

IES Correlation to New Mexico

Grades 5 - 8 Earth Science Related Standards

Correlation Key:

"XX" In-depth Coverage = In-depth coverage of concept in student edition.

"X" Coverage = Coverage in student edition and/or Teacher Edition supports the development of the concept.

Climate and Weather

Dynamic Planet

Energy Resources

Fossils

Materials and Minerals

Oceans

Rocks and Landforms

Soil

Water as a Resource

CONTENT STANDARD 1: UNIFYING CONCEPTS AND PROCESSES

STUDENTS WILL UNDERSTAND SCIENCE CONCEPTS OF ORDER AND ORGANIZATION

A. Apply information about the predictability and organization of the universe and its subsystems.

1. Explain which characteristics of the natural world make its future behavior predictable. Describe some characteristics of the natural world that make its future difficult to predict.

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B. Apply prediction to scientific problems and events.

1. Predict the outcome of an experiment based on the results of previous experiments.

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2. Relate the outcome of a simple science experiment to a process that happens in the world. Explain how science experiments help us understand processes that occur in nature and processes that occur in society.

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CONTENT STANDARD 2: UNIFYING CONCEPTS AND PROCESSES

STUDENTS WILL USE EVIDENCE, MODELS, AND EXPLANATIONS TO EXPLORE THE PHYSICAL WORLD

A. Identify and organize evidence needed to predict changes in natural and artificial systems.

1. In several experiments, before the experiment itself is done, identify what information is necessary to predict any changes that are anticipated. After the experiment is done, evaluate and discuss your conclusions about the predictions.

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B. Organize phenomena into hypotheses, models, laws, theories, principles, and paradigms.

1. Distinguish among physical, mathematical, and conceptual models; give examples of each.

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2. Explain and contrast what scientists mean by the terms: hypothesis, theory, principle, law, model, and paradigm.

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C. Design and develop models.

1. Develop an understanding that models take many forms and have explanatory power.

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2. Choose a concept or process and identify a useful model.

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3. Use models to explain the concepts or processes at work and the objectives of the experiments.

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CONTENT STANDARD 3: UNIFYING CONCEPTS AND PROCESSES

STUDENTS WILL USE FORM AND FUNCTION TO ORGANIZE AND UNDERSTAND THE PHYSICAL WORLD

A. Explain function by referring to form and explain form by referring to function.

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1. Investigate how various living things developed to meet specific needs.				X		X			
CONTENT STANDARD 4: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND THE PHYSICAL WORLD THROUGH THE CONCEPTS OF CHANGE, EQUILIBRIUM, AND MEASUREMENT									
A. Illustrate that constancy and change are properties of objects and processes.									
1. Develop an understanding that most things are in the process of changing, and some processes and properties are constant.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Identify the things in nature that do not change (Note: Include concepts, such as the force of gravity and properties of matter, in addition to objects).					XX				
B. Illustrate that energy and matter can be transformed and changed but the sum remains the same.									
1. Identify several forms of energy, and give examples of processes in which there is a flow of energy from one form to another.			XX						
2. Understand how matter may be transformed into different states (e.g.,	X								X
3. Understand how chemical processes can produce substances (products) with properties that are different from the starting substances used to form the products.							X		
C. Use elementary scientific devices to measure objects and simple phenomena.									
1. Use basic and advanced tools to observe and measure natural and artificial objects and events.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. In various investigations, discuss how the accuracy of the measurements influences the results and conclusions.	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Give examples of how techniques for measurement dramatically extend the five senses.	XX	XX	XX	XX	XX	XX	XX	XX	XX
D. Employ mathematics to quantify properties of objects and phenomena.									
1. Understand why mathematics is essential to representing, understanding, and predicting the behavior of the natural world (e.g., discuss the difficulty of describing temperature and weight without measurement and mathematical representation).	X	X	X	X	X	X	X	X	X
2. Use measurements in explaining an experiment or process in which the measurements were involved.	XX	XX	XX	XX	XX	XX	XX	XX	XX
E. Relate the contributions of external and internal forces to change in the form and function of objects, organisms, and natural systems.									
1. Explore environmental changes that could have a local or global impact.	XX	XX	XX		X	X	X	X	X

