



COLORADO
Science Content Standards Grades 5-8
Earth Materials and Processes F
The Changing Surface of Earth G
The Water Planet H
The Air Around You I
Astronomy J
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| CONTENT STANDARDS | PAGE REFERENCES |
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| STANDARD 1: Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> • identifying and evaluating alternative explanations and procedures; | (F) <i>Section Review 104 #5</i> (I) AIL 116 (J) 53-54, 70-71 <i>Section Review 74 #6</i> TF 71 |
| <ul style="list-style-type: none"> • using examples to demonstrate that scientific ideas are used to explain previous observations and to predict future events (for example, plate tectonics and future earthquake activity); | (F) <i>Section Review 104 #6, 129 #4</i> <i>Use the Internet 116-117</i> SJ 133, 165 IM 133 (J) <i>Applying Science 53</i> |
| <ul style="list-style-type: none"> • asking questions and stating hypotheses that lead to different types of scientific investigations (for example, experimentation, collecting specimens, constructing models, researching scientific literature); | (F) AIL 116 (G) <i>Lab 15</i> <i>Design Your Own Lab 54-55</i> AIL 83 (H) 31 #20 (I) <i>Section Review 73 #4</i> <i>Use the Internet 116-117</i> |
| <ul style="list-style-type: none"> • creating a written plan for an investigation; | (F) <i>Design Your Own Lab 176-177</i> (G) <i>Design Your Own Lab 54-55</i> (H) <i>Design Your Own Lab 26-27</i> (I) <i>Design Your Own Lab 26-27</i> (J) <i>Design Your Own Lab 126-127</i> |
| <ul style="list-style-type: none"> • using appropriate tools, technologies, and measurement units to gather and organize data; | (G) CYD 115 (H) <i>Science Online 105</i> (I) CC 46 AC 49 (J) <i>Model and Invent 94-95</i> |

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| <ul style="list-style-type: none"> interpreting and evaluating data in order to formulate conclusions; | (F) <i>Lab 105</i> (G) <i>Lab 114-115</i> (H) <i>Use the Internet 148-149</i> (I) <i>Use the Internet 116-117</i> (J) <i>Applying Math 8 Lab 113</i> |
| <ul style="list-style-type: none"> communicating results of their investigations in appropriate ways (for example, written reports, graphic displays, oral presentations); | (F) <i>CYD 89</i> (G) <i>CYD 83</i> (H) <i>CYD 15</i> (I) <i>CYD 117</i> (J) <i>AIL 126</i> |
| <ul style="list-style-type: none"> using metric units in measuring, calculating, and reporting results; | (F) <i>Lab 26-27</i> (G) <i>Lab 25, 113</i> (H) <i>MiniLab 69</i> (I) <i>Lab 85</i> (J) <i>MiniLab 47 Lab 75</i> |
| <ul style="list-style-type: none"> explaining that scientific investigations sometimes result in unexpected findings that lead to new questions and more investigations; and | (F) <i>102-103</i> <i>Oops, Accidents in Science 90</i> <i>Figure 6 103</i> <i>TF 103</i> (H) <i>Oops, Accidents in Science 90</i> (I) <i>Oops, Accidents in Science 118</i> |
| <ul style="list-style-type: none"> giving examples of how collaboration can be useful in solving scientific problems and sharing findings. | (F) <i>Communicating Your Data 117</i> (J) <i>24-26, 29</i> <i>Science Online 25</i> <i>D 24</i> <i>CC 25</i> |
| <p>STANDARD 2: Physical Science: Students know and understand common properties, forms, and changes in matter and energy. (Focus: Physics and Chemistry) 2.1 Students know that matter has characteristic properties, which are related to its composition and structure. As students in grades 5-8 extend their knowledge, what they know and are able to do includes</p> | |
| <ul style="list-style-type: none"> examining, describing, comparing, measuring, and classifying objects based on common physical and chemical properties (for example, states of matter, mass, volume, electrical charge, temperature, density, boiling points, pH, magnetism, solubility); | (F) <i>Lab 26-27</i> <i>AIL 26</i> (G) <i>Try at Home MiniLab 40, 104</i> (H) <i>MiniLab 11</i> <i>Lab 15</i> <i>Design Your Own Lab 118-119</i> <i>CU 14</i> |
| <ul style="list-style-type: none"> separating mixtures of substances based on their properties (for example, solubility, boiling points, magnetic properties, densities); | (G) <i>MiniLab 44</i> (H) <i>MA 102</i> <i>DI 102</i> |

