Proyecto Futuro
Earth and Space Science

Alignment with Standards

Albuquerque Public Schools District Core Curriculum Scope and Sequence (adopted 1999)
New Mexico State Standards and Benchmarks (adopted 1996)
National Science Education Standards, National Research Council, 1996
Principles and Standards for School Mathematics, National Council of Teachers of Mathematics, 2000

New Mexico Museum of Natural History and Science
Spring, 2000

This document aligns activities in the *Proyecto Futuro* Earth and Space Science module with science and math standards at the local (Albuquerque Public Schools), state (New Mexico) and national levels. Each activity is aligned with specific content standards according to the Table of Contents listed below. The process-related standards at each of these levels are listed separately (see Table of Contents) but are not tied to specific activities, as they are addressed by activities throughout the module.

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Note: Beginning on page 12, when a standard addresses a number of topics, individual words in the text of the alignment have been printed in **bold** to show the connection between that component of the standard, benchmark, or competency and the *Proyecto Futuro* activity.

APS District Core Curriculum Scope and Sequence (DCCSS) Process Standards

Science

The activities in the Earth and Space Science component of *Proyecto Futuro* provide opportunities for students to achieve many of the curriculum competencies of Standard 4 (Science, Technology, Individuals, Society) and Standard 5 (Science Inquiry) of the DCCSS, K-5 and Standard 4 (Nature of Science), 6-8.

K-5

The competencies identified below are from the 5th grade DCCSS; there are related competencies at all grade levels that vary according to the developmental level of the student.

Standard 4: ***Science Technology, Individuals, and Society***

Interactions of Science and Technology

4.1.1 examine and discuss common objects and daily activities as they relate to science;
4.1.2 examine and describe the role of technology in science;
4.1.3 use available technology for the study of science and understand the usefulness of scientific instruments;
4.1.4 identify a problem and design a solution using appropriate technology, evaluate its effectiveness, and communicate the process;
4.1.5 compare the effect of new ways to solve a problem or get something done;
4.1.6 observe patterns and causes of change in the surrounding world;
4.1.8 analyze patterns and causes of change in the surrounding world;
4.1.9 recognize the characteristics of questionable claims and misconceptions.

Standard 5: ***Science Inquiry***

Scientific Processes

5.1.1 pose questions that could lead to scientific investigations, experiments, and models;
5.1.2 propose possible solutions to science-related questions;
5.1.3 collect and organize data compiled from observations or investigations;
5.1.4 make predictions based on knowledge of the past, statistics, and/or the exploration of data;
5.1.5 justify ideas or predictions;
5.1.6 justify findings in relation to the hypothesis;
5.1.7 explain occurrences in observations and/or the results of investigations and draw conclusions;
5.1.8 analyze information based on knowledge of the past and/or data collected from observations and investigations;
5.1.9 use mathematics processes in science;
5.1.10 work in a variety of cooperative activities and tasks that develop an understanding of the concepts of science.

Demonstrate Proper Procedures

5.2.1 ask for help in situations when needed;
5.2.4 demonstrate the proper handling and use of laboratory equipment;
5.2.5 identify the suitability of equipment and materials for different purposes.

APS District Core Curriculum Scope and Sequence (DCCSS) Process Standards

6-8

The competencies identified below are from the Middle School Science DCCSS, The Nature of Science. The activities in the Earth and Space component of *Proyecto Futuro* provide opportunities for students to achieve many of the curriculum competencies of Standard 4: The Nature of Science.

Standard 4: ***The Nature of Science***

Understand Science as a Process

4.1.1 cite examples of scientific investigation that are ongoing and recognize that investigations have been modified as new information has emerged;
4.1.2 describe science as a search for patterns in nature and give specific examples;
4.1.5 predict new areas of scientific inquiry based on previous research;
4.1.6 explore the impact of natural events such as global warming, drought, and earthquakes.

Study the History of Science and Technology

4.2.1 examine the role of technology in the advancement of science.

Use Scientific Inquiry

4.3.1 in laboratory activities, use their own understanding of science to guide their scientific investigations;
4.3.2 identify a problem for scientific investigation;
4.3.4 design an investigation and write the procedure;
4.3.5 identify and control variables in an experiment;
4.3.6 using appropriate tools, accurately collect data from an investigation and organize it into tables, charts, or graphs;
4.3.7 analyze the data collected from experiments and formulate conclusions;
4.3.10 participate in peer review of results from an investigation;
4.3.11 provide different explanations for the same evidence in science;
4.3.12 practice safe laboratory procedures and use safety equipment;
4.3.13 use mathematics to manipulate scientific data according to grade-level math competencies;
4.3.14 prepare and give an oral and written presentation on a laboratory investigation.

Gather Scientific Information

4.4.1 develop skills that allow collection of data as a member of a team;
4.4.2 assume different cooperative group roles during scientific investigations e.g., recorder, observer, leader.

Mathematics

The Albuquerque Public Schools Core Curriculum Scope and Sequence, K-8, does not separate out process standards for mathematics. Instead, competencies to address Problem Solving, Reasoning and Proof, Communication, Connections, and Representations are woven throughout the Content Standards.

