

**GLENCOE CORRELATION**  
**EARTH SCIENCE: GEOLOGY,**  
**THE ENVIRONMENT, AND THE UNIVERSE**  
**MARYLAND**  
**Science Content Standards**  
**Grade Twelve**

CONTENT STANDARDS	PAGE REFERENCES
<b>1.0 Skills and Processes - Students will demonstrate the thinking and acting inherent in the practice of science.</b>	
<b>Scientific Inquiry</b>	
By the end of <b>grade 12</b> , students know and are able to do everything required at earlier grades and:	
1.12.1 access and process information from readings, investigations, and/or oral communications. (SFS 3.2) (SFS 4.1)	
The student will read a technical selection and interpret it appropriately. (CLG 1.5.6)	SE: <i>Internet</i> 466 <i>Activity</i> 620, 854 <i>Discovery Lab</i> 775 TWE: MIN 13, 656 CFU 675 P 732, 756 ESJ 750
<i>The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction. (CLG 1.3.4)</i>	TWE: M 28, 386 R 41 P 191 D 314 E 749
The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory. (CLG 1.2.7)	SE: <i>GeoLab</i> 70-71, 114-115, 174-175, 232-233 <i>MiniLab</i> 163, 229, 290, 348, 616 <i>Discovery Lab</i> 299
The student will create and/or interpret graphics (scale drawings, photographs, digital images, etc.). (CLG 1.5.4)	SE: <i>Mapping GeoLab</i> 42-43, 204-205 <i>Problem-Solving Lab</i> 63 <i>Activity</i> 72 TWE: A 41 R 49 CFU 139 ACT 158 P 189 TPK 219
1.12.2 formulate questions that lead to a testable <b>hypothesis</b> , which demonstrates the logical connections between the scientific concepts and the design of an <b>investigation</b> .	
The student will identify meaningful, answerable scientific questions. (CLG 1.2.1)	SE: <i>Design Your Own GeoLab</i> 92-93 TWE: TPK 11 P 13 E 100, 112, 265 A 227 AC 273 MIN 281 CL 289

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<i>The student will pose meaningful, answerable, scientific questions. (CLG 1.2.2)</i>	TWE: P 13, 685 R 161 TL 165 CFU 203 CL 215 A 221, 227
<b>1.12.3 use observations, research, and select appropriate scientific information to form predictions and hypotheses.</b>	
The student will formulate a working hypothesis. (CLG 1.2.3)	SE: <i>Design Your Own GeoLab</i> 92-93, 378-379, 570-571, 676-677 <i>Internet GeoLab</i> 352-353, 488-489, 642-643 <i>Section Assessment</i> 363 TWE: A 12 P 13
<b>1.12.4 design experimental approaches, which answer scientific questions.</b>	
The student will select appropriate instruments and materials to conduct an investigation. (CLG 1.2.5)	SE: <i>Design Your Own GeoLab</i> 92-93, 378-379, 676-677, 704-705 TWE: A 71, 115, 688 P 685
The student will identify appropriate methods for conducting an investigation and affirm the need for proper controls in an experiment. (CLG 1.2.6)	SE 11-16, 17-19, 25#23, 48, 930-931 <i>MiniLab</i> 12 <i>GeoLab</i> 232-233 <i>Design Your Own GeoLab</i> 378-379 TWE: A 10 P 13
<b>1.12.5 demonstrate safety when conducting an investigation.</b>	
The student will recognize safe laboratory procedures. (CLG 1.3.2)	SE: 12-13, 24#15, 25#19, 910-911 <i>GeoLab</i> 70-71, 114-115, 174-175 <i>Design Your Own GeoLab</i> 92-93, 378-379, 704-705
<i>The student will demonstrate safe handling of the chemicals and materials of science. (CLG 1.3.3)</i>	SE: <i>GeoLab</i> 70-71, 114-115, 174-175 <i>Design Your Own GeoLab</i> 92-93, 378-379, 676-677, 704-705
<b>1.12.6 use mathematical processes (measuring, calculating, etc.) when conducting investigations, analyzing information, and/or displaying information.</b>	
The student will recognize mathematics as part of the scientific endeavor, comprehend the nature of mathematical thinking, and become familiar with key mathematical ideas and skills. (CLG 4.6.2)	SE: 14-16, 44, 87-88, 94, 206, 380 <i>Mapping GeoLab</i> 42-43 TWE: D 15 ACT 403
The student will recognize the important role that mathematics serves when solving problems in physics. (CLG 5.7.2)	SE: 14-16, 87-88, 778-779 <i>Using Math</i> 778 <i>Problem-Solving Lab</i> 791 TWE: AC 85, 240 MIN 393, 836 E 695