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2. Describe the general idea of evolution as: a series of more or less gradual changes that account for the present form and function of objects, organisms, and natural and artificial systems, and the present arising from materials and forms of the past.				X					
CONTENT STANDARD 5: SCIENCE AS INQUIRY STUDENTS WILL ACQUIRE THE ABILITIES TO DO SCIENTIFIC INQUIRY									
A. Use the scientific method within the classroom and school environment									
1. Design and conduct investigations including adequate number of trials, unbiased sampling, accurate measurement and record keeping, and comparison to control	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Design an investigation or experiment to answer questions about local community issues that involve science	XX	XX	XX	XX	XX	XX	XX	XX	XX
B. Employ equipment, tools, a variety of techniques and information sources to gather, analyze, and interpret data									
1. Use appropriate math to analyze data such as the mean and median of sets of data, calculate percent and ratios, and determine the units in which values should be expressed	X	X	X	X	X	X	X	X	X
2. Read analog and digital meters that measure length, volume, mass, time, and temperature; use microscopes cameras, and tape recorders for capturing information	X	X	X	X	X	X	X	X	X
3. Use computers to locate, select, identify, collect, store, manipulate, and receive information	X	X	X	X	X	X	X	X	X
4. Use basic and advanced tools to observe and measure natural and artificial objects and events	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Locate, read, listen to, and view forms of information to interpret and evaluate; organize information in text, tables, and graphs; and use methods, forms, and technologies to describe the meaning and implications of information	XX	XX	XX	XX	XX	XX	XX	XX	XX
C. Explain that scientific theories emphasize evidence, have logically consistent arguments, and use scientific principles, models, and theories. Well-accepted scientific theories are formulations of apparent relationships or underlying principles of certain observed phenomena that have been verified to a very high degree									
CONTENT STANDARD 6: SCIENCE AS INQUIRY STUDENTS WILL UNDERSTAND THE PROCESS OF SCIENTIFIC INQUIRY									
A. Use different kinds of methods, including observations, experiments, and theoretical and mathematical models to answer a variety of scientific questions									
1. use various mathematical and investigative procedures to determine patterns and relationships, and make predictions	XX	XX	XX	XX	XX	XX	XX	XX	XX
B. Use their own understanding of science to guide their scientific investigations									
1. Design an investigation or experiment to answer questions about local community issues that involve science	XX	XX	XX	XX	XX	XX	XX	XX	XX

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C. Use criteria for sound scientific investigations to verify the truth of the results of their own and others' investigations									
1. Critically analyze the supporting rationale in scientific explanations. Identify weakly supported conclusions and opportunities for other scientific explanations. Also, identify what types of new information would be needed to make currently favored explanations demonstrably false	XX	XX	XX	XX	XX	XX	XX	XX	XX
D. Choose appropriate methods and analytic techniques for specific science problems and investigations									
1. Apply the process of inquiry in designing an investigation	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Design and conduct investigations including adequate number of trials, unbiased sampling, accurate measurement and record keeping, and comparison to control	XX	XX	XX	XX	XX	XX	XX	XX	XX
E. Use technology and scientific methods to gather evidence to enhance the accuracy of their findings									
1. Read analog and digital meters that measure length, volume, mass, time, and temperature; use microscopes, cameras, and tape recorders for capturing information; and use computers to locate, select, identify, store, manipulate, and receive information	X	X	X	X	X	X	X	X	X
F. Describe the results of investigations with teachers, peers, parents, and others.									
1. Explain findings of investigations to the class in several ways (individual and group presentations, logbook, etc.)	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Understand that scientists examine other scientists' work, that scientific findings need to be communicated and confirmed and that some scientists may develop new or different explanations for the same set of observations	XX	XX	XX	XX	XX	XX	XX	XX	XX
G. Explain that scientific investigations can result in new ideas, objects, methods, techniques, and procedures for investigations									
1. Examine how scientific investigations sometimes result in new ideas and phenomena for study	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Examine how scientific investigations generate new methods for procedures	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Understand how scientific inquiry leads to new investigations	XX	XX	XX	XX	XX	XX	XX	XX	XX
H. Explain that in areas where there is not a great deal of experimental or observational evidence, it is typical for scientists to differ with one another about the theory,									
1. Analyze and evaluate arguments based on small sets of data, experiments, with few repeated trials, biased samples, or samples with no control sample	XX	XX	XX	XX	XX	XX	XX	XX	XX
CONTENT STANDARD 11: LIFE SCIENCE STUDENTS WILL KNOW AND UNDERSTAND THE SYNERGY AMONG ORGANISMS AND THE ENVIRONMENTS OF ORGANISMS									
E. Categorize organisms based on the function they serve within their ecosystem.									
1. Relate trophic levels and food webs to the flow of energy in an ecosystem.						X			