Proyecto Futuro Earth and Space Science
Alignment with Standards
New Mexico Content Standards and Benchmarks for Science
Process Skills

Standards	K-4 Benchmarks	5-8 Benchmarks
Unifying Concepts and Processes **Standard 1:** ***Students will understand science concepts of order and organization.***	• demonstrate knowledge and understanding that science is based on the assumption that the environment is understandable and predictable • demonstrate an understanding of prediction and its uses	• apply information about the predictability and organization of the universe and its subsystems • apply prediction to scientific problems and events
Standard 2: ***Students will use evidence, models, and explanations to explore the physical world.***	• recognize models as representations of real objects and events, and explain how the models work	• design and develop models
Standard 4: ***Students will understand the physical world through the concepts of change, equilibrium, and measurement.***	• use simple devices to measure objects and change • employ basic mathematics as a tool to quantify properties of objects and change	• use elementary scientific devices to measure objects and simple phenomena • employ mathematics to quantify properties of objects and phenomena
Science as Inquiry **Standard 5:** ***Students will acquire the abilities to do scientific inquiry.***	• describe and use simple equipment, tools, techniques, and a variety of information sources to gather data and extend the senses	• employ equipment, tools, a variety of techniques and information sources to gather, analyze, and interpret data
Standard 6: ***Students will understand the process of scientific inquiry.***	• describe the different methods used in the process of scientific investigation for: asking questions (formulating hypothesis), answering questions, and comparing the answer(s) to what scientists already know • explain that scientists develop explanations using observations (evidence) and what they already know about the world (scientific knowledge) • explain that scientists use different kinds of investigations depending upon the questions they are trying to answer • explain that instruments can provide more information than scientists can obtain using only their senses	• use different kinds of methods, including observation, experiments, and theoretical and mathematical models to answer a variety of scientific questions • use their own understanding of science to guide their scientific investigations • choose appropriate methods and analytic techniques for specific science problems and investigations • use technology and scientific methods to gather evidence to enhance the accuracy of their findings • describe the results of investigations with teachers, peers, parents, and others • explain that scientific investigations can result in new ideas, objects, methods, techniques, and procedures for investigation

Proyecto Futuro Ea. .id Space Science
Alignment with Standards
New Mexico Content Standards and Benchmarks for Science
Process Skills

Standards	K-4 Benchmarks	5-8 Benchmarks
Technology and the History of Science **Standard 14:** ***Students will know and understand the differences between and among the interactions of science and technology.***	• discriminate between natural objects and artificial objects • explain that science is one of many ways of posing solutions to questions about the natural world • describe the kinds of problems people have solved through scientific investigations	• design and conduct experiments that distinguish between natural and artificial objects and materials • compare and contrast a variety of scientific and technological solutions to problems
Standard 15: ***Students will know and understand the impact between science and technology in society.***	• describe science as a social enterprise that includes a variety of work settings	• illustrate the impact that work settings have on scientific investigations
Science in Personal, Social, and Environmental Perspectives **Standard 16:** ***Students will know and understand the relationship between natural hazards and environmental risks for organisms.***	• describe methods to reduce environmental risks • identify factors that change environments rapidly and slowly	• determine options for reducing and eliminating environmental risks and for coping with natural catastrophic events • predict the human and financial cost of slow natural events such as drought and rapid natural events such as earthquakes

Proyecto Futuro Earth and Space Science
Alignment with Standards
New Mexico Content Standards and Benchmarks for Mathematics
Unifying Concepts and Processes

Standard	K-4 Benchmarks	5-8 Benchmarks
Standard 1: ***Students will understand and use Mathematics in Problem Solving***	• use problem-solving approaches to investigate and understand mathematical content; • develop and apply strategies to solve a wide variety of problems; • verify and interpret results with respect to the original problem situation; • use manipulatives, calculators, computers, and other tools as appropriate in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts.	• develop and apply strategies to solve a wide variety of problems, with an emphasis on multistep and nonroutine problems; • verify and interpret results with respect to the original problem situation; • generalize solutions and strategies to new problem situations, and • use manipulatives, calculators, computers, and other tools as appropriate in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts.
Standard 2: ***Students will understand and use Mathematics in Communication***	• identify and define mathematical thinking in a variety of contexts and forms; • use drawings, discussion, reading, writing, and listening to access, learn, and communicate mathematical ideas; • use a variety of media and methods to communicate mathematical concepts, thoughts, and problem solutions including charts, slides, graphs, maps, drawings, pictures, sound recordings, video, e-mail, and others; and • explore mathematical ideas through the use of learning tools such as manipulatives, calculators, and computers.	• use drawings, discussion, reading, writing, and listening to access, learn, and communicate mathematical ideas; • create and use a variety of media and methods to communicate mathematical concepts, thoughts, and problem solutions including charts, slides, graphs, maps, drawings, pictures, sound recordings, video, e-mail, and others; • represent mathematical ideas through the use of learning tools such as manipulatives, calculators, and computers.
Standard 3: ***Students will understand and use Mathematics in Reasoning***	• describe logical conclusions in mathematics; • use information sources, models, known facts, properties, and relationships to explain mathematical thinking; • justify answers and solution processes; and • use patterns and relationships to analyze mathematical situations.	• use a variety of reasoning processes to explain mathematical thinking and to solve problems; • verify results to justify and validate thinking; and • construct and evaluate mathematical arguments and conjectures.

Standard 4: ***Students will understand and use Mathematical Connections***	• recognize relationships among different topics in mathematics; • use mathematics in other curriculum areas.	• describe how mathematics is integrated throughout the school and surrounding environment; • use mathematical foundations as a basis for more complex mathematics; • apply mathematical thinking and modeling to solve problems in other curriculum areas such as...science.

Proyecto Futuro Earth and Space Science
Alignment with Standards
National Science Education Standards
Process Skills

Standard	K-4 Benchmarks	5-8 Benchmarks
Standard A: ***Science as Inquiry*** *Abilities necessary to do scientific inquiry* *Understandings about scientific inquiry*	• Ask a question about objects, organisms, and events in the environment • Plan and conduct a simple investigation • Employ simple equipment and tools to gather data and extend the senses • Use data to construct a reasonable explanation • Communicate investigations and explanations	• Identify questions that can be answered through scientific investigations • Design and conduct a scientific investigation • Use appropriate tools and techniques to gather, analyze, and interpret data • Develop descriptions, explanations, predictions, and models using evidence • Think critically and logically to make the relationships between evidence and explanations • Recognize and analyze alternative explanations and predictions • Communicate scientific procedures and explanations • Use mathematics in all aspects of scientific inquiry
Standard E: ***Science and Technology*** *Abilities of technological design* *Understandings about science and technology*	• Identify a simple problem • Propose a solution • Implement proposed solutions • Evaluate a product or design • Communicate a problem, design, and solution	• Design a solution or product • Implement a proposed design • Communicate the process of a technological design
Standard F: ***Science in Personal and Social Perspectives*** *Personal health* *Types of resources* *Changes in environments* *Science and technology in local challenges*	• Follow safety rules for personal health • Develop an understanding of basic resources, such as air, water, and soil • Understand changes in environments • Invent new ways of doing things and solving problems	• Use safety precautions for personal health • Develop an understanding of populations, resources, and environments • Understand that internal and external processes of the earth system cause natural hazards • Understand risks and benefits • Build an awareness of the influences of science and technology in society