<b>CONTENT STANDARDS</b>	<b>PAGE REFERENCES</b>
<i>The student will recognize mathematics as an integral part of the scientific process. (CLG 1.7.4)</i>	SE: 14-16, 87-88, 206, 542, 712-715, 770 <i>Problem-Solving Lab 35</i> <i>Mapping GeoLab 42-43</i> TWE: CB 494C P 615
The student will use ratio and proportion in appropriate situations to solve problems. (CLG 1.6.1)	SE: 35-36, 87-88, 644 <i>Discovery Lab 239, 747</i> <i>Mapping GeoLab 594-595</i> <i>Design Your Own GeoLab 798-799</i> TWE: P 213 AC 424 E 795
<i>The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets. (CLG 1.6.2)</i>	TWE: P 693
The student will express and/or compare small and large quantities using scientific notation and relative order of magnitude. (CLG 1.6.3)	SE: 16, 24#14, 505-507, 747-748, 816 TWE: A 16 ITI 56 CB 506 CFU 510 E 815
<i>The student will manipulate quantities and/or numerical values in algebraic equations. (CLG 1.6.4)</i>	SE: <i>GeoLab 20-21</i> <i>Using Math 748, 778, 850</i> TWE: AC 240, 426 E 241 MIN 503, 749, 777
The student will judge the reasonableness of an answer. (CLG 1.6.5)	SE: <i>GeoLab 20-21</i> <i>Internet GeoLab 352-353</i> <i>Problem-Solving Lab 637</i> <i>Design Your Own GeoLab 704-705, 798-799</i>
1.12.7 collect, organize, and display data in multiple ways that fit the context using appropriate instruments to effectively convey the information (e.g., <i>calculators, spreadsheets, and databases and graphing programs</i> ). (SFS 3.2) (SFS 4.1)	
<i>The student will test a working hypothesis. (CLG 1.2.4)</i>	SE: <i>Design Your Own GeoLab 92-93, 378-379, 676-677, 704-705</i> TWE: A 163
<i>The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques. (CLG 1.3.1)</i>	SE: <i>Design Your Own GeoLab 70-71, 92-93, 292-293, 378-379, 676-677, 704-705</i> <i>GeoLab 114-115, 174-175, 232-233, 292-293, 406-407</i>
The student will organize data appropriately using techniques such as tables, graphs, and webs (for graphs: axes labeled with appropriate quantities, appropriate units on axes, axes labeled with appropriate intervals, independent and dependent variables on correct axes, appropriate title). (CLG 1.4.1)	SE: 206 <i>Section Assessment 161, 221, 243</i> <i>GeoLab 232-233</i> <i>Design Your Own GeoLab 378-379</i> TWE: CFU 49 AC 85 A 163 TL 165

