



MINNESOTA
Academic Standards – Science Grade 8
Earth Materials and Processes (F)
The Changing Surface of Earth (G)
The Water Planet (H)
The Air Around You (I)
Astronomy (J) © 2005

| OBJECTIVES | PAGE REFERENCES |
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| I. HISTORY AND NATURE OF SCIENCE | |
| A. Scientific World View The student will understand that science is a way of knowing about the world that is characterized by empirical criteria, logical argument and skeptical review. | |
| 1. The student will explain and give examples of how science can be used to make informed ethical decisions by identifying likely consequences of particular actions. | (F) AR 73 D 80 AS 89 (G) 4-5 <i>You Do It 5</i> (H) <i>Science and Society 28</i> <i>National Geographic Society Visualizing 77</i> |
| 2. The student will explain the development, usefulness and limitations of scientific models in the explanation and prediction of natural phenomena. | (F) <i>Design Your Own Lab 176-177</i> (G) <i>Model and Invent 144-145</i> (I) <i>Model and Invent 56-57</i> (J) <i>Model and Invent 94-95</i> CYD 95 |
| B. Scientific Inquiry The student will understand that scientific inquiry is used by scientists to investigate the natural world in systematic ways. | |
| 1. The student will know that scientific investigations involve the common elements of systematic observations, the careful collection of relevant evidence, logical reasoning and innovation in developing hypotheses and explanations. | (F) 98-101, 102-104, 106-108, 114-115 SJ 107 (J) 2-5 <i>You Do It 5</i> D 4 AC 5 |
| 2. The student will describe how scientists can conduct investigations in a simple system and make generalizations to more complex systems. | (F) <i>MiniLab 144</i> (G) <i>Model and Invent 26-27</i> AIL 26 (H) <i>MiniLab 80, 107</i> |
| The student will use multiple skills to design and conduct scientific investigations. | |
| 1. The student will specify variables to be changed, controlled and measured. | (F) <i>Design Your Own Lab 176-177</i> (G) <i>Design Your Own Lab 54-55</i> (H) <i>Design Your Own Lab 118-119</i> (I) <i>Design Your Own Lab 26-27</i> (J) <i>Design Your Own Lab 126-127</i> |

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| 2. The student will use sufficient trials and adequate sample size to ensure reliable data. | (H) <i>Lab 58-59</i> AIL 58 (I) <i>Lab 86-87, 103</i> AIL 116 |
| 3. The student will use appropriate technology and mathematics skills to access, gather, store, retrieve and organize data. | (F) <i>Science Online 108</i> (G) <i>CYD 115</i> (H) <i>Use the Internet 148-149</i> (I) <i>Use the Internet 116-117</i> AC 49 (J) <i>Model and Invent 94-95</i> |
| C. Scientific Enterprise The student will know that science and technology are human efforts that both influence and are influenced by civilizations and cultures worldwide. | |
| 1. The student will evaluate the credibility and validity of scientific and technological information from various sources. | (G) <i>You Do It 5</i> <i>Use the Internet 176-177</i> (J) <i>DI 27, 28, 77</i> |
| D. Historic Perspectives The student will understand how scientific discovery, culture, societal norms and technology have influenced one another in different time periods. | |
| 1. The student will relate personal experiences in scientific investigation to the experiences of scientists throughout history. | (F) <i>D 28</i> <i>ATE 178</i> (G) <i>You Do It 5</i> <i>Science and History 28</i> (H) <i>You Do It 5</i> <i>Oops! Accidents in Science 150</i> AC 4 |
| 2. The student will cite examples of how science and technology contributed to changes in agriculture, manufacturing, sanitation, medicine, warfare, transportation, information processing or communication. | (F) <i>102</i> (G) <i>Science Online 22</i> <i>Integrate Career 51</i> <i>Section Review 53 #3</i> (H) <i>78, 82-83</i> <i>Integrate Career 79</i> VL 79 (J) <i>29</i> |
| III. EARTH AND SPACE SCIENCE | |
| A. Earth Structure and Processes The student will identify Earth's composition, structure and processes. | |
| 1. The student will explain how earthquakes, volcanoes, sea-floor spreading and mountain building are evidence of the movement of crustal plates. | (F) <i>112-114, 159-161</i> <i>Section Review 115 #1,2,4-6; 161 #5,6</i> DI 114 AS 115, 161 CU 161 |
| 2. The student will describe how features on the Earth's surface are created and constantly changing through a combination of slow and rapid processes of weathering, erosion, sediment deposition, landslides, volcanic eruptions and earthquakes. | (F) <i>Section Review 115 #1,2,5; 129 #3; 161 #1,5,6</i> (G) <i>Section Review 68 #1,2; 74 #2-4; 81 #1</i> <i>Science Stats 84</i> CC 71 AS 81 |