Standard G: ***History and Nature of Science*** *Science as a human endeavor* *Nature of science*	• Understand basic principles of science as a human endeavor	• Formulate and test explanations of nature using observation, experiments, and theoretical and mathematical models to understand the nature of science

Principles and Standards for School Mathematices (National Math Standards)
Process Skills

Problem Solving Standard (preK-12)

- build new mathematical knowledge through problem solving;
- solve problems that arise in mathematics and in other contexts;
- apply and adapt a variety of appropriate strategies to solve problems;
- monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof Standard (preK-12)

- make and investigate mathematical conjectures;
- develop and evaluate mathematical arguments and proofs;
- select and use various types of reasoning and methods of proof.

Communication Standard (preK-12)

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.

Connections Standard (preK-12)

- recognize and use connections between mathematical ideas;
- recognize and apply mathematics in contexts outside mathematics.

Representation Standard (preK-12)

- create and use representations to organize, record, and communicate mathematical ideas;
- use representations to model and interpret physical, social, and mathematical phenomena.

WATER

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
How Much Water is There? (grades 4-8)	**Standard 2: *Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.1 recognize that water covers a majority of the Earth's surface 2.1.2 identify sources of water Grade 5: *Changes in the Earth's Surface* 2.1.2 recognize that water covers a majority of the Earth's surface Grades 6-8: *Water Systems* 2.3.3 investigate the composition, environment, and population of oceans	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the gases of the atmosphere. 5-8: *Structure of the earth system* Water, which covers a majority of the Earth's surface, circulates through the crust, oceans, and atmosphere.
Groundwater (grades 2-8)	**Standard 2: *Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.2 identify sources of water Grades 6-8: *Water Systems* 2.3.1 explain that water circulates through the earth's crust, oceans and atmosphere	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the gases of the atmosphere. K-4: *Properties of earth materials* Soils have properties of color and texture, and capacity to retain water. 5-8: *Structure of the earth system* Water, which covers the majority of the Earth's surface, circulates through the crust, oceans and atmosphere. It falls to the surface where it collects in lakes, oceans, soil, and in rocks underground.
Porosity and Permeability (grades 4-8)	**Standard 2: *Earth and Space Science*** Grades 6-8: *Water Systems* 2.3.2 examine the effect of water in shaping the Earth's surface	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Soils have properties of color and texture, and capacity to retain water. 5-8: *Structure of the earth system* Soils are often found in layers, with each having a different chemical composition and texture.

WATER

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Cleaning Up Water (grades 3-8)	**Standard 2:** ***Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.7 connect human behaviors with effects on water supply and water quality Grades 6-8: *Water Systems* 2.3.2 examine the effect of water in shaping the Earth's surface	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe the uses of Earth's materials as resources and the Sun as the major source of external energy for the Earth 5-8: experiment with uses of Earth's materials as resources	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Varied materials have different physical and chemical properties which make them useful in different ways. 5-8: *Structure of the earth system* Water is a solvent. As it passes through the water cycle it dissolves minerals and gases and carries them to the oceans.
Water Cycle in a Bag (grades K-4)	**Standard 2:** ***Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.3 describe the water cycle 2.1.4 conduct experiments related to the collection of water vapor and/or water evaporation	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the gases of the atmosphere. 5-8: *Structure of the earth system* Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is know as the "water cycle."
Disappear-ing Puddles (grades K-4)	**Standard 2:** ***Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.4 conduct experiments related to the collection of water vapor and/or water evaporation	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the gases of the atmosphere. 5-8: *Structure of the earth system* Water evaporates from the Earth's surface, rises and cools as it moves to higher elevations.

WATER

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Rio Grande Water Cycle (grades 3-6)	**Standard 2: *Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.3 describe the water cycle 2.1.4 conduct experiments related to the collection of water vapor and/or water evaporation 2.1.6 explain how water is essential to survival 2.1.7 connect human behaviors with their effects on water supply and water quality 2.1.8 identify ways to conserve water	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe the uses of Earth's materials as resources and the Sun as the major source of external energy for the Earth K-4: describe changes in Earth's surface 5-8: experiment with the uses of Earth's materials as resources 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the gases of the atmosphere. K-4: The varied materials make them useful in different ways, as sources of fuel, building materials, or for growing the plants we use as food. 5-8: *Structure of the earth system* Water evaporates from the Earth's surface, rises, and cools as it moves to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil, and in rocks underground.

METEOROLOGY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Making a Cloud (grades 6-8)	**Standard 2:** ***Earth and Space Science*** Grade 1: *Weather and Seasons* 2.1.5 construct and interpret graphs of data collected and observations of weather conditions Grade 5: *Weather Factors and Conditions* 2.2.2 describe the characteristics of clouds 2.2.3 discuss the formation of clouds, precipitation, and violent storms 2.2.5 record data pertaining to observations, experiments, or investigations in a log or journal 2.2.6 interpret the data presented in tables, charts, and/or graphs 2.2.7 draw conclusions from scientific experiments/investigations pertaining to weather in a log or journal Grades 6-8: *Atmospheric Systems* 2.4.1 identify the components of the Earth's atmosphere 2.4.2 recognize the effects of **clouds**, oceans, and atmospheric movements on weather and climate	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily 5-8: observe, measure, and record weather changes that occur daily	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, **water**, and the **gases** of the atmosphere. 5-8: *Structure of the earth system* Clouds, formed by the condensation of water vapor, affect weather and climate.
How to Read a Thermo-meter (grades K-2)	**Standard 2:** ***Earth and Space Science*** Grade 1: *Weather and Seasons* 2.1.4 use units of measurement (Fahrenheit) to record temperature Grade 5: *Weather Factors and Conditions* 2.2.4 experiment and measure factors pertaining to weather	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily	**Standard D:** ***Earth and Space Science*** K-4: *Changes in earth and sky* Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation.
Making a Barometer (grades 4-8)	**Standard 2:** ***Earth and Space Science*** Grade 5: *Weather Factors and Conditions* 2.2.4 experiment and measure factors pertaining to weather 2.2.5 record data pertaining to observations, experiments, or investigations in a log or journal 2.2.6 interpret the data presented in tables, charts, and/or graphs	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily 5-8: observe, measure, and record weather changes that occur daily	**Standard D:** ***Earth and Space Science*** K-4: *Changes in earth and sky* Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation. 5-8: *Structure of the earth system* The atmosphere has different properties at different elevations.