CONTENT STANDARDS	PAGE REFERENCES
The student will use computers and/or graphing calculators to produce tables, graphs, and spreadsheet calculations. (CLG 1.5.5)	TWE: ACT 81 P 693
1.12.8 analyze appropriate data to identify <b>trends</b> to form <b>conclusions</b> and apply what has been learned to evaluate the hypothesis.	
The student will analyze data to make predictions, decisions, or form conclusions. (CLG 1.4.2)	SE: <i>GeoLab</i> 70-71, 292-293 <i>MiniLab</i> 126, 254, 290 <i>Problem-Solving Lab</i> 172 TWE: A 141, 175, 321 CL 157
The student will use experimental data from various investigators to validate results. (CLG 1.4.3)	SE: <i>Problem-Solving Lab</i> 110 <i>GeoLab</i> 114-115 <i>Design Your Own GeoLab</i> 676-677 TWE: A 77
The student will determine the relationships between quantities and develop the mathematical model that describes these relationships. (CLG 1.4.4)	SE: <i>GeoLab</i> 20-21, 174-175, 232-233, 826-827 <i>Problem-Solving Lab</i> 110, 217 <i>Design Your Own GeoLab</i> 798-799
The student will check graphs to determine that they do not misrepresent results. (CLG 1.4.5)	SE: <i>Problem-Solving Lab</i> 502
The student will describe trends revealed by data. (CLG 1.4.6)	SE: 380 <i>Problem-Solving Lab</i> 18, 699 <i>GeoLab</i> 114-115 TWE: A 18, 291, 360 P 82 ACT 275
The student will use analyzed data to confirm, modify, or reject an hypothesis. (CLG 1.4.9)	SE: <i>Design Your Own GeoLab</i> 92-93, 378-379 <i>Section Assessment</i> 447 TWE: AC 633
1.12.9 interpret and communicate findings through speaking, writing, and drawing in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications. (SFS 3.1) (SFS 4.1)	
The student will demonstrate the ability to summarize data (measurements/observations). (CLG 1.5.1)	SE: <i>GeoLab</i> 20-21, 70-71, 516-517 <i>Design Your Own GeoLab</i> 92-93, 570-571 <i>MiniLab</i> 163, 587 <i>Internet GeoLab</i> 488-489 TWE: R 113 E 230
The student will explain scientific concepts and processes through drawing, writing, and/or oral communication. (CLG 1.5.2)	SE: <i>GeoLab</i> 114-115 <i>MiniLab</i> 536 TWE: E 6 EC 90 CL 482 A 489, 561 M 559

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The student will use tables, charts, and graphs to display data in making arguments and claims in both oral and written presentations. (CLG 2.8.3), (CLG 5.6.4)	SE: <i>GeoLab</i> 232-233, 292-293, 406-407, 618-619 <i>MiniLab</i> 428, 674 <i>Problem-Solving Lab</i> 486 <i>Internet GeoLab</i> 488-489, 642-643 TWE: A 163
<i>The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results. (CLG 1.5.3)</i>	TWE: ACT 81 P 693
The student will communicate conclusions derived through a synthesis of ideas. (CLG 1.5.9)	SE: <i>Design Your Own GeoLab</i> 92-93 <i>GeoLab</i> 174-175 <i>Activity</i> 234 TWE: A 171, 346 CL 289, 308, 667 R 611 P 650
<b>Critical Thinking</b>	
1.12.10 analyze similarities and differences of objects, materials, concepts, and actions.	
The student will describe similarities and differences when explaining concepts and/or principles. (CLG 1.5.8)	SE: 364-366, 839-842 <i>Design Your Own GeoLab</i> 92-93, 370-371 <i>MiniLab</i> 108, 636 <i>GeoLab</i> 114-115, 140-141 TWE: AC 372 P 424
1.12.11 construct various classification systems and infer degree of divergence and/or kinship of various objects, materials, concepts, actions, and organisms.	
The student will use, explain, and/or construct various classification systems. (CLG 1.5.7)	SE: 287-289, 364-366 <i>MiniLab</i> 79, 108 <i>Internet GeoLab</i> 852-853 TWE: P 89 A 148 M 169 MIN 286, 364
1.12.12 critique scientific information in order to detect <b>bias</b> and analyze the source of the bias. (SFS 2.2)	
The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers. (CLG 1.1.3)	SE: 443-447, 756-757 TWE: R 779 AC 842
The student will recognize data that are biased. (CLG 1.1.4), (CLG 2.8.2), (CLG 5.6.2)	TWE: CB 774C AC 842
The student will explain the factors that produce biased data. (CLG 1.1.5)	TWE: AC 842