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| <ul style="list-style-type: none"> classifying and describing matter in terms of elements, compounds, mixtures, atoms, and molecules (for example, copper is an element, water is a compound, air is a mixture); and | (F) 8-9, 23-24 <i>Launch Lab 7</i> <i>National Geographic Society Visualizing 10</i> TC 6 (I) 8-9 D 9 VL 9 |
| <ul style="list-style-type: none"> developing simple models to explain observed properties of matter (for example, using a particle model to account for the solubility of a substance). | (F) <i>MiniLab 111</i> IL 10 (I) <i>Design Your Own Lab 26-27</i> <i>Lab 85</i> AS 27 |
| 2.2 Students know that energy appears in different forms, and can move (be transferred) and change (be transformed). As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> measuring quantities associated with energy forms (for example, temperature, mass, speed, distance, electrical charge, current, voltage); and | (F) <i>Lab 105</i> (H) <i>Lab 15</i> (I) <i>Lab 85</i> <i>Design Your Own Lab 26-27</i> <i>Model and Invent 56-57</i> (J) <i>Lab 60-61</i> |
| <ul style="list-style-type: none"> describing qualitative and quantitative relationships, using data and observations and graphs, associated with energy transfer or energy transformation (for example, speed of object vs. height of ramp; length of string vs. pitch of sound; electric current vs. volume of gas produced in electrolysis, with length of time kept constant). | (F) <i>Lab 82</i> <i>Integrate Career 77</i> CC 71 (I) <i>Design Your Own Lab 26-27</i> <i>Model and Invent 56-57</i> AS 57 (J) <i>Lab 60-61</i> |
| 2.3 Students understand that interactions can produce changes in a system, although the total quantities of matter and energy remain unchanged. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> identifying and classifying factors causing change within a system (for example, force, light, heat); | (F) 40, 45-48, 50-55, 126-129 <i>Section Review 48 #1,5</i> <i>Integrate Career 141</i> AC 128 (J) <i>Lab 60-61</i> QD 44 AS 61 |
| <ul style="list-style-type: none"> identifying and predicting what will change and what will remain unchanged when matter experiences an external force or energy change (for example, boiling a liquid; comparing the force, distance, and work involved in simple machines); | (F) <i>MiniLab 144</i> DI 132 IL 134 QD 142 (J) <i>Lab 60-61</i> AIL |

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| <ul style="list-style-type: none"> observing and gathering data to support the concept of conservation of mass within a closed system (for example, precipitation reaction, forming mixtures, gas production); | See Glencoe's <i>Chemistry L</i> © 2005. (L) 40 <i>MiniLab</i> 40 <i>Applying Math</i> 42 <i>Section Review</i> 45 #3 VL 40 |
| <ul style="list-style-type: none"> describing, measuring (for example, temperature, mass, volume, melting point of a substance) and calculating quantities before and after a chemical or physical change within a system (for example, temperature change, mass change, specific heat); and | (F) AC 164 (G) <i>Design Your Own Lab</i> 54-55 (H) <i>Science Online</i> 9 <i>Lab</i> 15 AC 9 DI 9 SJ 10 |
| <ul style="list-style-type: none"> describing, measuring (for example, time, distance, mass, force) and calculating quantities that characterize moving objects and their interactions within a system (for example, force, velocity, acceleration, potential energy, kinetic energy). | (F) <i>Section Review</i> 104 #6 <i>Lab</i> 105, 138 IL 163 (J) <i>Figure</i> 9 17 <i>MiniLab</i> 21 |
| STANDARD 3: Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. (Focus: Biology-- Anatomy, Physiology, Botany, Zoology, Ecology) 3.1 Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with their environment. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> constructing and using classification systems based on the structure of organisms; | (H) 135, 137-139 <i>MiniLab</i> 139 AP 126 IL 137 TF 137 |
| <ul style="list-style-type: none"> describing the importance of plant and animal adaptations, including local examples; | (G) 157-160 <i>Section Review</i> 161 #2,3,5,6 <i>Lab</i> 169 AC 158 (H) <i>Integrate Chemistry</i> 138 IL 137 (I) 70-73 <i>Section Review</i> 73 #2,3 |
| <ul style="list-style-type: none"> creating and interpreting food chains and food webs; | (H) <i>Section Review</i> 142 #5 TP 135 AR 136 MA 136 R 142 |

