

EarthComm Correlations for New Jersey Grade 12 Earth Systems/Environmental Science Content Standards

Correlation Key: “XX” Indepth Coverage = In depth coverage in student edition “X” Coverage = Coverage in student edition and/or teacher edition supports the development of the concept and/or skill.	Earth's Dynamic Geosphere			Understanding Your Environment			Earth's Fluid Spheres			Earth's Natural Resources			Earth System Evolution		
	G1	G2	G3	U1	U2	U3	F1	F2	F3	N1	N2	N3	E1	E2	E3
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 12, students will:															
A. Habits of Mind															
1. When making decisions, evaluate conclusions, weigh evidence, and recognize that arguments may not have equal merit.	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
2. Assess the risks and benefits associated with alternative solutions.	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	Xx
3. Engage in collaboration, peer review, and accurate reporting of findings.	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
4. Explore cases that demonstrate the interdisciplinary nature of the scientific enterprise.			xx		x	xx	x	x	x	x	x	x		x	x
B. Inquiry and Problem Solving															
1. Select and use appropriate instrumentation to	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx

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design and conduct investigations.															
2. Show that experimental results can lead to new questions and further investigations.	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx

C. Safety															
1. Understand, evaluate and practice safe procedures for conducting science investigations.	x	x	x	x	x	x	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 12**, students will:

A. Cultural Contributions															
1. Recognize the role of the scientific community in responding to changing social and political conditions and how scientific and technological achievement effect historical events.	x	x	x	x	x	x	xx	x	x	xx	xx	xx	x	x	x

B. Historical Perspectives															
1. Examine the lives and contributions of important scientists who effected major breakthroughs in our understanding of the natural and designed world	x	xx	xx	x	x	x	x	x	x	xx	x	x	x	x	x
2. Discuss significant technological achievements in which science has played an important part as well as technological advances that have contributed directly to the advancement of scientific knowledge.	xx	xx	xx	x	x	x	x	xx	x	x	xx	x	xx	x	x

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3. Describe the historical origin of important scientific developments such as atomic theory, genetics, plate tectonics, etc., showing how scientific theories develop, are tested, and can be replaced or modified in light of new information and improved investigative techniques.	x	xx	x	x	x	x	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 recognized the need for students to fully integrate mathematics skills with their learning of science.															
by the end of Grade 12 , students will:															
A. Numerical Operations															
Reinforce indicators from previous grade level.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
B. Geometry and Measurement															
1. When performing mathematical operations with measured quantities, express answers to reflect the degree of precision and accuracy of the input data.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
C. Patterns and Algebra															
1. Apply mathematical models that describe physical phenomena to predict real world events.	xx	x	x				xx			xx			xx	x	
D. Data Analysis and Probability															
1. Construct and interpret graphs of data to represent inverse and non-linear relationships, and statistical distributions.	xx	xx	xx	x	x	xx	xx	xx	xx	xx	x	xx	xx	xx	x
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 standards 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 student' abilities with technological design including experiences in predicting, decision making, critical thinking an ultimately, problem solving.

by the end of **Grade 12**, students will:

A. Science and Technology

1. Know that scientific inquiry is driven by the desire to understand the natural world and seeks to answer questions that may or may not directly influence humans, while technology is driven by the need to meet human needs and solve human problems.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
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B. Nature of Technology

1. Assess the impacts of introducing new technology in terms of alternative solutions, costs, tradeoffs, risks, benefits and environmental impact.	x	x	x	x	x	x	x	x	x	xx	xx	xx	x	x	x
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C. Technological Design

1. Plan, develop, and implement a proposal to solve an authentic, technological problem.	x		xx			xx	x	x	xx	xx	xx	xx			
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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 12**, students will:

A. Earth's Properties and Materials

1. Explain the interrelationship of the geosphere, hydrosphere, and the atmosphere.	x	x	x	xx	xx	xx	xx	xx	xx	x	x	xx	x	x	x
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B. Atmosphere and Water

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1. Describe how weather (in the short term) and climate (in the long term) involve the transfer of energy in and out of the atmosphere.								x	x						xx
C. Processes that Shape the Earth															
1. Use the theory of plate tectonics to explain the relationship among earthquakes, volcanoes, mid-ocean ridges, and deep-sea trenches.	xx	xx	xx												xx
2. Know that Earth is a system in which chemical elements exist in fixed amounts and move through the solid Earth, oceans, atmosphere, and living things as part of geochemical cycles.	xx	x	x	x	x	x	xx	x	x	x	x	x	x	xx	x
3. Recognize that the evolution of life on Earth has changed the composition of Earth's atmosphere through time.															
D. How We Study the Earth															
1. Analyze the evidence produced by a variety of techniques that is used to understand changes in the Earth that have occurred over time.															
• topography	xx	xx	x	x	x	x	x	x	x	x	x	x	x	xx	x
• fossils				xx						x					xx
• rock stratification				xx											
• ice cores							x		xx					xx	
• radiometric data				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.															
by the end of Grade 12, students will:															
A. Earth, Moon, Sun System															
Reinforce indicators from previous grade level.								x						xx	xx

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B. Solar System															
1. Explain that our solar system coalesced from a nebular cloud of gas and dust left from exploding stars.														XX	
C. Stars															
1. Describe the physical characteristics, stages of development, and the apparent motions of stars.														XX	
D. Galaxies and Universe															
1. Describe data gathering and observation technologies and explain how they are used to explore the solar system and beyond.														XX	
2. Cite evidence to describe the scientific theory of the origin of the universe and the current explanations of its evolution.														XX	
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.															
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 12 , students will:															
A. Natural Systems and Interactions															
1. Distinguish naturally occurring process from those believed to have been modified by human interaction or activity.															
• climate change	XX					XX	XX		XX					XX	XX
• ozone production						X							XX		
• erosion and deposition	X			XX	XX				XX						
• threatened and endangered species										X					XX
B. Human Interactions and Impact															
1. Assess the impact of human activities on the cycling of matter and the flow of energy through				XX		XX		X		XX	XX	XX	XX	XX	XX

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ecosystems.															
2. Use scientific, economic, and other data to assess environmental risks and benefits associated with societal activity.	xx		xx	xx	xx	xx	xx	xx		xx	xx	xx		xx	