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1.12.13 analyze the adequacy of the supporting evidence used to form conclusions, devise a plan, or solve a practical problem. (SFS 2.2)	
The student will determine the sources of error that limits the accuracy or precision of experimental results. (CLG 1.4.7)	SE: <i>Problem-Solving Lab</i> 110, 637 <i>GeoLab</i> 140-141, 174-175, 827-828 <i>Design Your Own GeoLab</i> 704-705, 798-799 TWE: A 21 P 218
1.12.14 provide supporting evidence when forming conclusions, devising a plan or solving a practical problem. (SFS 2.2)	
The student will defend the need for verifiable data. (CLG 1.2.8)	SE: <i>Problem-Solving Lab</i> 35, 88 <i>GeoLab</i> 140-141 <i>MiniLab</i> 348, 376 <i>Design Your Own GeoLab</i> 378-379 <i>Internet GeoLab</i> 488-489, 642-643, 852-853 <i>Mapping GeoLab</i> 594-595
<i>1.12.15 analyze and extend patterns.</i>	
1.12.16 analyze conclusions and modify ideas based on new information from developmentally appropriate readings, data, and the ideas of others.	
The student will modify or affirm scientific ideas according to accumulated evidence. (CLG 1.1.2)	SE: <i>Design Your Own GeoLab</i> 92-93 <i>Problem-Solving Lab</i> 110 TWE: IM 87, 212, 301, 344, 444, 461, 524, 554
1.12.17 describe to others how scientific information was used.	
<b>Applications of Science</b>	
1.12.18 apply scientific principles and/or concepts to understand a new situation.	
1.12.19 The student will apply skills, processes, and concepts of biology, chemistry, physics, and earth/space science to societal issues. (CLG 1.7.1)	SE: 142, 189-190, 219-221, 228-231, 254-257, 375-377, 620 TWE: EC 131 AC 196 TS 380
<i>The student will describe the role of science in the development of literature, art, and music. (CLG 1.7.3)</i>	SE: 678 <i>Focus on Careers</i> 148 TWE: TS 678
<i>The student will apply chemistry to the concepts of biology, earth/space science, and environmental science. (CLG 4.6.1)</i>	SE: 53-59, 60-66, 130-131, 155-158 <i>GeoLab</i> 70-71 TWE: AC 56, 101, 215 CL 246 CFU 663
<i>The student will apply physics to the concepts of biology, earth/space science, and environmental science. (CLG 5.7.1)</i>	SE: 181-190, 218-219, 280-282, 747-752, 821-825 TWE: CB 182, 403 AC 183, 240, 286
<i>The student will investigate the role of chemistry in areas of human endeavor and achievement. (CLG 4.6.3)</i>	SE: 142, 589-590, 736 TWE: AC 54, 720 CB 294, 696 P 727