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2. Classify organisms as beneficial, competitive, or detrimental to each other for survival.						X			
3. Design a viable ecosystem; interpret the relationships in the ecosystem.						X			
4. Observe a defined ecosystem; conduct a population count; chart the energy flow; predict the impact of stimuli including the change in resources over time.	X					X			
F. Examine the impact humans have had on other species and natural systems over time.									
1. Identify environmental changes affecting the diversity and balance of an ecosystem; suggest alternative approaches that are less intrusive.	X	X	X		X	X	X	X	X
2. Analyze the impact of humans on a natural habitat.	X		X		X		X		X
G. Illustrate the impact that overpopulation might have on various regions of the world.									
1. Observe a defined ecosystem; conduct a population count; chart the energy flow; predict the impact of stimuli including the change in resources over time.									
H. Analyze consumption of nonrenewable resources based on population factors (birth rate, death rate, and density).									
1. Make informed decisions concerning conservation of energy and resources.			XX		XX			X	XX
2. Predict social, political, and economic consequences of the world's natural resources.			XX		XX			X	XX
3. Investigate ways that limited resources impact human populations.			XX		XX			X	XX
CONTENT STANDARD 12: EARTH AND SPACE SCIENCE									
STUDENTS WILL KNOW AND UNDERSTAND PROPERTIES OF EARTH SCIENCE									
A. Explain how earth's materials can be transformed from one state to another									
1. Relate common cycles (e.g., rock, water, carbon, and nitrogen) to each other	X	X				X	XX		XX
2. Investigate earth's energy sources to understand changes on earth		X	XX			X	X		X
B. Experiment with the uses of earth's materials as resources									
1. Design and conduct field investigations to study types of soil; recognize how different types lead to differences in drainage, percolation, and groundwater quality								XX	
2. Make informed decisions concerning the conservation of energy and resources			XX		XX				XX
3. Conduct research, organize data, and evaluate the impact of human activity and natural events on the quality of mineral, soil, air, and water supplies	XX	X			XX			XX	XX

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4. Research the mineral deposits found in New Mexico. Describe the benefits gained, and the possible negative effects, from the development of these resources					XX				
C. Model natural processes that shape the earth's surface									
1. Create a model depicting the processes that shape the earth's surface e.g., include how the earthen materials are transported by the forces of erosion and effects that weather phenomena have on earth	XX	XX		X		X	XX	X	X
2. Observe, graph, record, and predict geological changes on earth	X	XX	X	X	X	XX	XX	X	X
3. Develop an understanding of the earth's interior plate tectonics, global features, and geological phenomena, e.g., explain the relationship of plate tectonics to volcanoes and earthquakes		XX				XX			
D. Observe, measure, and record weather changes that occur daily									
1. Use technology and other resources to select and organize information about atmospheric properties e.g., demonstrate mathematics and science literacy by interpreting daily weather maps	XX								
2. Observe, record, and communicate the patterns of the sun, moon, weather, and seasons	X								
E. Explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time									
1. Infer the relative ages of fossils from their location in different strata and indicator fossils				XX			X		
2. Classify a variety of fossils by structure; make inferences regarding the type of environment in which they lived				XX			X		
F. Use a rectilinear coordinate system such as latitude and longitude to locate points on the surface of earth									
1. Locate points on the surface of earth using the rectilinear coordinate system	X	X	X	X	X	X	XX	X	XX
G. Describe the interaction between the earth's lithosphere, hydrosphere, atmosphere, and biosphere									
1. Describe how changes in the lithosphere, hydrosphere, biosphere and atmosphere affect each other	XX	XX	XX	X	XX	XX	XX	XX	XX
CONTENT STANDARD 13: EARTH AND SPACE SCIENCE STUDENTS WILL KNOW AND UNDERSTAND BASIC CONCEPTS OF COSMOLOGY.									
A. Model the predictable patterns of the sun and planets in the solar system									
1. Model the movements of planets and other objects in space									
2. Investigate the problems of building a scale model of the solar system									
B. Describe the elements of the universe including stars, galaxies, dust clouds, and nebulae									
1. Describe the life cycle of a star based on its position in the Hertzsprung-Russel diagram									
2. Describe galaxies, dust clouds, and nebulae									