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| 3. The student will describe the various processes and interactions of the rock cycle. | (F) 36-37 <i>MiniLab</i> 37 <i>National Geographic Society Visualizing</i> 38 <i>Section Review</i> 39 #2-6 AC 38 D 38 CU 39 |
| 4. The student will interpret successive layers of sedimentary rocks and their fossils to document the age and history of the Earth. | (G) 132-134, 136-137 <i>Science Online</i> 133, 136 <i>National Geographic Society Visualizing</i> 135 <i>Section Review</i> 137 #6 DI 133 D 134 AS 137 |
| 5. The student will recognize that constructive and destructive Earth processes can affect the evidence of Earth's history. | (G) 134 <i>National Geographic Society Visualizing</i> 135 <i>Section Review</i> 137 #3 D 134 DI 134 V 135 |
| 6. The student will classify and identify rocks and minerals using characteristics including but not limited to density, hardness and streak. | (F) <i>Lab</i> 26-27, 56-57 TF 10 DI 11 AIL 26, 56 AS 27, 57 |
| The student will investigate the impact humans have on the environment. | |
| 1. The student will identify and research an environmental issue and evaluate its impact. | (F) <i>Science Online</i> 142 CC 113, 165 DI 157 (H) 58-59 <i>Science and History</i> 60 AIL 58 (I) <i>Use the Internet</i> 116-117 |
| B. The Water Cycle, Weather and Climate The student will investigate how the atmosphere interacts with the Earth system. | |
| 1. The student will define radiation, conduction and convection and explain their effects on weather and climate. | (I) 13, 17-20, 21 <i>Section Review</i> 20 #1,6 TC 6 DI 18 UA 18 |
| 2. The student will identify the forces that create currents and layers in the Earth's atmosphere and water systems. | (H) 84, 86, 104-109 <i>Science Online</i> 105 <i>MiniLab</i> 107 (I) 10-15, 21-22, 24-25 <i>Applying Science</i> 12 <i>National Geographic Society Visualizing</i> 23 |

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| 3. The student will describe the effect of Earth's rotation on the winds and ocean currents. | (H) 104-106 DI 105 (I) 22 <i>Science Online</i> 22 <i>National Geographic Society Visualizing</i> 23 AC 23 |
| 4. The student will collect and use data to predict the weather. | (I) <i>Science Online</i> 45 <i>Lab</i> 55 CC 41, 46 IL 46 AS 51 |
| 5. The student will identify the composition and structures of the atmosphere. | (I) 8-15 <i>Science Online</i> 10 <i>Applying Science</i> 12 <i>MiniLab</i> 13 TF 13 |
| 6. The student will describe climate changes that have occurred over time. | (I) 78-84 IM 78 FF 78 D 78, 83 US 80 TF 83 AS 84 |
| C. The Universe The student will compare objects in the solar system and explain their interactions with the Earth. | |
| 1. The student will recognize that the sun is the principal energy source for the solar system and that this energy is transferred in the form of radiation. | (I) 13, 17-18, 21 TP 17 TF 18 (J) 109 |
| 2. The student will explain how the combination of the Earth's tilted axis and revolution around the sun causes the progression of seasons and weather patterns. | (I) 66 (J) 43-45 <i>Section Review</i> 45 #4 D 44 QD 44 |
| 3. The student will compare and contrast the planets, taking into account their composition, mass and distance from the sun, and recognize the conditions that have allowed life to flourish on Earth. | (J) 78, 112 <i>MiniLab</i> 84 <i>Section Review</i> 87 #1 <i>Table</i> 3 88-89 VL 71 D 78 QD 78, 86 AC 88 |
| 4. The student will use the predictability of the motions of the Earth and sun to explain the length of day, length of year, phases of the moon, eclipses, tides, and shadows. | (J) 41, 43-44, 46-50 <i>Section Review</i> 54 #1-4 <i>Lab</i> 55 (H) 113-116 <i>Science Online</i> 113 AC 114 |

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| The student will describe the composition and structure of the universe. | |
| 1. The student will recognize that the universe consists of many billions of galaxies, each containing many billions of stars, and that there are vast distances that separate these galaxies and stars from one another. | (J) 120-123, 125 <i>MiniLab</i> 122 DI 123 D 128 |
| 2. The student will recognize that the sun is a medium-sized star and is the closest star to Earth. It is the central and largest body in the solar system and is one of billions of stars in the Milky Way Galaxy. | (J) 109-112, 114, 120 <i>Section Review</i> 112 #1,4 DI 110 |

Codes Used for TWE Pages

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| AC | Activity |
| AIL | Alternative Inquiry Lab |
| AR | Active Reading |
| AS | Assessment |
| ATE | Analyze the Event |
| CC | Curriculum Connection |
| CU | Check for Understanding |
| CYD | Communicating Your Data |
| D | Discussion |
| DI | Differentiated Instruction |
| FF | Fun Fact |
| IL | Inquiry Lab |
| IM | Identifying Misconceptions |
| QD | Quick Demo |
| SJ | Science Journal |
| TC | Theme Connection |
| TF | Teacher FYI |
| TP | Tie to Prior Knowledge |
| UA | Use an Analogy |
| US | Using Science Words |
| V | Visualizing |
| VL | Visual Learning |