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<i>The student will investigate the role of physics in all areas of human endeavor and achievement. (CLG 5.7.3)</i>	SE: 314-316, 354, 466, 747-752, 775-779, 800, 828 TWE: E 673 CD 688 AES 819
1.12.20 defend a position on a scientific issue and take into account the different types of risks and benefits in formulating a plan of action. (SFS 2.3)	
<i>The student will investigate an issue such as climatic changes or electric power generation. (CLG 2.8.1)</i>	SE: 294, 666-668, 690-697, 698-703, 706 Activity 176, 234 TWE: AC 193 EC 273 E 712
<i>The student will investigate a social issue related to physics such as alternate energy source, fiber optics in telecommunications, nuclear power, microwave technology, effect of power lines, etc. (CLG 5.6.1)</i>	SE: 354, 690-697, 854 TWE: CL 695 A 697 EC 788, 809 AES 810
1.12.21 The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues. (CLG 1.1.1), (CLG 2.8.5), (CLG 5.6.3) (SFS 2.3)	SE: 176, 234, 260, 324 TWE: R 377
The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science. (CLG 2.8.4)	SE: 11-13, 17-19 TWE: CB 4D A 5
<b>Technology</b>	
1.12.22 design, construct, and use <b>models</b> (e.g., math, computer, physical) to make <b>predictions</b> about actual events.	
<i>The student will use models and computer simulations to extend his/her understanding of scientific concepts. (CLG 1.4.8)</i>	TWE: A 41 ACT 81 ITI 305 P 693
1.12.23 demonstrate and explain how using existing tools extend knowledge and identify the limitations, which drive the need for new technologies (i.e., create improvements in observing, estimating, measuring, computing, collecting, and communicating scientific data and information).	
The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments. (CLG 1.7.6)	SE: 10, 22, 37-41, 72, 747-752, 828 TWE: CB 7 CL 38 AC 314 ACT 319
1.12.24 explain that when designing a device, process, or system (e.g., manufacturing, marketing, operating, maintaining, replacing, and disposing of) risk analysis and technology assessment determines how it will be employed.	
1.12.26 explain that science and technology have strongly influenced the course of history and cite how human inventiveness has brought new risks as well as improvements to human existence.	
The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society. (CLG 1.7.2)	SE: 10, 22, 72, 116, 294, 324, 354, 736, 752

CONTENT STANDARDS	PAGE REFERENCES
<b>History of Science</b>	
1.12.27 describe how various cultures from ancient times to the present have made contributions that led to current scientific ideas and technological invention.	
1.12.28 explain that scientific careers differ from one another in what is studied, techniques used, where studied, and outcomes sought but they share a common purpose and philosophy and are part of the same scientific enterprise.	
The student will investigate career possibilities in the various areas of science. (CLG 1.7.5)	SE: Focus on Careers 48, 148, 266, 438, 548, 650, 742, 860 TWE: E 6
<b>2.0 Earth/Space Science - Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.</b>	
<b>Materials and Processes That Shape A Planet</b>	
2.12.1 explain how the formation, <b>weathering, sedimentation</b> , and reformation of rock constitutes a continuing “ <b>rock cycle</b> ” in which the total amount of materials stay the same.	
The student will describe current efforts and technologies used to study the atmosphere, land, and oceans of Earth (remote sensing from space, undersea exploration, seismology, weather data collection). (CLG 2.1.1)	SE: 37-41, 312-316, 354, 385-387, 466, 500-504 TWE: CL 38 EC 39 ACT 40 P 314
The student will identify common rock forming mineral groups using a key and the properties of minerals (hardness, luster, specific gravity, streak, color, cleavage). (CLG 2.4.2)	SE: 84-91, 918-919 <i>Earth Science Online</i> 85 <i>Problem-Solving Lab</i> 88 <i>Design Your Own GeoLab</i> 92-93 TWE: CB 76D AC 85 CL 86 RE 86 CFU 91
The student will use texture and composition to describe various types of rocks (igneous, sedimentary, metamorphic). (CLG 2.4.3)	SE: 99-106, 107-113, 128-132, 133-139 <i>MiniLab</i> 108 <i>Problem-Solving Lab</i> 110, 138 <i>GeoLab</i> 140-141 TWE: ITI 107 E 111
<b>Earth History</b>	
The student will apply the law of conservation to the processes that affect rocks and minerals (metamorphism, weathering, erosion, deposition, melting, crystallization). (CLG 2.4.4)	SE: 69 TWE: E 695
The student will explain the dynamic activity of the earth (plate tectonics, sea floor spreading, faulting, earthquakes, volcanoes). CLG (2.4.5)	SE: 448-454, 455-459, 471-475, 476-479, 480-487, 495-499, 523-527, 528-534, 535-539 <i>Problem-Solving Lab</i> 458