METEOROLOGY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Making a Barometer (cont'd)	2.2.7 draw conclusions from scientific experiments/investigations pertaining to weather in a log or journal Grades 6-8: *Atmospheric Systems* 2.4.1 identify the components of the Earth's atmosphere 2.4.2 recognize the effect of clouds, oceans, and **atmospheric movements** on weather and climate		
Making a Wind Vane (grades 3-8)	**Standard 2: *Earth and Space Science*** Grade 5: *Weather Factors and Conditions* 2.2.4 experiment and measure factors pertaining to weather 2.2.5 record data pertaining to observations, experiments, or investigations in a log or journal 2.2.6 interpret the data presented in tables, charts, and/or graphs 2.2.7 draw conclusions from scientific experiment/investigations pertaining to weather in a log or journal Grades 6-8: *Atmospheric Systems* 2.4.1 identify the components of the Earth's atmosphere 2.4.2 describe the interaction between the Earth's geosphere, hydrosphere, atmosphere, and biosphere as it relates to weather and climate	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily 5-8: observe, measure, and record weather changes that occur daily	**Standard D: *Earth and Space Science*** K-4: *Changes in earth and sky* Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation. 5-8: *Structure of the earth system* The atmosphere has different properties at different elevations. Global patterns of atmospheric movement influence local weather.
Relative Humidity (grades 4-8)	**Standard 2: *Earth and Space Science*** Grade 1: *Weather and Seasons* 2.1.5 construct and interpret graphs of data collected and observations of weather conditions Grade 5: *Weather Factors and Conditions* 2.2.4 experiment and measure factors pertaining to weather 2.2.5 record data pertaining to observations, experiments, or investigations in a log or journal 2.2.6 interpret the data presented in tables, charts, and/or graphs	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily 5-8: observe, measure, and record weather changes that occur daily	**Standard D: *Earth and Space Science*** K-4: *Changes in earth and sky* Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation. 5-8: *Structure of the earth system* The atmosphere has different properties at different elevations. Global patterns of atmospheric movement influence local weather.

METEOROLOGY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Relative Humidity (cont'd)	2.2.7 draw conclusions from scientific experiments/investigations pertaining to weather in a log or journal Grades 6-8: *Atmospheric Systems* 2.4.1 identify the components of the Earth's atmosphere 2.4.2 describe the interaction between the Earth's geosphere, hydrosphere, atmosphere, and biosphere as it relates to weather and climate		
Finding Air Speed: Making an Anemometer (grades 3-8)	**Standard 2: *Earth and Space Science*** Grade 1: *Weather and Seasons* 2.1.3 observe and record daily weather 2.1.5 construct and interpret graphs of data collected and observations of weather conditions Grade 5: *Weather Factors and Conditions* 2.2.1 identify various weather factors and their effects 2.2.4 experiment and measure factors pertaining to weather 2.2.5 record data pertaining to observations, experiments, or investigations in a log or journal 2.2.6 interpret the data presented in tables, charts, and/or graphs 2.2.7 draw conclusions from scientific experiments/investigations pertaining to weather in a log or journal Grades 6-8: *Atmospheric Systems* 2.4.1 identify the components of the Earth's atmosphere 2.4.2 describe the interaction between the Earth's geosphere, hydrosphere, atmosphere, and biosphere as it relates to weather and climate	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe weather changes that occur daily 5-8: observe, measure, and record weather changes that occur daily	**Standard D: *Earth and Space Science*** K-4: *Changes in earth and sky* Weather changes from day to day and over the seasons. Weather can be described by measurable quantities, such as temperature, wind direction and speed, and precipitation. 5-8: *Structure of the earth system* The atmosphere has different properties at different elevations. Global patterns of atmospheric movement influence local weather.

ROCKS AND MINERALS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Chocolate Chip Cookie Geology (grades 1-3)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.1 observe, describe and classify rocks and samples of soils by their properties	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid **rocks and soils,** water, and the gases of the atmosphere. K-4: *Properties of earth materials* Soils have properties of color and texture.
Rock Salt (grades 2-6)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.1 observe, describe and classify rocks and samples of soils by their properties Grades 6-8: *Geology* 2.2.7 investigate the properties of minerals	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid **rocks and soils,** water, and the gases of the atmosphere. 5-8: *Structure of the earth system* Old rocks at the Earth's surface weather, forming sediments that are buried, then compacted, heated, and often, recrystallized into new rock.
Shake and Settle (grades 1-5)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.1 observe, describe and classify rocks and samples of soils by their properties 2.1.3 demonstrate the processes involved in weathering and erosion Grade 5: *Changes in the Earth's Surface* 2.1.7 demonstrate the processes involved in weathering and erosion Grades 6-8: *Geology* 2.2.8 compare the composition and texture of soils	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid **rocks and soils,** water and the gases of the atmosphere. K-4: *Properties of earth materials* Soils have properties of color and texture, and capacity to retain water. 5-8: *Structure of the earth system* Soils are often found in layers, with each having a different chemical composition and texture.

