

EarthComm Correlations to Kansas

Grades 9 - 12 Earth and Space Science Standards

Correlation Key: "XX" In-depth Coverage = In-depth coverage of concept in student edition. "X" Coverage = Coverage in student edition and/or teacher edition supports the development of the concept.	Earth's Dynamic Geosphere	Understanding Your Environment	Earth's Fluid Spheres	Earth's Natural Resources	Earth System Evolution
	V PT E	BG RS LU	O SW C	ER MR WR	A CC CL

STANDARD 1: SCIENCE AS INQUIRY: As a result of their activities in grades 9-12, all students will develop the abilities necessary to do scientific inquiry and understandings about scientific inquiry.

Benchmark 1: Students will demonstrate the fundamental abilities necessary to do scientific inquiry.

1. Develop a rich understanding and curiosity of the natural (material) world through experience.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Develop questions and identify concepts that guide scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Design and conduct scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Use technology and mathematics to improve investigations and communications.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Formulate and revise scientific explanations and models using logic and evidence.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
6. Recognize and analyze alternative explanations and models.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
7. Communicate and defend a scientific argument.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

STANDARD 3: LIFE SCIENCE: As a result of their activities in grades 9-12, all students will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 3: Students will understand the major concepts of the theory of biological evolution.

1. That the theory of evolution is both the history of descent, with modification of different lineages of organisms from common ancestors, and the ongoing adaptation of organisms															X
2. That biologists use evolution theory to explain the earth's present day biodiversity—the number, variety and variability of organisms.															X
3. That biologists recognize that the primary mechanisms of evolution are natural selection and genetic drift.															X
4. The sources and value of variation.															X
5. That evolution is a broad, unifying theoretical framework in biology.															X

Benchmark 4: Students will understand the interdependence of organisms and their interaction with the physical environment.

1. Atoms and molecules on the earth cycle among the living and nonliving components of the biosphere.												X			
2. Energy flows through ecosystems.															
3. Organisms cooperate and compete in ecosystems.															
4. Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite. This fundamental tension has profound effects on the interactions among organisms.															
5. Human beings live within and impact ecosystems.												X	X	X	

STANDARD 4: EARTH AND SPACE SCIENCE: As a result of their activities in grades 9-12, students will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, and the organization and development of the universe.

Benchmark 1: Students will develop an understanding of the sources of energy that power the dynamic earth system.

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1. Essentially all energy on earth originates with the sun, is generated by radioactive decay in the earth's interior, or is left over from the earth's formation.	X										XX			XX	
2. Convection circulation in the mantle is driven by the outward transfer of the earth's internal heat.	X	XX													
3. Movable continental and oceanic plates make up the earth's surface; the hot, convecting mantle is the energy source for plate movement.	X	XX	X					XX							
4. Energy from the sun heats the oceans and the atmosphere, and affects oceanic and atmospheric circulation.								XX	X	X				X	XX
5. Energy flow determines global climate and, in turn, is influenced by geographic features, cloud cover, and the earth's rotation.	X							X						XX	XX

Benchmark 2: Students will develop an understanding of the actions and the interactions of the earth's subsystems: the geosphere, hydrosphere, atmosphere and biosphere.

1. The systems at the earth's surface are powered principally by the sun and contain an essentially fixed amount of each stable chemical atom or element.	X							X	X					XX	X
2. The processes of the carbon, rock, and water cycles.	XX			XX	X			X	X			XX		XX	
3. Water, glaciers, winds, waves, and gravity as weathering and erosion agents.					XX			X	X	XX					
4. Earth's motions and seasons.														XX	XX
5. The composition and structure of earth's atmosphere.	X														XX
6. Severe storms and safety precautions.									XX						
7. Basic weather forecasting, weather maps, fronts, and pressure systems.									XX						

Benchmark 3. Students will develop an understanding of the origin and evolution of the dynamic earth system.

1. The geologic time scale and how it relates to the history of the earth.	X			X												XX
2. Rock sequences, fossils, and radioactive decay and how they are used to estimate the time rocks were formed.	X	XX		XX					X	X				X	X	XX
3. Earth changes as short term (during a human's lifetime), such as earthquakes and volcanic eruptions, and as long term (over a geological time scale), such as mountain building and plate movements.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	X	X	X	XX	XX	XX
4. The dramatic changes in the earth's atmosphere (i.e. introduction of O ₂) which were affected by the emergence of life on earth.															X	
5. The rock cycle describes the formation of rocks.	X	X	X	XX							X	X				

Benchmark 4. Students will develop an understanding of the organization of the universe, and its development.