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The student will explain the role of natural forces on Earth (retention of an atmosphere, an agent of erosion and deposition, tides and deep ocean currents). (CLG 2.2.2)	SE: 162-166, 181-190, 198-203, 400-405, 413-421, 495-499 TWE: CFU 166 CB 384D D 400 R 405
The student will interpret the effects of natural cycles on human activity (weathering, erosion and deposition, agriculture, aquaculture). CLG 2.5.2)	SE: 153-161, 167-173, 189-190 TWE: CB 152C-D RE 158 ESJ 164, 169 CL 171 IM 189 E 189
2.12.5 use <b>absolute dating</b> , <b>superposition</b> , and <b>fossil correlation</b> to explain the sequence of events, which make up Earth's <b>biologic</b> and <b>geologic</b> history.	
The student will research the change in belief in the age of the earth (fossil record, rock layers, radioactive dating, Big Bang theory). (CLG 2.6.2)	SE: 557-561, 562-565, 566-569, 577-579, 589-593, 849-851 TWE: CB 563, 576C A 579 CFU 579
The student will create a geologic time scale including eras, periods, and epochs (analogies, ratios, scale drawings, powers of ten). (CLG 2.7.1)	SE: 553-556 <i>Section Assessment 554</i> <i>Design Your Own GeoLab 570-571</i> TWE: MIN 554, 650 A 556 SF 648
The student will construct a model to show humans' place in the time continuum. (CLG 2.7.2)	SE: 639-641 <i>Design Your Own GeoLab 570-571</i> TWE: IM 662
<b>Plate Tectonics</b>	
2.12.6 describe Earth's surface in reference to <b>plate tectonics</b> (i.e., internal heat flow and the dynamic nature of Earth's <b>crust</b> ).	
The student will describe the structure of Earth (inner core, outer core, mantle, lithosphere – crust and upper mantle). (CLG 2.4.1)	SE: 8, 455-459, 503-504 TWE: A 502 CB 503
<b>Astronomy</b>	
2.12.7 identify and describe the properties, interactions, and the theories of formation of the universe and its components (i.e., galaxies, stars, <b>planets</b> , <b>asteroids</b> , <b>comets</b> , and meteors).	
The student will describe current efforts and technologies used to study the universe (optical telescopes, radio telescopes, spectroscopes, satellites, space probes, manned missions). (CLG 2.1.2)	SE: 747-752, 780-785, 786-792, 828, 854, 902-907 <i>Discovery Lab 775</i> TWE: ESJ 750 A 752 P 756
The student will explain the role of natural forces in the universe (formation of planets, orbital mechanics, stellar evolution). (CLG 2.2.1)	SE: 758-767, 775-779, 793-797, 821-825 <i>MiniLab 761, 777</i> <i>Problem-Solving Lab 791</i> TWE: D 764 ESJ 776 A 825