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| <ul style="list-style-type: none"> explaining the interaction and interdependence of nonliving and living components within ecosystems; and | (H) 16-18, 46-47, 49, 51-53 TP 16 VL 17 AC 46 (I) 107-109 <i>Use the Internet</i> 116-117 |
| <ul style="list-style-type: none"> describing how an environment's ability to provide food, water, space, and essential nutrients determines carrying capacity. | (G) 157-158 <i>Section Review</i> 161 #2,5 AC 158 D 158, 163 |
| 3.2 Students know and understand interrelationships of matter and energy in living systems. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> describing the basic processes of photosynthesis and respiration and their importance to life (for example, set up a terrarium or aquarium and make changes such as blocking out light); | (G) 163 <i>Integrate Chemistry</i> 163 D 163 (H) 135-136 IM 136 (I) 17 |
| <ul style="list-style-type: none"> comparing and contrasting food webs within and between different ecosystems (for example, grasslands, tundra, marine) and predicting the consequences of disrupting one of the organisms in a food web; | (G) <i>Section Review</i> 161 #6 (H) 46-47, 135-137 <i>Integrate Life Science</i> 47 CC 136 VL 136 |
| <ul style="list-style-type: none"> describing ways (for example, digestion, transport of nutrients by circulatory system) that multicellular organisms get food and other matter to their cells; | (G) 163, 166 (H) 16, 135 TF 16 US 17 IM 136 (I) <i>Integrate Health</i> 105 |
| <ul style="list-style-type: none"> explaining the recycling of materials by determining a pathway of a substance that is important for life (for example, trace water through an ecosystem); and | (G) 163 (H) 47, 49, 52-53 <i>National Geographic Society Visualizing</i> 48 <i>Section Review</i> 49 #5 DI 48 |
| <ul style="list-style-type: none"> describing the role of organisms in the decomposition and recycling of dead organisms (for example, bacteria's role in the decomposition and recycling of matter from a dead animal). | (F) 67 D 68 (G) DI 167 (H) 46 |
| 3.3 Students know and understand how the human body functions, factors that influence its structures and functions, and how these structures and functions compare with those of other organisms. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> describing the observable components and functions of a cell (for example, cell membrane, nucleus, cytoplasm, chloroplasts; movement of molecules into and out of cells); | (H) <i>MiniLab</i> 139 |

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| <ul style="list-style-type: none"> comparing and contrasting the basic structures and functions of different types of cells (for example, single-celled organisms in pond water, Elodea, onion cell, human cheek cell); | (H) <i>MiniLab</i> 139 |
| <ul style="list-style-type: none"> describing the growth and development of several organisms (for example, embryonic development of a vertebrate); | (G) 166 <i>Science Online</i> 166 <i>Section Review</i> 168 (H) 138 CU 142 |
| <ul style="list-style-type: none"> describing the structures and functions of human body systems; and | (I) 105 <i>Integrate Health</i> 105 TF 105 |
| <ul style="list-style-type: none"> describing and giving examples of noncommunicable diseases and communicable diseases (for example, heart disease and chicken pox). | See Glencoe's <i>Ecology E</i> © 2005 (E) 13, 71-72, 79, 81, 98-100, 105-106, 181-182, 185-188, 190-195 <i>National Geographic</i> 70 UAA 70 TFYI 185, 186, 187 |
| 3.4 Students know and understand how organisms change over time in terms of biological evolution and genetics. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> describing the purpose of body cell division and sex cell division; | See Glencoe's <i>Life's Structure and Function A</i> © 2005 (A) 98-104, 106-109 <i>Lab</i> 105 CC 107 AC 109 AS 111 |
| <ul style="list-style-type: none"> describing the role of chromosomes and genes in heredity (for example, genes control traits, while chromosomes are made up of many genes); and | See Glencoe's <i>Life's Structure and Function A</i> © 2005 (A) 100, 106-107, 114, 128 UAA 100 CC 107 |
| <ul style="list-style-type: none"> describing evidence that reveals changes or constancy in groups of organisms over geologic time. | (G) 159-161, 164-166 <i>Section Review</i> 161 #4; 168 #2-4 <i>National Geographic Society Visualizing</i> 165 D 159 VL 159 TF 164 IM 166 |