ROCKS AND MINERALS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Erosion by Water (grades 3-8)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.3 demonstrate the processes involved in weathering and erosion Grade 5: *Changes in the Earth's Surface* 2.1.7 demonstrate the processes involved in weathering and erosion Grades 6-9: *Geology* 2.2.9 model natural processes involved in making and changing landforms	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid **rocks and soils**, water, and the gases of the atmosphere. K-4: *Changes in earth and sky* The surface of the Earth changes. Some changes are due to slow processes, such as erosion and weathering. 5-8: *Structure of the Earth System* Landforms are the result of a combination of constructive and destructive forces. Destructive forces include weathering and erosion.
Rock Cycle Web (grades 5-8)	**Standard 2:** ***Earth and Space Science*** Grades 6-8: *Geology* 2.2.6 describe the processes of rock formation in relation to the rock cycle and classify rocks as igneous, sedimentary, or metamorphic	**Standard 12:** ***Students will know and understand properties of Earth Science.*** 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** 5-8: *Structure of the Earth System* Some changes in the solid earth can be described as the "rock cycle." Old rocks at the Earth's surface weather, forming sediments that are buried, then compacted, heated and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.

TIME AND FOSSILS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
How Much is a Million? (grades 4-8)	**Math Standard 1:** ***Number and Operations*** Grade 5: *Place Value: Demonstrate the meaning of place value through models and recording numbers to 10,000.* 1.1.1 model a given mathematical situation in at least one way, providing an explanation and an appropriate mathematical sentence or equation 1.2.2 apply factor relationships of 100 and 1000 in real-world applications Grade 6: *Demonstrate meaning, structure, and operations with fractions using words, models, and symbols in context.* 1.3.3 translate conjectures into formal and fluent computation with appropriate mathematical terminology Grade 6: *Use estimation strategies in context.* 1.5.1 select and use the appropriate estimation strategies in a variety of situations	**Math Standard 1:** ***Students will understand and use Mathematics in Problem Solving.*** K-4, 5-8: use **manipulatives,** calculators, computers, and other tools as appropriate in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts. **Math Standard 7:** ***Students will understand and use computation and estimation.*** K-4: select and use computation techniques appropriate to specific problems and determine if the results are reasonable 5-8: develop, analyze, and explain methods for solving problems	**Math Standard:** ***Number and Operations*** *Understand numbers, ways of representing numbers, relationships among numbers, and number systems;* *Compute fluently and make reasonable estimates.* 3-5: understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals 6-8: develop an understanding of large numbers and recognize and appropriately use exponential, scientific, and calculator notation
Geologic Time Line (grades 4-8)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the time Grades 6-8: *Geology* 2.2.5 explain how fossils are formed and compare to existing organisms	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at that time 5-8: explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time. 5-8: *Earth's History* Fossils provide important evidence of how life and environmental conditions have changed. **Standard C:** ***Life Science*** 5-8: *Diversity and adaptations of organisms* Fossils indicate that many organisms that lived long ago are extinct. Extinction of species is common; most of the species that have lived on the Earth no longer exist.

TIME AND FOSSILS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Tracks in Time (grades K-4)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at the time	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at that time	**Standard D:** ***Earth and Space Science*** *K-4: Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time.
Making Fossils (grades 2-6)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at the time Grades 6-8: *Geology* 2.2.5 explain how fossils are formed and compare to existing organisms	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at that time 5-8: explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time. 5-8: *Earth's history* Fossils provide evidence of how life and environmental conditions have changed.
Amber Fossils (grades 2-6)	**Standard 2:** ***Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at the time Grade 6-8: *Geology* 2.2.5 explain how fossils are formed and compare fossils to existing organisms	**Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at that time 5-8: explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time. 5-8: *Earth's history* Fossils provide important evidence of how life and environmental conditions have changed. 5-8: *Structure of the earth system* Living organisms have played many roles in the earth system including producing some types of rocks.

TIME AND FOSSILS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Microfossils (grades 3-6)	**Standard 2: *Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at the time Grades 6-8: *Geology* 2.2.5 explain how fossils are formed and compare fossils to existing organisms	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at that time 5-8: explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time. 5-8: *Earth's history* Fossils provide important evidence of how life and environmental conditions have changed. 5-8: *Structure of the earth system* Living organisms have played many roles in the earth system including producing some types of rocks.
Digging Up Dinosaurs (grades 4-8)	**Standard 2: *Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.4 recognize that fossils provide a record of animals and plants that lived long ago and evidence about the nature of the environment at the time 2.1.5 investigate facts about dinosaurs, their habitats, and the concept of extinction Grades 6-8: *Geology* 2.2.5 explain how fossils are formed and compare fossils to existing organisms	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: recognize that fossils provide a record of animals and plants that live long ago and evidence about the nature of the environment at that time 5-8: explain how fossils are formed and how fossils provide evidence of the complexity and diversity of life over time	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at the time. 5-8: *Earth's history* Fossils provide important evidence of how life and environmental conditions have changed. **Standard C: *Life Science*** 5-8: *Diversity and adaptations of organisms* Fossils indicate that many organisms lived long ago are extinct. Extinction of species is common; most of the species that have lived on the Earth no longer exist.