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The student will research the various planetary models (Ptolemy, Copernicus, Kepler, Galileo). (CLG 2.6.1)	SE: 775-779, 858-859 <i>Section Assessment 779</i> TWE: CB 774C R 779
The student will investigate various physical cycles found in the natural world (rock cycle, water cycle, tides, lunar phases, eclipses, seasons). (CLG 2.5.1)	SE: 138-139, 290-291, 370, 400-403, 762-767 <i>Earth Science Online 765</i> TWE: A 139, 767 MIN 763 E 764
The student will demonstrate the relative sizes and distances of planets in the solar system. (CLG 2.7.3)	SE: 780-785, 786-792 <i>Discovery Lab 747</i> <i>Section Assessment 785, 792</i> <i>Design Your Own GeoLab 798-799</i> TWE: ACT 780 CFU 785 RE 860
<i>2.12.8 compare the similarities and differences among the sun, the terrestrial planets, and the gas planets and relate those similarities and differences to the structure, scale, and formation of the solar system.</i>	
<b>Interactions of Hydrosphere and Atmosphere</b>	
<i>2.12.12 analyze the major components of the <b>atmosphere</b> and <b>hydrosphere</b> and explain how the transfer of <b>energy</b> through them influences Earth's <b>weather</b> and <b>climate</b>.</i>	
The student will describe heat transfer systems affecting the atmosphere, land, and oceans (convection, conduction, radiation from space and from within Earth). (CLG 2.3.1)	SE: 275-277, 299-304, 362, 404-405, 578-579 <i>MiniLab 302, 376</i> TWE: M 276 A 277 CFU 405
The student will investigate meteorological phenomena (hurricanes, tornadoes, floods, thunderstorms, blizzards). (CLG 2.3.2)	SE: 329-333, 334-340, 341-346, 347-351 <i>MiniLab 348</i> <i>Problem-Solving Lab 350</i> <i>Internet GeoLab 352-353</i> TWE: CB 328C-D R 333 A 340, 351
The student will research topics of current concern with regard to climate (greenhouse effect, global warming [or cooling], ocean currents). (CLG 2.3.3)	SE: 294, 370-371, 375-377, 724-729 <i>Earth Science Online 371, 725</i> TWE: AC 273 EC 273 P 371 R 377
The student will investigate various physical cycles found in the natural world (rock cycle, water cycle, tides, lunar phases, eclipses, seasons). (CLG 2.5.1)	SE: 138-139, 212, 290-291, 370, 400-403, 762-767 <i>Earth Science Online 765</i> TWE: A 139 MIN 763 E 764

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<i>2.12.15 explain the principles of hydrology including surface and ground water flows, aquifers, percolation, desalinization and sources of water contamination and pollution.</i>	
<i>2.12.16 analyze the major components, thermal structure and chemical composition of the atmosphere.</i>	
The student will describe heat transfer systems affecting the atmosphere, land, and oceans (convection, conduction, and radiation) from space and from within Earth. (CLG 2.3.1)	SE: 275-277, 299-304, 362, 404-405, 578-579 MiniLab 302, 376 TWE: M 276 A 277 CFU 405
<i>The student will describe changes in atmospheric conditions over time and explain possible causes including the greenhouse effect and ice age cycles.</i>	
<i>The student will relate the dramatic changes in the composition of the Earth's atmosphere (introduction of oxygen) to the presence of single-celled life forms.</i>	
<b>6.0 Environmental Science - Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.</b>	
<b>Flow of Matter and Energy</b>	
<i>6.12.1 analyze and explain the movement of matter and energy through the biosphere (lithosphere, hydrosphere, atmosphere, and organisms) and the influence of this movement on weather patterns, climatic zones, and the distribution of life.</i>	
<i>The student will demonstrate that matter cycles through and between living systems and the physical environment constantly being recombined in different ways. (CLG 6.1.1)</i>	SE: 69 TWE: E 695 ITP 905
<i>The student will analyze how the transfer of energy between atmosphere, land masses and oceans results in areas of different temperatures and densities that produce weather patterns and establish climate zones around the earth. (CLG 6.1.2)</i>	SE: 282-284, 299-304, 305-311, 329-333, 341-344, 361-363, 404-405 TWE: TPK 343 SF 436 CD 437
<b>Interdependence of Organisms</b>	
<i>6.12.2 use physical, chemical, biological, and ecological concepts to analyze and explain the interdependence of organisms within the environment.</i>	
<i>The student will explain how organisms are linked by the transfer and transformation of matter and energy at the ecosystem level. (CLG 6.2.1)</i>	SE: 664-665 Activity 432 TWE: TS 432 CL 585 AC 720
<i>The student will explain why interrelationships and interdependencies of organisms contribute to the dynamics of ecosystems. (CLG 6.2.2)</i>	TWE: TS 432 CL 585 CB 720 AC 720
<i>The student will conclude that populations grow or decline due to a variety of factors. (CLG 6.2.3)</i>	SE: 711-715, 742 Section Assessment 715 TWE: CB 710 MIN 713 M 714 A 715

