

Investigating Earth Systems Correlation to New Jersey Grade 8 Earth Systems/Environmental Science Content Standards

Correlation Key: “XX” In depth coverage = In depth coverage of student edition. “X” Coverage = Coverage in student edition and/or teacher edition supports the development of the concept and/or skill.	Climate and Weather	Dynamic Planet	Energy Resources	Fossils	Materials and Minerals	Oceans	Rocks and Landforms	Soil	Water as a Resource
STANDARD 5.1 (SCIENTIFIC PROCESSES) ALL STUDENTS WILL DEVELOP PROBLEM-SOLVING, DECISION-MAKING AND INQUIRY SKILLS, REFLECTED BY FORMULATING USABLE QUESTIONS AND HYPOTHESES, PLANNING EXPERIMENTS, CONDUCTING SYSTEMATIC OBSERVATIONS, INTERPRETING AND ANALYZING DATA, DRAWING CONCLUSIONS, AND COMMUNICATING RESULTS.									
Descriptive Statement: Students best learn science by doing science. Science is not merely a collection of facts and theories but a process, a way of thinking about and investigating the world in which we live. This standard addresses those skills that are used by scientists as they discover and explain the physical universe - skills that are an essential and ongoing part of learning science.									
by the end of Grade 8 , students will:									
A. Habits of Mind									
1. Evaluate the strengths and weaknesses of data, claims, and arguments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Communicate experimental findings to others.	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Recognize that the results of scientific investigations are seldom exactly the same and that replication is often necessary.	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Recognize that curiosity, skepticism, open-mindedness, and honesty are attributes of scientists.	XX	XX	XX	XX	XX	XX	XX	XX	XX
B. Inquiry and Problem Solving									

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1. Identify questions and make predictions that can be addressed by conducting investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Design and conduct investigations incorporating the use of a control.			XX		XX	XX	XX		
3. Collect, organize, and interpret the data that result from experiments.	XX	XX	XX	XX	XX	XX	XX	XX	XX
C. Safety									
1. Know when and how to use appropriate safety equipment with all classroom materials.	X	X	X	X	X	X	X	X	X
2. Understand and practice safety procedures for conducting science investigations.	X	X	X	X	X	X	X	X	X
STANDARD 5.2 (SCIENCE AND SOCIETY) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF HOW PEOPLE OF VARIOUS CULTURES HAVE CONTRIBUTED TO THE ADVANCEMENT OF SCIENCE AND TECHNOLOGY, AND HOW MAJOR DISCOVERIES AND EVENTS HAVE ADVANCED SCIENCE AND TECHNOLOGY.									
Descriptive Statement: Science is a human endeavor involving successes and failures, trials and tribulations. Students should know that great numbers of people from many cultures have contributed to our understanding of science and that science has a rich and fascinating history. This standard encourages students to learn about the people and events that have shaped or revolutionized important scientific theories and concepts.									
by the end of Grade 8 , students will:									
A. Cultural Contributions									
1. Recognize that scientific theories:									
• develop over time,	X	X		X					
• depend on the contributions of many people, and	X	X		X		X	X		
• reflect the social and political climate of their time.	X	X		X		X	X		

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2. Know that scientists are men and women of many cultures who often work together to solve scientific and technological problems.	X	X	X	X	X	X	X	X	X
3. Describe how different people in different cultures have made and continue to make contributions to science and technology.	X	X		X		X	X		
B. Historical Perspectives									
1. Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.		X		X		X	X		
2. Describe the development and exponential growth of scientific knowledge and technological innovations.	X	X	X	X	X	X	X	X	X
STANDARD 5.3 (MATHEMATICAL APPLICATIONS) ALL STUDENTS WILL INTEGRATE MATHEMATICS AS A TOOL FOR PROBLEM-SOLVING IN SCIENCE, AND AS A MEANS OF EXPRESSING AND/OR MODELING SCIENTIFIC THEORIES.									
Descriptive Statement: Science cannot be practiced or learned without appreciation of the role of mathematics in discovering and expressing natural laws. This standard recognizes the need for students to fully integrate mathematics skills with their learning of science.									
by the end of Grade 8 , students will:									
A. Numerical Operations									
1. Express quantities using appropriate number formats, such as:									
• decimals.	XX	XX	XX	XX	XX	XX	XX	XX	XX
• percents.	XX		X	X	XX				
• scientific notation.	X	X	X	X	X	X	X	X	X

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B. Geometry and Measurement									
1. Perform mathematical computations using labeled quantities and express answers in correctly derived units.	XX	XX	XX	XX	XX	XX	XX	XX	XX
C. Patterns and Algebra									
1. Express physical relationships in terms of mathematical equations derived from collected data.	X	X	X	XX	X				X
D. Data Analysis and Probability									
1. Represent and describe mathematical relationships among variables using:									
• graphs.	XX	XX	XX	X	X	XX	X	X	X
• tables.	XX	XX	XX	X	XX	XX	XX	XX	X
2. Analyze experimental data sets using measures of central tendency:									
• mean.	XX	XX	XX	XX	X			X	XX
• mode.	X	X	X	X	X			X	X
• median.	X	X	X	X	X			X	X
3. Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables when appropriate.	X	X	X		X				
4. Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.	X	X	XX		X	X	X	X	XX
STANDARD 5.4 (NATURE AND PROCESS OF TECHNOLOGY) ALL STUDENTS WILL UNDERSTAND THE INTERRELATIONSHIPS BETWEEN SCIENCE AND TECHNOLOGY AND DEVELOP A CONCEPTUAL UNDERSTANDING OF THE NATURE AND PROCESS OF TECHNOLOGY.									