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| STANDARD 4: Earth and Space Science: Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space. (Focus: Geology, Meteorology, Astronomy, Oceanography) 4.1 Students know and understand the composition of Earth, its history, and the natural processes that shape it. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> explaining how minerals, rocks, and soils form; | (F) 11, 37, 39 <i>Integrate Physics</i> 11 <i>Lab</i> 13 <i>National Geographic Society Visualizing</i> 38 AS 13 SJ 51 (G) <i>National Geographic Society Visualizing</i> 43 AC 43 |
| <ul style="list-style-type: none"> explaining how fossils are formed and used as evidence to indicate that life has changed through time; | (G) 124-131 <i>Try at Home MiniLab</i> 125 <i>Integrate Life Science</i> 130 <i>Section Review</i> 131 #1-7 DI 130 VL 130 |
| <ul style="list-style-type: none"> modeling natural processes that shape Earth's surface (for example, weathering, erosion, mountain building, volcanic activity); and | (F) <i>Model and Invent</i> 176-177 (G) <i>MiniLab</i> 40, 65 <i>Design Your Own Lab</i> 54-55, 82-83 <i>Lab</i> 75 QD 41 |
| <ul style="list-style-type: none"> explaining the distribution and causes of natural events (for example, earthquakes, volcanoes, landslides). | (F) <i>Use the Internet</i> 116-117 <i>National Geographic Society Visualizing</i> 132 <i>Science Online</i> 133 AR 127 SJ 133 QD 159 CC 160 (G) <i>Section Review</i> 68 #1-3 |
| 4.2 Students know and understand the general characteristics of the atmosphere and fundamental processes of weather. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> describing the basic composition, properties, and structure of the atmosphere (for example, the range and distribution of temperature and pressure in the troposphere and stratosphere); | (I) 8-15 <i>Science Online</i> 10 <i>Applying Science</i> 12 <i>MiniLab</i> 13 <i>Section Review</i> 15 #2-6 VL 9 TF 9, 13 |

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| <ul style="list-style-type: none"> observing, measuring, and recording changes in weather conditions (for example, humidity, temperature, air pressure, cloud types, wind, precipitation); | (I) <i>Science Online</i> 45 <i>MiniLab</i> 53 <i>Model and Invent</i> 56-57 LD 38 IL 46 AC 49 |
| <ul style="list-style-type: none"> explaining how atmospheric circulation is driven by solar heating (for example, the transfer of energy by radiation, convection, conduction); and | (I) 17-19, 20, 21-22, 24-25 <i>MiniLab</i> 19 <i>Section Review</i> 20 #1,6 <i>National Geographic Society Visualizing</i> 23 TP 17 DI 18 D 18 |
| <ul style="list-style-type: none"> describing large-scale and local weather systems (for example, fronts, air masses, storms). | (I) 44-48 <i>Section Review</i> 51 #1-3, 5,6 SJ 48 AC 49 CC 50 AS 51 |
| 4.3 Students know major sources of water, its uses, importance, and cyclic patterns of movement through the environment. | |
| As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> investigating and comparing the properties and behavior of water in its solid, liquid, and gaseous states; | (H) <i>Launch Lab</i> 7 <i>Science Online</i> 9 AC 9 SJ 10 TF 11 IM 12 |
| <ul style="list-style-type: none"> describing the distribution and circulation of the world's water through oceans, glaciers, rivers, groundwater, and atmosphere; and | (H) 24-25, 36-43, 44-45, 51-53, 69-74, 100, 104-109 <i>Section Review</i> 43 #1,3 TF 40 |
| <ul style="list-style-type: none"> describing the composition and physical characteristics of oceans (for example, currents, waves, features of the ocean floor, salinity). | (H) <i>MiniLab</i> 111 <i>National Geographic Society Visualizing</i> 112 MA 102 AS 103 AR 105 CC 106 QD 113 |