CONTENT STANDARDS	PAGE REFERENCES
<i>The student will provide examples showing that natural selection leads to organisms that are well suited for survival in particular environments. (CLG 6.2.4)</i>	This objective can be met during teacher/class discussion.
<b>Natural Resources and Human Needs</b>	
<i>6.12.4 use concepts from chemistry, physics, biology, and ecology to analyze and interpret the impact both positive (recycling) and negative (toxic wastes) of human activities on the earth's resources (land, water, air, energy, biological).</i>	
<i>The student will evaluate the interrelationships between humans and air quality. (CLG 6.3.1)</i>	SE: 294, 380, 666-668, 724-729 <i>Earth Science Online 667</i> <i>Problem-Solving Lab 728</i> TWE: CB 654C-D CL 667 CFU 668 A 729
<i>The student will evaluate the interrelationship between humans and water quality and quantity. (CLG 6.3.2)</i>	SE: 228-231, 234, 254-257, 260, 669-675, 730-733, 898-901 TWE: AES 230 CB 654D CFU 733
<i>The student will evaluate the interrelationships between humans and land resources. (CLG 6.3.3)</i>	SE: 659-663, 716-723 <i>MiniLab 718</i> <i>Using Math 721</i> TWE: CB 654C M 660 A 663 ACT 719 R 723 CFU 723
<i>The student will evaluate the interrelationships between humans and biological resources. (CLG 6.3.4)</i>	SE: 656-657, 711-715 TWE: AC 720 P 727 MIN 732
<i>The student will evaluate the interrelationships between humans and energy resources. (CLG 6.3.5)</i>	SE: 683-689, 690-697, 698-703, 736, 741 <i>Problem-Solving Lab 699</i> TWE: CB 682C-D CL 684 AC 686 P 700

CONTENT STANDARDS	PAGE REFERENCES
<b>Environmental Issues</b>	
<i>6.12.5 investigate and analyze environmental issues from local to global perspectives (e.g., world population, food production and distribution, pollution and epidemics, biodiversity) to develop an action project that protects, sustains, or enhances the natural environment.</i>	
<i>The student will identify an environmental issue and formulate related research questions. (CLG 6.4.1)</i>	SE: Activity 234 Design Your Own GeoLab 676-677, 704-705 TWE: P 685 M 702 CFU 703 E 713, 722 CL 741
<i>The student will design and conduct the research. (CLG 6.4.2)</i>	SE: Activity 234 Design Your Own GeoLab 676-677, 704-705 TWE: P 685 M 702 CFU 703 E 713, 722 CL 741
<i>The student will interpret findings to form conclusions and make recommendations to help resolve the issue. (CLG 6.4.3)</i>	SE: Design Your Own GeoLab 676-677, 704-705 TWE: P 685 M 702 CFU 703 E 713 CL 741
<i>The student will apply the conclusions to develop and implement an action project. (CLG 6.4.4)</i>	SE: Design Your Own GeoLab 676-677, 704-705 TWE: P 685 M 702 CL 741
<i>The student will analyze the effectiveness of the action project in terms of achieving the desired outcomes. (CLG 6.4.5)</i>	SE: Design Your Own GeoLab 676-677, 704-705 TWE: P 685 M 702

## Codes Used for TWE Pages

A	Assessment
AC	Across the Curriculum
ACT	Activity
AES	Applying Earth Science
CB	Content Background
CD	Concept Development
CFU	Check for Understanding
CL	Collaborative Learning
D	Demo
E	Enrichment
EC	Environmental Connection
ESJ	Earth Science Journal
IM	Identifying Misconceptions
ITI	Interpreting the Illustration
ITP	Interpreting the Photo
M	Modeling
MIN	Meeting Individual Needs
P	Project
R	Reteach
RE	Reinforcement
SF	Section Focus
TL	Time Line
TPK	Tying to Prior Knowledge
TS	Teaching Strategies