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Descriptive Statement: This standard has three equally important strands:

- Developing students' understanding of the interrelationship between science and technology;
- Introducing students to and expanding their understanding of the nature of technology; and
- Introducing and developing students' abilities with technological design including experiences in predicting, decision making, critical thinking and ultimately, problem solving.

by the end of **Grade 8**, students will:

A. Science and Technology

1. Compare and contrast science with technology, illustrating similarities and differences between these two human endeavors.	X	X	X	X	X	X	X	X	X
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B. Nature of Technology

1. Analyze a product or system to determine the problem it was designed to solve, the design constraints, trade-offs and risks involved in using the product or system, how the product or system might fail, and how the product or system might be improved.	XX	XX	XX	X	XX	X	X	XX	XX
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C. Technological Design

1. Recognize how feedback loops are used to control systems.	X	X	X	X	X	XX	X	X	X
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STANDARD 5.8 (EARTH SCIENCE) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF THE STRUCTURE, DYNAMICS, AND GEOPHYSICAL SYSTEMS OF THE EARTH.

Descriptive Statement: The study of science should include a study of the planet Earth and its relationship to the rest of the universe. This standard describes what students should know about the composition of the Earth and the forces that shape it, while standard 5.9 describes what students should know about astronomy and space science.

by the end of **Grade 8**, students will:

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A. Earth's Properties and Materials									
Reinforce indicators from previous grade level.	XX	XX		XX		XX	XX	XX	XX
B. Atmosphere and Water									
1. Describe conditions in the atmosphere that lead to weather systems and how these systems are represented on weather maps	XX					X			
C. Processes that Shape the Earth									
1. Explain how Earth's landforms and materials are created through constructive and destructive processes.	X	XX	X	XX	X	X	XX	XX	X
2. Show how successive layers of sedimentary rock and the fossils contained in them can be used to confirm the age, history, changing life forms, and geology of Earth.		X		XX			XX		
D. How We Study the Earth									
1. Utilize data gathered from emerging technologies (i.e. geographic information systems (GIS) and global positioning systems (GPS)) to create representations and describe processes of change on the Earth's surface.	XX	XX	X	X	X	X	XX	X	X
2. Explain how technology designed to investigate features of the Earth's surface impacts how scientists study the Earth	XX	X	XX	X	XX	XX	X	X	X
STANDARD 5.9 (ASTRONOMY & SPACE SCIENCE) ALL STUDENTS WILL GAIN AN UNDERSTANDING OF THE ORIGIN, EVOLUTION, AND STRUCTURE OF THE UNIVERSE.									
Descriptive Statement: The study of science should include a study of the planet Earth and its relationship to the rest of the universe. This standard describes what students should know about astronomy and space science, while Standard 5.8 describes what students should know about the composition of the earth and the forces that shape it.									

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by the end of Grade 8 , students will:									
A. Earth, Moon, Sun System									
1. Investigate the Earth, moon, and sun as a system and explain how the motion of these bodies results in the phases of the moon and eclipses.									
2. Explain how the regular and predictable motions of the Earth and moon produce tides.									
3. Explain how the tilt, rotation, and orbital pattern of the Earth relative to the sun produce seasons and weather patterns.									
B. Solar System									
1. Describe the physical characteristics of the planets and other objects within the solar system and compare Earth to the rest of the planets.									
C. Stars									
1. Understand that the sun is a star and that it shares characteristics with other stars.									
D. Galaxies and Universe									
1. Know that the universe consists of many billions of galaxies, each including billions of stars.									
STANDARD 5.10 (ENVIRONMENTAL STUDIES) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF THE ENVIRONMENT AS A SYSTEM OF INTERDEPENDENT COMPONENTS AFFECTED BY HUMAN ACTIVITY AND NATURAL PHENOMENA.									

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Descriptive Statement: Creating an awareness of the need to protect, conserve and preserve natural resources is a goal of science education. This standard calls for students to develop knowledge of environmental issues, including management of natural resources, production and use of energy, waste management, and the interdependence of ecosystems.									
by the end of Grade 8 , students will:									
A. Natural Systems and Interactions									
1. Investigate the impact of catastrophic events such as forest fires, floods, and hurricanes on the environment of New Jersey.	XX	XX				X	X		X
B. Human Interactions and Impact									
1. Compare and contrast practices that affect the use and management of natural resources.			XX		XX	X		X	XX