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| 4.4 Students know the structure of the solar system, composition and interactions of objects in the universe, and how space is explored. | |
| As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> describing the basic components, composition, size, and theories of origin of the solar system; | (J) 70-72, 74, 76-81, 82-87 <i>Science Online</i> 71 <i>National Geographic Society Visualizing</i> 73 <i>Section Review</i> 81 #2-6; 87 #1-5 DI 72 SJ 72 |
| <ul style="list-style-type: none"> explaining the effects of relative motion and positions of the Sun, Earth, and Moon (for example, seasons, eclipses, moon phases, tides); | (J) 43-45, 46-50 <i>Section Review</i> 45 #2-6 AC 43 QD 49 UA 49 |
| <ul style="list-style-type: none"> comparing Earth to other planets (for example, size, composition, relative distance from the Sun); and | (J) 83 <i>MiniLab</i> 79 <i>Applying Math</i> 80 AS 74 TF 77 QD 78 CC 85 |
| <ul style="list-style-type: none"> identifying technology needed to explore space (for example, telescopes, spectrosopes, spacecraft, life support systems). | (J) 8-13, 15-18, 23-29 <i>Section Review</i> 13 #1,4 <i>Lab</i> 14 <i>Integrate Career</i> 18 <i>National Geographic Society Visualizing</i> 19 TF 12 AS 81 |
| STANDARD 5: Students know and understand interrelationships among science, technology, and human activity and how they can affect the world. | |
| As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> investigating and describing the extent of human uses of renewable and non-renewable resources (for example, forests, fossil fuels); | (F) <i>Figure</i> 3 69 <i>Integrate Career</i> 77 <i>Science Online</i> 79 CC 71 TF 77, 84 D 80 CU 81 VL 87 |
| <ul style="list-style-type: none"> describing advantages and disadvantages that might accompany the introduction of a new technology (for example, mountain bikes, cellular telephones, pagers); | (F) 77-81 <i>Section Review</i> 81 #1,4 D 74 AS 89 (J) <i>Section Review</i> 29 #1,3 CC 25 D 26 |

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| <ul style="list-style-type: none"> describing how the use of technology can help solve an individual or community problem (for example, using catalytic converters on automobiles to help reduce air pollution); and | (F) <i>Model and Invent</i> 88-89 (G) <i>Science Online</i> 78 (H) 82, 83 <i>Lab</i> 58-59 VL 79 (I) SJ 113 DI 113 AC 113 |
| <ul style="list-style-type: none"> describing how people use science and technology in their professions. | (F) <i>Science and History</i> 28 <i>Integrate Career</i> 52 (G) <i>Integrate Career</i> 51 (H) <i>Integrate Career</i> 108 (I) 52-54 VL 54 (J) 21-22, 23-29 <i>Integrate Career</i> 18, 51 |
| STANDARD 6: Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines. As students in grades 5-8 extend their knowledge, what they know and are able to do includes | |
| <ul style="list-style-type: none"> explaining why a controlled experiment must have comparable results when repeated; | (G) EA 83, 115 (H) EA 59 (I) EA 27 (J) EA 61 |
| <ul style="list-style-type: none"> giving examples of how scientific knowledge changes as new knowledge is acquired and previous ideas are modified (for example, through space exploration); | (F) 98-101, 102-104, 106-108, 110-115 <i>Integrate Chemistry</i> 103 <i>Section Review</i> 104 #5 DI 100 CU 104 (J) CU 29 |
| <ul style="list-style-type: none"> describing contributions to the advancement of science made by people in different cultures and at different times in history; | (F) <i>Science and History</i> 28 SJ 107 (G) 157 DI 156 (H) <i>Integrate History</i> 56 (J) 21-22 CC 16 CD 16 |
| <ul style="list-style-type: none"> identifying, comparing, and predicting variables and conditions related to change (for example, climate, population, motion); | (F) <i>National Geographic Society Visualizing</i> 76 <i>Use the Internet</i> 116-117 (I) 74-75 <i>MiniLab</i> 75 AC 75 DI 76 D 78 |

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| <ul style="list-style-type: none"> identifying and illustrating natural cycles within systems (for example, water, planetary motion, geological changes, climate); and | (F) 111 <i>National Geographic Society Visualizing</i> 109 (H) VL 25 AC 114 (J) <i>Lab</i> 75, 113 |
| <ul style="list-style-type: none"> using a model to predict change (for example, computer simulation, video sequence, stream table). | (F) <i>Use the Internet</i> 116-117 AC 113 (G) <i>Lab</i> 114-115 AIL 114 (J) <i>Lab</i> 60-61, 113 |

Codes Used for TWE Pages

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| AC | Activity |
| AIL | Alternative Inquiry Lab |
| AP | About the Photo |
| AR | Active Reading |
| AS | Assessment |
| CC | Curriculum Connection |
| CD | Cultural Diversity |
| CU | Check for Understanding |
| CYD | Communicating Your Data |
| D | Discussion |
| DI | Differentiated Instruction |
| EA | Error Analysis |
| IL | Inquiry Lab |
| IM | Identifying Misconceptions |
| LD | Lab Demonstration |
| MA | Make A Model |
| QD | Quick Demo |
| R | Reteach |
| SJ | Science Journal |
| TC | Theme Connection |
| TF | Teacher FYI |
| TP | Tie to Prior Knowledge |
| UA | Use an Analogy |
| US | Using Science Words |
| VL | Visual Learning |