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C. Explain various scientific theories for the origin of the universe									
1. Research the Big Bang theory of how the universe began, including the age of the universe (13-15 billion years) and the age of the earth (4.5-4.7 billion years)									
D. Explain how instruments and vehicles are used for space exploration work									
1. Explore how instruments and vehicles are used for space exploration									
CONTENT STANDARD 14: TECHNOLOGY AND THE HISTORY OF SCIENCE STUDENTS WILL KNOW AND UNDERSTAND THE DIFFERENCES BETWEEN THE INTERACTIONS OF SCIENCE AND TECHNOLOGY									
A. Design and conduct experiments that distinguish between natural and artificial objects and materials.									
1. Critique and evaluate technological designs and products.	XX	XX	XX	XX	XX	XX	XX	XX	XX
B. Demonstrate trade-offs in safety, cost, efficiency, and appearance related to technological solutions provided through science.									
1. Analyze and evaluate economic, political, social, ethical, and aesthetic constraints affecting progress with specific scientific technological endeavors.	X	X	XX	X	XX	X	X	X	X
C. Compare and contrast a variety of scientific and technological solutions to problems.									
1. Identify and analyze ways the advances in science and technology have affected each other and society.	X	X	XX	X	XX	X	X	X	X
D. Examine the role of technology, particularly computers and other electronic advances, in the advancement of science.									
1. Examine how scientists conduct investigations; write in the advancement of science.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Investigate recent technological advances that have contributed to advances in science, e.g., Polymerase Chain Reaction.	X	X	XX			XX			
CONTENT STANDARD 15: TECHNOLOGY AND THE HISTORY OF SCIENCE STUDENTS WILL KNOW AND UNDERSTAND THE IMPACT BETWEEN SCIENCE AND TECHNOLOGY IN SOCIETY									
A. Illustrate the impact that work settings have on scientific investigations.									
1. Compare how science has been practiced by individuals in different cultures.	X	X	X	X	X	X	X	X	X
2. Identify the role that science plays in the careers and home lives of family and friends.	X	X	X	X	X	X	X	X	X
B. Demonstrate how the direction for scientific investigations is related to social issues and challenges.									
1. Predict, analyze, and evaluate potential effects of technological solutions to simple problems on other people or the environment, considering costs, benefits, and consequences.	X	X	X	XX	XX	X	X	X	X
2. Critique and evaluate technological designs and products.	X	X	X	X	XX	X	X	X	X

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3. Investigate current local issues related to science and technology (e.g., landfills, population density, etc.).	XX	X	XX	X	XX	XX	X	XX	XX
C. Explain how the benefits of science and technology are enjoyed by some groups and not by other groups.									
1. Explore reasons why there are fewer reported scientific advances in areas of high poverty.	X	X	X	X	X	X	X	X	X
D. Compare and contrast the science contributions of people with diverse interests, talents, qualities, and motivations from a variety of social and ethnic backgrounds.									
1. Identify the background qualifications and training needed to have careers related to science and technology.	X	X	X	X	X	X	X	X	X
E. Predict new areas of scientific inquiry based on previous research.									
1. Identify and analyze ways the advances in science and technology have affected each other and society.	X	X	X	X	X	X	X	X	X
F. Analyze the impact of culture, gender, and other factors on an individual's choice of science as a career.									
1. Compare how science has been practiced by individuals in different cultures.	X	X	X	X	X	X	X	X	X
2. Explore the historical barriers to science careers that have restricted access to women and minority populations.	X	X	X	X	X	X	X	X	X
G. Differentiate between ethical and unethical scientific practices and research.									
1. Explore the societal consequences of dishonest reporting of the results of a science experiment.	X	X	X	X	X	X	X	X	X
CONTENT STANDARD 16: SCIENCE IN PERSONAL, SOCIAL, AND ENVIRONMENTAL PERSPECTIVES									
STUDENTS WILL KNOW AND UNDERSTAND THE RELATIONSHIP BETWEEN NATURAL HAZARDS AND ENVIRONMENTAL RISKS FOR ORGANISMS.									
A. Analyze environmental risks for personal and social costs.									
1. Explore the personal risks and costs to society in dealing with environmental hazards (e.g., biological hazards such as groundwater contamination; natural hazards such as floods and tornadoes; chemical hazards in the air, soil, and water; and personal choices such as alcohol, tobacco, and drugs).	XX	XX					X		XX
B. Determine options for reducing and eliminating environmental risks and for coping with natural catastrophic events.									
1. Investigate innovative technology to reduce risks due to environmental problems and coping with natural disasters.	X	X							
C. Predict the human and financial cost of slow natural events such as drought and rapid natural events such as earthquakes.									
1. Predict the human and financial cost of slow natural events such as drought and rapid natural events such as earthquakes.	X	X							X

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D. Develop models for prevention of substance abuse including tobacco, alcohol and other drugs, and to reduce the associated environmental risks.									
1. Investigate the negative consequences of alcohol, tobacco, drug use, and sexual promiscuity.									
2. Develop strategies for healthy behavior, e.g., role-play situations exploring the effects of social risks.									