

Course SEM0103
Name of Publisher Glencoe/McGraw-Hill
Title of Submission Earth Science
Author Glencoe/McGraw-Hill
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ISBN 0078617006, STUDENT ED
*** Price** \$62.00 * Prices effective through October 1, 2006.

Content Area: Science
Grade/Course: SEM0103

Strand	The Scientific Process
Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION: Discover, invent, and investigate using the skills necessary to engage in the scientific process	

Topic	Scientific Inquiry			Page Reference
Benchmark SC.8.1.1	Determine the link(s) between evidence and the conclusion(s) of an investigation			The opportunity to address this objective is available. See the following: SE: 9-11, 18-19, 23 TWE: 9-11, 18-19, 23
Sample Performance Assessment (SPA)	The student: Determines if the conclusion(s) and evidence from an experiment or other sources are logically linked.			
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Determine and analyze the logical link(s) between evidence and the conclusion(s) of an investigation and apply to the real world	Determine the logical link(s) between the evidence and the conclusion(s) of an investigation	Identify a link between evidence and the conclusion(s) of an investigation	Recognize a link between evidence and the conclusion(s) of an investigation	

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Topic	Scientific Inquiry			Page Reference
Benchmark SC.8.1.2	Communicate the significant components of the experimental design and results of a scientific investigation			SE: 52-53, 228-229, 260-261, 350-351, 434, 444-445, 503, 533, 616-617, 746-747
Sample Performance Assessment (SPA)	The student: Presents formal written report and/or gives an oral presentation that communicates experimental design and results of an investigation.			TWE: 52-53, 228-229, 260-261, 350-351, 434, 444-445, 503, 533,
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Communicate, with clarity and detail, the components of the experimental design and results of a scientific investigation	Communicate the significant components of the experimental design and results of the scientific investigation	Communicate some significant details related to the experimental design and results of a scientific investigation	Communicate few details related to the experimental design and results of a scientific investigation	

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Strand	The Scientific Process
Standard 2: The Scientific Process: NATURE OF SCIENCE: Understand that science, technology, and society are interrelated	

Topic	Science, Technology, and Society			Page Reference
Benchmark SC.8.2.1	Describe significant relationships among society, science, and technology and how one impacts the other			SE: 12-14, 112, 262, 476, 592, 635-637, 638-640, 643-645, 649, 652
Sample Performance Assessment (SPA)	The student: Provides earth and space examples of how science, technology, and society have impacted each other.			TWE: 12-14, 112, 262, 476, 592, 635-637, 638-640, 643-645, 649, 652
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Evaluate and describe the relationships among society, science, and technology and how one impacts the other	Describe significant relationships among society, science, and technology and how one impacts the other	List a few relationships between society, science, or technology	Recognize relationships among society, science, and technology	

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Topic		Unifying Concepts and Themes		Page Reference
Benchmark SC.8.2.2		Describe how scale and mathematical models can be used to support and explain scientific		SE: 164-170, 171, 714-715
Sample Performance Assessment (SPA)		The student: Describes the scale of a model and mathematically how it supports and explains scientific data.		TWE: 164-170, 171, 714-715
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Analyze and describe how scale and mathematical models can be used to support and explain scientific data, using examples	Describe how scale and mathematical models can be used to support and explain scientific data	Give some examples of how scale or mathematical models can be used to support and explain scientific data	Recognize that scale and mathematical models can be used to support and explain scientific data	

Strand	Life and Environmental Sciences
Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT: Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment	

There are no benchmarks for this standard for this Grade/Course.

Strand	Life and Environmental Sciences
Standard 4: Life and Environmental Sciences: STRUCTURE AND FUNCTION IN ORGANISMS: Understand the structures and functions of living organisms and how organisms can be compared scientifically	

There are no benchmarks for this standard for this Grade/Course.