PLATE TECTONICS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Be the Earth (grades 2-4)	**Standard 2:** ***Earth and Space Science*** Grade 5: *Change in the Earth's Surface* 2.1.2 identify and describe the layers of the Earth's surface Grades 6-8: *Geology* 2.2.1 mark or draw a model of the Earth's layers	**Standard 12:** ***Students will know and understand properties of Earth Science.*** 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, water, the gases of the atmosphere. 5-8: *Structure of the earth system* The solid Earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.
Earth Building (grades 2-4)	**Standard 2:** ***Earth and Space Science*** Grade 5: *Change in the Earth's Surface* 2.1.2 identify and describe the layers of the Earth's surface Grades 6-8: *Geology* 2.2.1 mark or draw a model of the Earth's layers	**Standard 12:** ***Students will know and understand properties of Earth Science.*** 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, water, the gases of the atmosphere. 5-8: *Structure of the earth system* The solid Earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.
Primary Plate Puzzle (grades K-3)	**Standard 2:** ***Earth and Space Science*** Grades 6-8: *Geology* 2.2.2 identify and locate the Earth's major crustal plates that serve as the basis for understanding continental drift and plate tectonics	**Standard 12:** ***Students will know and understand properties of Earth Science.*** 5-8: model natural processes that shape the Earth's surface	**Standard D:** ***Earth and Space Science*** K-4: *Changes in earth and sky* The surface of the Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

PLATE TECTONICS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Plate Puzzle (grades 4-6)	**Standard 2: *Earth and Space Science*** Grades 6-8: *Geology* 2.2.2 identify and locate the Earth's major crustal plates that serve as the basis for understanding continental drifted and plate tectonics 2.2.3 demonstrate how motion of crustal plates leads to major geological events such as volcanoes, earthquakes, and mountain building 2.2.9 model natural processes involved in making and changing landforms	**Standard 12: *Students will know and understand properties of Earth Science.*** 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Changes in earth and sky* The surface of the Earth changes. Some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes. 5-8: *Earth's history* The Earth processes we see today, including erosion, movement of lithospheric plates, and changes in atmospheric composition, are similar to those that occurred in the past. 5-8: *Structure of the earth system* Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.
New Mexico Volcanoes (grades 2-6)	**Standard 2: *Earth and Space Science*** Grade 2: *Properties of the Earth's Surface* 2.1.2 identify geological features in the community Grade 5: *Change in the Earth's Surface* 2.1.4 recognize that the Earth's surface is the result of a combination of constructive and destructive forces 2.1.5 describe the parts of the volcano and the volcanic process Grades 6-8: *Geology* 2.2.3 demonstrate how motion of crustal plates leads to major geological events such as volcanoes, earthquakes, and mountain building 2.2.4 show evidence that Earth-shaping processes seen today are similar to processes which occurred in the past	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, water, and the gases of the atmosphere. K-4: *Changes in earth and sky* The surface of the Earth changes. Some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes. 5-8: *Structure of the earth system* Landforms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment.

PLATE TECTONICS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
New Mexico Volcanoes (cont'd)	2.2.9 model natural processes involved in making and changing landforms		5-8: *Structure of the earth system* Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.
Earthquake Mapping (grades 6-8)	**Standard 2: *Earth and Space Science*** Grade 2: *Properties of Earth's Surface* 2.1.2 identify geological features in the community Grade 5: *Changes in the Earth's Surface* 2.1.6 model the characteristics and cause of earthquakes Grades 6-8: *Geology* 2.2.2 identify and locate the Earth's major crustal plates that serve as the basis for understanding continental drift and plate tectonics 2.2.3 demonstrate how motion of crustal plates leads to major geological events such as volcanoes, earthquakes, and mountain building 2.2.4 show evidence that Earth-shaping processes seen today are similar to processes which occurred in the past	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: use a rectilinear coordinate system such as latitude and longitude to locate points on the surface of Earth	**Standard D: *Earth and Space Science*** K-4: *Changes in earth and sky* The surface of the Earth changes. Some changes are due to rapid processes, such as landslides, volcanic eruptions, and **earthquakes.** 5-8: *Structure of the earth system* Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.

ASTRONOMY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Daytime Astronomy (grades 2-6)	**Standard 2:** ***Earth and Space Science*** Grade K: *Elements of the Solar System* 2.1.3 observe and record the location of the sun and moon at different times from a specific location Grade 4: *Solar System* 2.1.1 investigate information abut the sun 2.1.8 conduct experiments related to rotation and revolution of the Earth and the moon Grades 6-8: *Space Science* 2.1.5 explain the regular and predictable motion of most objects in the solar system and how their motions determine days, seasons, years, moon phases, and eclipses	**Standard 13:** ***Students will know and understand basic concepts of cosmology.*** K-4: describe the patterns of movement of objects in the sky 5-8: model the predictable patterns of the Sun and planets in the solar system	**Standard D:** ***Earth and Space Science*** K-4: *Objects in the sky* The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described. K-4: *Changes in the earth and sky* Objects in the sky have patterns of movement. The sun appears to move across the sky in the same way every day, but its path changes slowly over the seasons. 5-8: *Earth in the solar system* Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.
Moon Phases (grades 3-8)	**Standard 2:** ***Earth and Space Science*** Grade K: *Elements of the Solar System* 2.1.1 identify the sun, earth, and moon 2.1.3 observe and record the location of the sun and moon at different time from a specific location Grade 4: *Solar System* 2.1.6 observe and diagram different phases of the moon 2.1.7 demonstrate, illustrate, and explain either a lunar or solar eclipse 2.1.8 conduct experiments related to rotation and revolution of the earth and the moon Grades 6-8: *Space Science* 2.1.5 explain the regular and predictable motion of most objects in the solar system and how their motions determine days, seasons, years, moon phases, and eclipses	**Standard 13:** ***Students will know and understand basic concepts of cosmology.*** K-4: describe the patterns of movement of objects in the sky 5-8: model the predictable patterns of the Sun and planets in the solar system	**Standard D:** ***Earth and Space Science*** K-4: *Changes in earth and sky* Objects in the sky have patterns of movement. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month. 5-8: *Earth in the solar system* Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.

