1</i></p>

<p>III.I.I.3 III.I.I.7 III.I.I.9 III.I.I.12 III.I.I.13</p> <p>Strand III: Science and Society</p> <p>Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.</p> <p>Benchmark I: Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.</p>	<p>Standards with Test Item Specifications:</p> <p><u>Science and Technology</u></p> <p>3. Evaluate the influences of technology on society (e.g., communications, petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples (e.g., the wheel, the plow, the printing press, the lightning rod).</p> <p>7. Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment.</p> <p><u>Science and Society</u></p> <p>9. Describe how scientific knowledge helps decision makers with local, national, and global challenges (e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change).</p> <p>12. Explain how societies can change ecosystems and how these changes can be reversible and irreversible.</p> <p>13. Describe how environmental, economic, and political interests impact resource management and use in New Mexico.</p>
	<p>Item Types:</p> <ul style="list-style-type: none"> • <i>MC = multiple choice with or without stimulus</i>
	<p>Sample Question:</p> <p>Which of the following environmental issues can be traced to CFC's and other similar compounds?</p> <p>A) acid rain B) destruction of the ozone layer* C) greenhouse gas build up D) increase in atmospheric carbon dioxide</p>

	<p><i>Standard: III.I.1.7</i> <i>DOK Level: 1</i></p>
--	--

Environmental Science EoC Reporting Category Alignment Framework					
Reporting Category	Standard	DOK (Count by DOK)			Grand Total
		1	2	3	
Geochemical Cycles	II.III.II.9	1			1
	II.III.II.10	3	1		4
	II.III.II.11	1	1		2
	II.III.II.12		2		2
Ecosystems	II.II.I.1	2			2
	II.II.I.2	1	1		2
	II.II.I.3	1	2		3
	II.II.I.4		2		2
Science, Technology and Society	III.I.I.3		4	1	5
	III.I.I.7		1		1
	III.I.I.9	1	1		2
	III.I.I.12	2	1		3
	III.I.I.13	1	1		2
Energy Transformation	II.I.II.1	3	1		4
	II.I.II.3		1		1
Energy Flow and Biodiversity	II.II.I.5	1	1		2
	II.II.I.6		2		2
	II.II.I.9	1	3		4
Energy and Earth's System	II.III.II.7	2			2
	II.III.II.8		2		2
Grand Total		20	27	1	48