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Strand	Life and Environmental Sciences
Standard 5: Life and Environmental Sciences: DIVERSITY, GENETICS, AND EVOLUTION: Understand genetics and biological evolution and their impact on the unity and diversity of organisms	

Topic	Biological Evolution			Page Reference
Benchmark SC.8.5.1	Describe how changes in the physical environment affect the survival of organisms			The opportunity to address this objective is available. See the following: SE: 313-322, 488-491, 492-502 TWE: 313-322, 488-491, 492-502
Sample Performance Assessment (SPA)	The student: Explains how organisms respond (e.g., some organisms adapt, some move out, others die) to changes in the physical environment, such as tsunamis and hurricanes.			
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Generalize and describe how a change in the physical environment might affect the survival of organisms	Describe how changes in the physical environment affect the survival of organisms	Identify changes in the physical environment that may affect the survival of organisms	Recognize that changes in the physical environment affect the survival of organisms	

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Strand	Physical, Earth, and Space Sciences
Standard 6: Physical, Earth, and Space Science: NATURE OF MATTER AND ENERGY: Understand the nature of matter and energy, forms of energy (including waves) and energy transformations, and their significance in understanding the structure of the universe	

Topic	Waves			Page Reference
Benchmark SC.8.6.1	Explain the relationship between the color of light and wavelength within the electromagnetic spectrum			SE: 628-629
Sample Performance Assessment (SPA)	The student: Diagrams and explains the small band of visible light within the larger electromagnetic spectrum.			TWE: 628-629
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Generalize and explain the relationship between the color of light and wavelength within the electromagnetic spectrum	Explain the relationship between the color of light and the wavelength within the electromagnetic spectrum	Identify the relationship between the color of light and the wavelength within the electromagnetic spectrum	Recognize that there is a relationship between the color of light and the wavelength within the electromagnetic spectrum	

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Topic		Waves		Page Reference
Benchmark SC.8.6.2	Explain how seismic waves provide scientists with information about the structure of Earth's interior			SE: 304-306, 307-308, 311
Sample Performance Assessment (SPA)	The student: Explain the differences between the movement of seismic waves (e.g., primary _p', secondary _s', surface) and provides examples.			TWE: 304-306, 307-308, 311
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Make inferences about the structure of Earth's interior based on the movements of seismic waves	Explain how seismic waves provide scientists with information about the structure of Earth's interior	Identify different seismic waves and identify how at least one type of wave provides scientists with information about Earth's interior structure	Recall the movements of different seismic waves	
Topic		Waves		Page Reference
Benchmark SC.8.6.3	Identify the characteristics and properties of mechanical and electromagnetic waves			SE: 524-525, 526, 628-629, 630
Sample Performance Assessment (SPA)	The student: Identifies the characteristics and properties of mechanical and electromagnetic waves (e.g., reflection, refraction, absorption, wavelength).			TWE: 524-525, 526, 628-629, 630

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Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Explain the key characteristics and properties of mechanical and electromagnetic waves and provide real world examples	Identify the characteristics and properties of mechanical and electromagnetic waves	Name some of the characteristics and properties of mechanical and electromagnetic waves	Define mechanical and electromagnetic waves	

Strand	Physical, Earth, and Space Sciences
Standard 7: Physical, Earth, and Space Sciences: FORCE AND MOTION: Understand the relationship between force, mass, and motion of objects; and know the major natural forces: gravitational, electric, and magnetic	

Topic	Forces of the Universe			Page Reference
Benchmark SC.8.7.1	Explain that every object has mass and therefore exerts a gravitational force on other objects			SE: 210-211
Sample Performance Assessment (SPA)	The student: Explains that every object exerts a gravitational force on other objects.			TWE: 210-211
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Explain the proportional relationship between mass and gravity	Explain that every object has mass and therefore exerts a gravitational force on other objects	Recognize that every object has mass and exerts a gravitational force on other objects	Recognize there is a relationship between gravity and mass	