ASTRONOMY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Scale Model of Solar System (grade 3-5)	**Standard 2:** ***Earth and Space Science*** Grade 4: *Solar System* 2.1.3 model the relative sizes of planets and their distances from the sun Grades 6-8: *Space Science* 2.1.3 identify major bodies in the solar system	**Standard 13:** ***Students will know and understand basic concepts of cosmology.*** K-4: describe the composition of the solar system including the Sun, planets, moons, asteroids, and comets and Earth's position in this system 5-8: model the predictable patterns of the Sun and planets in the solar system	**Standard D:** ***Earth and Space Science*** K-4: *Objects in the sky* The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described. 5-8: *Earth in the solar system* The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.
Classroom Planetarium (grades 3-8)	**Standard 2:** ***Earth and Space Science*** Grade 4: *Solar System* 2.1.4 compare and contrast comets, meteors, asteroids, and stars Grades 6-8: *Space Science* 2.1.2 investigate the composition of the universe beyond our solar system including stars, dust clouds, gaseous nebulae, the Milky Way Galaxy, galaxies, clusters of galaxies, quasars, black holes	**Standard 13:** ***Students will know and understand basic concepts of cosmology.*** K-4: describe the patterns of movement of objects in the sky K-4: Describe the composition of the solar system including the Sun, planets, moons, asteroids, and comets and Earth's position in this system 5-8: describe the elements of the universe including stars, galaxies, dust clouds, and nebulae	**Standard D:** ***Earth and Space Science*** K-4: *Objects in the sky* The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described. K-4: *Changes in earth and sky* Objects in the sky have patterns of movement. 5-8: *Earth in the solar system* Most objects in the solar system are in regular and predictable motion.
Star Charts (grades 3-8)	**Standard 2:** ***Earth and Space Science*** Grade 4: *Solar System* 2.1.8 conduct experiments related to the rotation and revolution of the earth and the moon 2.1.3 identify major bodies in the solar system 2.1.5 explain the regular and predictable motion of most objects in the solar system and how their motions determine days, seasons, years, moon phases, and eclipses	**Standard 13:** ***Students will know and understand basic concepts of cosmology.*** K-4: describe the patterns of movement of objects in the sky 5-8: model the predictable patterns of the sun and planets of the solar system	**Standard D:** ***Earth and Space Science*** K-4: *Objects in the sky* The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described. K-4: *Changes in earth and sky* Objects in the sky have patterns of movement.

ASTRONOMY

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Star Charts (cont'd)			5-8: *Earth in the solar system* Most objects in the solar system are in regular and predictable motion.
Using an Astrolabe (grades 4-8)	**Standard 2: *Earth and Space Science*** Grade 4: *Solar System* 2.1.5 identify the types of instruments and vehicles used for space exploration 2.1.3 identify major bodies in the solar system 2.1.6 describe how space is explored from Earth and characterize devices sent to space and celestial bodies	**Standard 13: *Students will know and understand basic concepts of cosmology.*** K-4: identify the types of instruments and vehicles for space exploration 5-8: explain how instruments and vehicles are used for space exploration	**Standard D: *Earth and Space Science*** K-4: *Objects in the sky* The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described. 5-8: *Earth in the solar system* Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.

MAPS AND MODELS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Primary Mapping (grades K-2)	**Math Standard 2:** ***Geometry, Spatial Sense, and Measurement*** Grade K: *Geometry: Compare, classify, and arrange geometric shapes and begin to develop spatial sense.* 2.1.4 use spatial vocabulary to describe relative position 2.1.7 identify and describe objects in the environment that depict geometric shapes and solids 2.1.8 build and take apart pictures, shapes, and structures formed with 2-D and 3-D geometric forms Grade 1: *Geometry: Recognize, identify, describe, compare, and classify geometric shapes.* 2.1.11 recognize geometry as a means of describing the physical world Grade 2: *Geometry: Sort, describe, identify, and analyze geometric shapes and solids and begin to apply spatial sense.* 2.1.8 explore the concept of area using common geometric shapes	**Math Standard 1:** ***Students will understand and use Mathematics in Problem Solving.*** K-4: use manipulatives, calculators, computers, and other tools as appropriate in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts **Math Standard 2:** ***Students will understand and use Mathematics in Communication.*** K-4: use a variety of methods to communicate mathematical concepts, thoughts, and problem solutions including charts, slides, graphs, **maps, drawings**, pictures, etc. **Math Standard 4:** ***Students will understand and use Mathematical Connections.*** K-4: use mathematics in other curriculum areas **Math Standard 8:** ***Students will have a foundation in geometric concepts.*** K-4: relate geometric ideas to number and measurement ideas **Science Standard 12:** ***Students will know and understand properties of Earth Science.*** K-4: use symbols and maps to represent the school and local community	**Math Standard:** ***Number and Operations*** *Compute fluently and make reasonable estimates* K-2: use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators **Math Standard:** ***Geometry*** *Use visualization, spatial reasoning, and geometric modeling to solve problems* K-2: recognize and represent shapes from different perspectives K-2: recognize geometric shapes and structures in the environment and specify their location

MAPS AND MODELS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Middle Grades Mapping (grades 5-8)	**Math Standard 2:** ***Geometry and Measurement*** Grade 4: *Measurement: Apply standard and metric units of measurement when measuring length, area, and perimeter.* 2.3.1 use appropriate math vocabulary in written and verbal communication to clarify thinking when solving measurement problems 2.3.2 develop and use tools for linear measurement using both standard and metric units 2.3.3 relate a meter stick and its division to the base ten number system **Math Standard 2:** ***Measurement, Geometry, and Spatial Sense*** Grade 6: *Solve problems involving perimeter and area of quadrilaterals, triangles, and composite figures.* 2.1.1 create and test strategies for finding perimeters and areas 2.1.2 translate conjectures into formulas for areas and perimeters using appropriate math symbolism	**Math Standard 2:** ***Students will understand and use Mathematics in Communication.*** 5-8: create and use a variety of methods to communicate mathematical concepts, thoughts, and problem solutions including **charts**, slides, **graphs**, **maps**, drawings, pictures, etc. **Math Standard 4:** ***Students will understand and use Mathematical Connections.*** 5-8: describe how mathematics is integrated throughout the school and surrounding environment **Math Standard 8:** ***Students will have a foundation in geometric concepts.*** 5-8: visualize and represent geometric figures with special attention to developing spatial sense **Math Standard 9:** ***Students will understand and use measurement.*** 5-8: describe the structure and use of different systems of measurement	**Math Standard:** ***Geometry*** *Use visualization, spatial reasoning, and geometric modeling to solve problems* 3-5: recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life **Math Standard:** ***Measurement*** *Apply appropriate techniques, tools, and formulas to determine measurements* 3-5: select and use benchmarks to estimate measurements
Globe Toss (grades 4-6)	**Math Standard 3:** ***Statistics*** Grade 4: *Statistics: Collect, organize, and interpret data from classwork and real-world situations* 3.1.4 organize data using a variety of graphic representations, including frequency tables and **charts** 3.1.5 complete a data analysis project from defining a question and the way data will be collected to publishing results Grade 4: *Probability: Apply probability vocabulary to explain concept of chance* 3.2.2 investigate concept of chance	**Math Standard 1:** ***Students will understand and use Mathematics in Problem Solving.*** 5-8: verify and interpret results with respect to the original problem situation **Math Standard 4:** ***Students will understand and use Mathematical Connections.*** 5-8: apply mathematical thinking and modeling to solve problems in other curriculum areas	**Math Standard:** ***Data Analysis and Probability*** *Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them* 3-5: collect data using observations, surveys, and experiments 3-5: represent data using tables and graphs