1. Organization of the universe.																XX
2. Expansion of the universe from a hot dense early state.																XX
3. Organization and development of stars, solar systems, and planets.																XX
4. General methods of the exploration of our solar system and space as well as the importance of such exploration.																XX

STANDARD 5: SCIENCE AND TECHNOLOGY: As a result of activities in grades 9-12, all students will develop understandings about science and technology and abilities of technological design.

Benchmark 1: Students will develop understandings about science and technology.

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1. Creativity, imagination, and a broad knowledge base are all required in the work of science and engineering.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Science and technology are pursued for different purposes.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3. Scientists in different disciplines ask different questions, use different methods of investigation, and accept different types of evidence to support their explanations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4. Science advances new technologies. New technologies open new areas for scientific inquiry.	X	X	XX	X	X	X	X	XX	X	X	XX	X	XX	X	X
5. Technological knowledge is often not made public because of the financial and military potential of the idea or invention. Scientific knowledge is made public through presentations at professional meetings and publications in scientific journals.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES: As a result of their activities in grades 9-12, all students will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.															
Benchmark 1: Students will develop an understanding of the overall functioning of human systems and their interaction with the environment in order to understand specific mechanisms and processes related to health issues.															
1. Hazards and the potential for accidents exist for all human beings.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. The severity of disease symptoms is dependent on many factors, such as human resistance and the virulence of the disease-producing organism.															
3. Informed personal choices concerning fitness and health involve an understanding of chemistry and biology.															
4. Selection of foods and eating patterns determine nutritional balance.															
5. Sexuality is basic to healthy human development.															
6. Intelligent use of chemical products relates directly to an understanding of chemistry.												X			
Benchmark 2: Students will demonstrate an understanding of population growth.															
1. Rate of change in populations is determined by the combined effects of birth and death, and emigration and immigration.															
2. A variety of factors influence birth rates and fertility rates.															
3. Populations can reach limits to growth.															
Benchmark 3: Students will understand that human populations use natural resources and influence environmental quality.															
1. Natural resources from the lithosphere and ecosystems have been and will continue to be used to sustain human populations.											XX	XX	XX		
2. The earth does not have infinite resources.											XX	XX	XX		
3. Materials from human activities affect both physical and chemical cycles of the earth.											XX	XX	XX		
4. Humans use many natural systems as resources.											XX	XX	XX		
Benchmark 4: Students will understand the effect of natural and human-influenced hazards.															
1. Natural processes of earth may be hazardous for humans.	XX	XX	XX			XX									

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2. There is a need to assess potential risk and danger from natural and human induced hazards.	XX	XX	XX		X	XX		XX		X		X		X	
Benchmark 5: Students will develop an understanding of the relationship between science, technology, and society.															
1. Science and technology are essential components of modern society. Science and technology indicate what can happen, not what should happen. The latter involves human decisions about the use of knowledge.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Understanding basic concepts and principles of science and technology should precede active debate about the economics, policies, politics, and ethics of various challenges related to science and technology.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3. Progress in science and technology can be affected by social issues and challenges.	X	XX	X	X	X	X	X	X	X	XX	XX	X	X	XX	X
STANDARD 7: HISTORY AND NATURE OF SCIENCE: As a result of activities in grades 9-12, all students will develop understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.															
Benchmark 1: Students will develop an understanding that science is a human endeavor.															
1. Demonstrate an understanding of science as both vocation and avocation.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Explain how science uses peer review, replication of methods, and norms of honesty.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Recognize the universality of basic science concepts and the influence of personal and cultural beliefs that embed science in society.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4. Recognize that society helps create the ways of thinking (mindsets) required for scientific advances, both toward training scientists and educating a populace to utilize benefits of science (e.g., standards of hygiene, attitudes toward forces of nature, etc.).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5. Recognize society's role in supporting topics of research and determining institutions where research is conducted.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Benchmark 2: Students will develop an understanding of the nature of scientific knowledge.															
1. Demonstrate an understanding of the nature of scientific knowledge.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Benchmark 3: Students will understand science from historical perspectives.															
1. Demonstrate an understanding of the history of science.	X	XX	X	XX	X	X	X	X	XX	XX	X	X	X	XX	X