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Strand	The Scientific Process
Standard 8: Physical, Earth, and Space Sciences: EARTH AND SPACE SCIENCE: Understand the Earth and its processes, the solar system, and the universe and its contents	

Topic	Earth Materials			Page Reference
Benchmark SC.8.8.1	Compare the characteristics of the three main types of rocks			SE: 94-97, 98, 99-102, 103-109, 110-111
Sample Performance Assessment (SPA)	The student: Compares the characteristics of igneous, metamorphic, and sedimentary rocks.			TWE: 94-97, 98, 99-102, 103-109, 110-111
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Classify rocks by their characteristics and justify their placement into the three main categories	Compare the characteristics of the three main types of rocks and give an example of each	Describe the characteristics of the three main types of rocks	Identify the three main types of rocks	

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Topic	Earth Materials			Page Reference
Benchmark SC.8.8.2	Illustrate the rock cycle and explain how igneous, metamorphic, and sedimentary rocks are formed			SE: 90-93, 94-96, 99-100, 103, 109
Sample Performance Assessment (SPA)	The student: Diagrams the rock cycle, including interrelationships and formation of igneous, metamorphic, and sedimentary rocks			TWE: 90-93, 94-96, 99-100, 103, 109
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Diagram the rock cycle and identify the major factors (e.g., time, pressure, temperature) in the formation of igneous, metamorphic, and sedimentary rocks	Illustrate the rock cycle and explain how igneous, metamorphic, and sedimentary rocks are formed	Illustrate and define the rock cycle	Define the rock cycle	

Topic	Earth in the Solar System			Page Reference
Benchmark SC.8.8.3	Describe how the Earth's motions and tilt on its axis affect the seasons and weather patterns			SE: 492-493, 498, 661, 663-665, 680-681
Sample Performance Assessment (SPA)	The student: Diagrams and explains how Earth's motions and tilt on its axis affect the seasons and weather patterns.			TWE: 492-493, 498, 661, 663-665, 680-681
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Compare how the Earth's motions and tilt on its axis affect the seasons and weather patterns in different regions of the world	Describe how the Earth's motions and tilt on its axis affect the seasons and weather patterns	Recognize that the Earth's motions and tilt on its axis affect the seasons and weather patterns	Recognize the Earth's motions or tilt on its axis	

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Topic		Forces that Shape the Earth			Page Reference
Benchmark SC.8.8.4	Explain how the sun is the major source of energy influencing climate and weather on Earth				SE: 437, 492-498, 527-530
Sample Performance Assessment (SPA)	The student: Describes how the sun's heating of the Earth drives weather systems, ocean currents, and the water cycle.				TWE: 437, 492-498, 527-530
Rubric					
Advanced	Proficient	Partially Proficient	Novice		
Analyze and explain the importance of the sun's role in influencing the climate and weather on Earth	Explain how the sun is the major source of energy influencing climate and weather on Earth	Describe how the sun is the major source of energy on Earth	Recognize that the sun is the major source of energy on Earth		
Topic		Forces that Shape the Earth			Page Reference
Benchmark SC.8.8.5	Explain the concepts of continental drift and plate tectonics				SE: 272-275, 280-285
Sample Performance Assessment (SPA)	The student: Describes continental drift and how the Earth's crust is divided into plates that move on convection currents of magma in the mantle.				TWE: 272-275, 280-285

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Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Defend a prediction for future continental drift based on knowledge of plate tectonics	Explain the concepts of continental drift and plate tectonics	Define continental drift and plate tectonics	Recognize that the Earth's crust is made of moving plates	

Topic	Forces that Shape the Earth			Page Reference
Benchmark SC.8.8.6	Explain the relationship between density and convection currents in the ocean and atmosphere			The opportunity to address this objective is available. See the following: SE: 439-443, 518-523 TWE: 439-443, 518-523
Sample Performance Assessment (SPA)	The student: Describes the relationships between density and convection currents and the effect on global wind patterns and major ocean currents.			

Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Explain the relationship between density and convection currents and how they affect the ocean and atmosphere	Explain the relationship between density and convection currents in the ocean and atmosphere	Explain density and convection currents in the ocean and atmosphere	Define density and convection currents	

Topic	Forces that Shape the Earth			Page Reference
Benchmark SC.8.8.7	Describe the physical characteristics of oceans			SE: 514-517, 518-523,

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Sample Performance Assessment (SPA)	The student: Describes a variety of the ocean's physical characteristics (e.g., size, depth, geologic history, ocean floor, currents).			524-530, 542-547 TWE: 514-517, 518-523, 524-530, 542-547
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Explain the physical characteristics of the oceans over geologic time	Describe and illustrate the physical characteristics of the oceans	Identify, with assistance, the physical characteristics of the oceans	List some characteristics of the oceans	

Topic	The Universe			Page Reference
Benchmark SC.8.8.8	Describe the composition of objects in the galaxy			SE: 692-693, 696-701, 702-709, 710-713, 728, 729-732, 734-739, 740-741
Sample Performance Assessment (SPA)	The student: Describes the physical properties and chemical composition (e.g., solid, gaseous, hydrogen) of objects in the galaxy (e.g., stars, planets, comets)			TWE: 692-693, 696-701, 702-709, 710-713, 728, 729-732, 734-739, 740-741
Rubric				

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Analyze and compare the composition of different objects in the galaxy and make inferences about their physical and chemical properties	Describe the composition of objects in the galaxy	Identify the composition of objects in the galaxy	Recognize that all objects in the galaxy are made up of matter and energy	

Topic		Page Reference
Benchmark SC.8.8.9	Explain the predictable motions of the Earth and moon	SE: 492-493, 527-530, 663-665, 666-670, 675
Sample Performance Assessment (SPA)	The student: Explains the phenomena caused by the predictable motions of the Earth and moon (e.g., day, night, seasons, year, eclipses, phases of moon, tides).	TWE: 492-493, 527-530, 663-665, 666-670, 675

Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Analyze and explain the predictable motions of the Earth and moon and its impact on Earth	Explain the predictable motions of the Earth and moon	Describe the predictable motions of the Earth or moon	Recognize the predictable motions of the Earth and moon	

Topic		Page Reference
Benchmark SC.8.8.10	Compare the characteristics and movement patterns of the planets in our solar system	SE: 694, 696-701,

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Sample Performance Assessment (SPA)	The student: Compares the movement of the planets in our solar system (e.g., planets differ in size, orbit, number of moons, composition, surface features, and movement patterns).			702-709 TWE: 694, 696-701, 702-709
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Analyze and explain the characteristics and movement patterns of the planets in our solar system	Compare the characteristics and movement patterns of the planets in our solar system	Describe the characteristics or movement patterns of the planets in our solar system	Recognize that the planets in our solar system move in patterns	
Topic	The Universe			Page Reference
Benchmark SC.8.8.11	Describe the major components of the universe			SE: 740-741
Sample Performance Assessment (SPA)	The student: Describes that the universe consists of billions of galaxies which are classified by shape and contain most of the visible mass of the universe.			TWE: 740-741
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Explain the major components in the universe, their movements, and their characteristics	Describe and give examples of major components of the universe	Identify some of the major components of the universe	Recognize a few major components of the universe	

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Topic	The Universe			Page Reference
Benchmark SC.8.8.12	Describe the role of gravitational force in the motions of planetary systems			SE: 690-691
Sample Performance Assessment (SPA)	The student: Describes how gravitational force keeps the Earth, other planets, and their moons in their orbits.			TWE: 690-691
Rubric				
Advanced	Proficient	Partially Proficient	Novice	
Analyze the role of gravitational force in determining the shape of the motions of planetary systems	Describe the role of gravitational force in the motions of planetary systems	Illustrate the motions of planetary systems	Recognize that gravitational force has a role in the motions of planetary systems	