

Eighth Grade

Medina County Schools'

Course of Study

For

Science

June, 2009

STANDARD 1: EARTH AND SPACE SCIENCES

Students demonstrate an understanding about how Earth systems and processes interact in the geosphere resulting in the habitability of Earth. This includes demonstrating an understanding of the composition of the universe, the solar system and Earth. In addition, it includes understanding the properties and the interconnected nature of Earth's systems, processes that shape Earth and Earth's history. Students also demonstrate an understanding of how the concepts and principles of energy, matter, motion and forces explain Earth systems, the solar system and the universe. Finally, they grasp an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with Earth and space sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Describe how the positions and motions of the objects in the universe cause predictable and cyclic events.	SC.1.A.8.1 <i>The Universe</i>	1. Describe how objects in the solar system are in regular and predictable motions that explain such phenomena as days, years, seasons, eclipses, tides and moon cycles.	Vocabulary
	SC.1.A.8.2	2. Explain that gravitational force is the dominant force determining motions in the solar system and in particular keeps the planets in orbit around the sun.	
	SC.1.A.8.3	3. Compare the orbits and composition of comets and asteroids with that of Earth.	Assessments
	SC.1.A.8.4	4. Describe the effect that asteroids or meteoroids have when moving through space and sometimes entering planetary atmospheres (e.g., meteor-"shooting star" and meteorite).	
			Resources/Remediation/ Enrichment

STANDARD 1: EARTH AND SPACE SCIENCES (Cont.)

Students demonstrate an understanding about how Earth systems and processes interact in the geosphere resulting in the habitability of Earth. This includes demonstrating an understanding of the composition of the universe, the solar system and Earth. In addition, it includes understanding the properties and the interconnected nature of Earth's systems, processes that shape Earth and Earth's history. Students also demonstrate an understanding of how the concepts and principles of energy, matter, motion and forces explain Earth systems, the solar system and the universe. Finally, they grasp an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with Earth and space sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
<p>B. Explain that the universe is composed of vast amounts of matter, most of which is at incomprehensible distances and held together by gravitational force. Describe how the universe is studied by the use of equipment such as telescopes, probes, satellites and spacecraft.</p>	<p>SC.1.B.8.5 <i>The Universe</i></p> <p>SC.1.B.8.6</p> <p>SC.1.B.8.7</p> <p>SC.1.B.8.8</p>	<p>5. Explain that the universe consists of billions of galaxies that are classified by shape.</p> <p>6. Explain interstellar distances are measured in light years (e.g., the nearest star beyond the sun is 4.3 light years away).</p> <p>7. Examine the life cycle of a star and predict the next likely stage of a star.</p> <p>8. Name and describe tools used to study the universe (e.g., telescopes, probes, satellites and spacecraft).</p>	<p>Vocabulary</p>
<p>C. Describe interactions of matter and energy throughout the lithosphere, hydrosphere and atmosphere (e.g., water cycle, weather and pollution).</p>	<p>See Grade 7 Page 119</p>	<p>No indicators present for this benchmark.</p>	<p>Assessments</p>
			<p>Resources/Remediation/ Enrichment</p>

STANDARD 1: EARTH AND SPACE SCIENCES (Cont.)

Students demonstrate an understanding about how Earth systems and processes interact in the geosphere resulting in the habitability of Earth. This includes demonstrating an understanding of the composition of the universe, the solar system and Earth. In addition, it includes understanding the properties and the interconnected nature of Earth's systems, processes that shape Earth and Earth's history. Students also demonstrate an understanding of how the concepts and principles of energy, matter, motion and forces explain Earth systems, the solar system and the universe. Finally, they grasp an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with Earth and space sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
D. Identify that the lithosphere contains rocks and minerals and that minerals make up rocks. Describe how rocks and minerals are formed and/or classified.	See Grade 6 Page 103	No indicators present for this benchmark.	Vocabulary
E. Describe the processes that contribute to the continuous changing of Earth's surface (e.g., earthquakes, volcanic eruptions, erosion, mountain building and lithospheric plate movements).	SC.1.E.8.9 <i>Earth Systems</i>	9. Describe the interior structure of Earth and Earth's crust as divided into tectonic plates riding on top of the slow moving currents of magma in the mantle.	Assessments
	SC.1.E.8.10	10. Explain that most major geological events (e.g., earthquakes, volcanic eruptions, hot spots and mountain building) result from plate motion.	
	SC.1.E.8.11	11. Use models to analyze the size and shape of Earth, its surface and its interior (e.g., globes, topographic maps, satellite images).	Resources/Remediation/ Enrichment
	SC.1.E.8.12	12. Explain that some processes involved in the rock cycle are directly related to thermal energy and forces in the mantle that drive plate motions.	