MAPS AND MODELS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Globe Toss (cont'd)	**Math Standard 1:** ***Number Sense, Numeration, and Operations*** Grade 5: *Decimals: Represent and use the relationships among fractions, decimals, and* ***percents.*** 1.7.2 develop a connection between fractions, decimals, and **percents** and apply appropriate models, notations, and reasoning to represent those connections **Math Standard 3:** ***Data Analysis, Statistics, and Probability*** Grade 5: *Probability: Collect simple probability experiments and use basic concepts to organize and analyze results.* 3.2.1 perform simple probability experiments, and appropriately organize data, identify patterns, predict outcomes and explain effects on outcomes when a probability experiment is repeated several times **Math Standard 1:** ***Number and Operation*** Grade 6: *Represent and use the relationships among fractions, decimals, and* ***percents.*** 1.2.1 select and use the appropriate form in a variety of situations **Math Standard 3:** ***Data Analysis, Statistics, and Probability*** Grade 6: *Consider and design a process to investigate a statistical question.* 3.1.1 Collect data using a variety of appropriate data collection instruments **Science Standard 2:** ***Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.1 recognize that water covers a majority of the Earth's surface Grade 5: *Changes in the Earth's Surface* 2.1.2 recognize that water covers a majority of the Earth's surface	**Math Standard 5:** ***Students will understand and use numbers and number relationships.*** 5-8: represent and use numbers in a variety of equivalent forms including integers, fractions, decimals, **percents**, exponents, and scientific notation **Math Standard 10:** ***Students will understand and use statistics.*** 5-8: construct, read, and interpret tables, charts, and graphs	**Science Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, water, and the gases of the atmosphere. 5-8: *Structure of the earth system* Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere.

MAPS AND MODELS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Play-Doh Topo (grades 3-8)	**Math Standard 2:** ***Geometry, Spatial Sense, and Measurement*** Grade 3: *3-D Geometry: observe, construct, and describe 3-D shapes* 2.2.1 handle, observe, construct, and describe 3-D shapes 2.2.4 communicate about spatial relationships in 3-D environments Grade 4: *3-D Geometry: visualize, represent, and apply two dimensional views of 3-D shapes using geometric vocabulary* 2.2.4 recognize geometry as a means of describing the physical world with particular attention to dividing and subdividing shapes 2.2.5 represent and solve problems using geometric models Grade 4: *Measurement: apply standard and metric units of measurement when measuring length, area, and perimeter* 2.3.2 develop and use tools for linear measurement using both standard and metric units 2.3.3 relate a metric stick and its division to the base ten number system Grade 5: *3-D Geometry: identify the attributes of 3-D shapes and models and volume* 2.2.1 identify the attributes of 3-D shapes by building them and relating them to 2-D shapes	**Math Standard 4:** ***Students will understand and use Mathematical Connections.*** 5-8: describe how mathematics is integrated throughout the school and surrounding environment **Math Standard 8:** ***Students will have a foundation in geometric concepts.*** 5-8: visualize and represent geometric figures with special attention to developing spatial sense 5-8: apply geometric properties and relationships to the world 5-8: use geometry as a means of describing the physical world **Math Standard 9:** ***Students will understand and use measurement.*** 5-8: estimate, make, and use measurements to describe and compare describe the structure and use of different systems of measurement **Science Standard 12:** ***Students will know and understand properties of Earth Science*** K-4: describe changes in Earth's surface 5-8: model natural processed that shape the Earth's surface	**Math Standard:** ***Geometry*** *Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical relationships* 3-5: investigate, describe, and reason about the results of subdividing, combining, and transforming shapes **Math Standard:** ***Measurement*** *Understand measurable attributes of objects and the units, systems, and processes of measurement* 3-5: understand such attributes as **length**, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute **Science Standard D:** ***Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid **rocks and soils**, water, and the gases of the atmosphere 5-8: *Structure of the earth system* Landforms are the result of a combination of constructive and destructive forces.

MAPS AND MODELS

Activity	APS DCCSS Content Competencies	NM State Standards and Benchmarks	National Standards
Stream Model (grades 3-8)	**Standard 2: *Earth and Space Science*** Grade 3: *Properties of the Earth's Water* 2.1.5 explain the effects of water erosion *Water Systems* 2.3.2 examine the effect of water in shaping the Earth's surface	**Standard 12: *Students will know and understand properties of Earth Science.*** K-4: describe changes in Earth's surface 5-8: model natural processes that shape the Earth's surface	**Standard D: *Earth and Space Science*** K-4: *Properties of earth materials* Earth materials are solid rocks and soils, water, and the gases of the atmosphere. The varied materials have different physical and chemical properties. K-4: *Properties of earth materials* Soils have properties of color and texture, and capacity to retain water. 5-8: *Structure of the earth system* Landforms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion. 5-8: *Structure of the earth system* Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.