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Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
E. Describe the processes that contribute to the continuous changing of Earth's surface (e.g., earthquakes, volcanic eruptions, erosion, mountain building and lithospheric plate movements).	SC.1.E.8.13	13. Describe how landforms are created through a combination of destructive (e.g., weathering and erosion) and constructive processes (e.g., crustal deformation, volcanic eruptions and deposition of sediment).	Vocabulary
	SC.1.E.8.14	14. Explain that folding, faulting and uplifting can rearrange the rock layers so the youngest is not always found on top.	
	SC.1.E.8.15	15. Illustrate how the three primary types of plate boundaries (transform, divergent and convergent) cause different landforms (e.g., mountains, volcanoes and ocean trenches).	Assessments
			Resources/Remediation/ Enrichment

STANDARD 2: LIFE SCIENCES

Students demonstrate an understanding of how living systems function and how they interact with the physical environment. This includes an understanding of the cycling of matter and flow of energy in living systems. An understanding of the characteristics, structure and function of cells, organisms and living systems will be developed. Students will also develop a deeper understanding of the principles of heredity, biological evolution, and the diversity and interdependence of life. Students demonstrate an understanding of different historical perspectives, scientific approaches and emerging scientific issues associated with the life sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures.	See Grade 7 Page 122	No indicators present for this benchmark.	Vocabulary
B. Describe the characteristics of an organism in terms of a combination of inherited traits and recognize reproduction as a characteristic of living organisms essential to the continuation of the species.	SC.2.B.8.1 <i>Heredity</i>	1. Describe that asexual reproduction limits the spread of detrimental characteristics through a species and allows for genetic continuity.	Assessments
	SC.2.B.8.2	2. Recognize that in sexual reproduction new combinations of traits are produced which may increase or decrease an organism's chances for survival.	
	SC.2.B.8.3 <i>Evolutionary Theory</i>	3. Explain how variations in structure, behavior or physiology allow some organisms to enhance their reproductive success and survival in a particular environment.	Resources/Remediation/ Enrichment

STANDARD 2: LIFE SCIENCES (Cont.)

Students demonstrate an understanding of how living systems function and how they interact with the physical environment. This includes an understanding of the cycling of matter and flow of energy in living systems. An understanding of the characteristics, structure and function of cells, organisms and living systems will be developed. Students will also develop a deeper understanding of the principles of heredity, biological evolution, and the diversity and interdependence of life. Students demonstrate an understanding of different historical perspectives, scientific approaches and emerging scientific issues associated with the life sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.	See Grade 7 Page 123	No indicators present for this benchmark.	Vocabulary
D. Explain how extinction of a species occurs when the environment changes and its adaptive characteristics are insufficient to allow survival (as seen in evidence of the fossil record).	SC.2.D.8.4 <i>Evolutionary Theory</i> SC.2.D.8.5	4. Explain that diversity of species is developed through gradual processes over many generations (e.g., fossil record). 5. Investigate how an organism adapted to a particular environment may become extinct if the environment, as shown by the fossil record, changes.	Assessments
			Resources/Remediation/ Enrichment

STANDARD 3: PHYSICAL SCIENCES

Students demonstrate an understanding of the composition of physical systems and the concepts and principles that describe and predict physical interactions and events in the natural world. This includes demonstrating an understanding of the structure and properties of matter, the properties of materials and objects, chemical reactions and the conservation of matter. In addition, it includes understanding the nature, transfer and conservation of energy; motion and the forces affecting motion; and the nature of waves and interactions of matter and energy. Students demonstrate an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with the physical sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Relate uses, properties and chemical processes to the behavior and/or arrangement of the small particles that compose matter.	See Grade 7 Page 125	No indicators present for this benchmark.	Vocabulary
B. In simple cases, describe the motion of objects and conceptually describe the effects of forces on an object.	SC.3.B.8.1 <i>Forces and Motion</i>	1. Describe how the change in the position (motion) of an object is always judged and described in comparison to a reference point.	Assessments
	SC.3.B.8.2	2. Explain that motion describes the change in the position of an object (characterized by a speed and direction) as time changes.	Resources/Remediation/ Enrichment
	SC.3.B.8.3	3. Explain that an unbalanced force acting on an object changes that object's speed and/or direction.	

STANDARD 3: PHYSICAL SCIENCES (Cont.)

Students demonstrate an understanding of the composition of physical systems and the concepts and principles that describe and predict physical interactions and events in the natural world. This includes demonstrating an understanding of the structure and properties of matter, the properties of materials and objects, chemical reactions and the conservation of matter. In addition, it includes understanding the nature, transfer and conservation of energy; motion and the forces affecting motion; and the nature of waves and interactions of matter and energy. Students demonstrate an understanding of the historical perspectives, scientific approaches and emerging scientific issues associated with the physical sciences.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
C. Describe renewable and nonrenewable sources of energy (e.g., solar, wind, fossil fuels, biomass, hydroelectricity, geothermal and nuclear energy) and the management of these sources.	See Grade 6 Page 109	No indicators present for this benchmark.	Vocabulary
D. Describe that energy takes many forms, some forms represent kinetic energy and some forms represent potential energy; and during energy transformations the total amount of energy remains constant.	SC.3.D.8.4 <i>Nature of Energy</i> SC.3.D.8.5	4. Demonstrate that waves transfer energy. 5. Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves).	Assessments Resources/Remediation/ Enrichment

STANDARD 4: SCIENCE AND TECHNOLOGY

Students recognize that science and technology are interconnected and that using technology involves assessment of the benefits, risks and costs. Students should build scientific and technological knowledge, as well as the skill required to design and construct devices. In addition, they should develop the processes to solve problems and understand that problems may be solved in several ways.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life.	SC.4.A.8.1 <i>Understanding Technology</i>	1. Examine how science and technology have advanced through the contributions of many different people, cultures and times in history.	Vocabulary
	SC.4.A.8.2	2. Examine how choices regarding the use of technology are influenced by constraints caused by various unavoidable factors (e.g., geographic location, limited resources, social, political and economic considerations).	Assessments
B. Design a solution or product taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety and aesthetics).	SC.4.B.8.3 <i>Abilities To Do Technological Design</i>	3. Design and build a product or create a solution to a problem given more than two constraints (e.g., limits of cost and time for design and production, supply of materials and environmental effects).	
	SC.4.B.8.4	4. Evaluate the overall effectiveness of a product design or solution.	Resources/Remediation/ Enrichment

STANDARD 5: SCIENTIFIC INQUIRY

Students develop scientific habits of mind as they use the processes of scientific inquiry to ask valid questions and to gather and analyze information. They understand how to develop hypotheses and make predictions. They are able to reflect on scientific practices as they develop plans of action to create and evaluate a variety of conclusions. Students are also able to demonstrate the ability to communicate their findings to others.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools.	SC.5.A.8.1 <i>Doing Scientific Inquiry</i>	1. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations.	Vocabulary
B. Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions.	SC.5.A.8.2	2. Describe the concepts of sample size and control and explain how these affect scientific investigations.	Assessments
	SC.5.B.8.3 <i>Doing Scientific Inquiry</i>	3. Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams and symbols).	
	SC.5.B.8.4	4. Apply appropriate math skills to interpret quantitative data (e.g., mean, median and mode).	Resources/Remediation/ Enrichment

STANDARD 6: SCIENTIFIC WAYS OF KNOWING

Students realize that the current body of scientific knowledge must be based on evidence, be predictive, logical, subject to modification and limited to the natural world. This includes demonstrating an understanding that scientific knowledge grows and advances as new evidence is discovered to support or modify existing theories, as well as to encourage the development of new theories. Students are able to reflect on ethical scientific practices and demonstrate an understanding of how the current body of scientific knowledge reflects the historical and cultural contributions of women and men who provide us with a more reliable and comprehensive understanding of the natural world.

Ohio Benchmarks Grade 8	Instructional Organization	Grade Level Indicators	Notes
A. Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation).	SC.6.A.8.1 <i>Nature of Science</i>	1. Identify the difference between description (e.g., observation and summary) and explanation (e.g., inference, prediction, significance and importance).	Vocabulary
B. Explain the importance of reproducibility and reduction of bias in scientific methods.	SC.6.B.8.2. <i>Ethical Practices</i>	2. Explain why it is important to examine data objectively and not let bias affect observations.	Assessments
C. Give examples of how thinking scientifically is helpful in daily life.	See Grade 7 Page 130	No indicators present for this benchmark.	Resources/Remediation/ Enrichment