

Science Textbook Correlation Matrices
Earth Science Standards of Learning
Publisher: Glencoe/McGraw-Hill

Text/Instructional Material Title: Glencoe Earth Science ©2002

Science Standard	Correlation By Page Numbers Make all correlations using the teacher text. Identify only <i>significant</i> areas of correlation. Use each bullet of the standard in the context of the stem. Please consult the 2003 Science Curriculum Framework for further information about each standard.
ES.1 The student will plan and conduct investigations in which	
a) volume, area, mass, elapsed time, direction, temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools;	31, 36, 47, 52–53, 197, 223, 385, 418, 438, 464, 469, 540–541, 663, 739, 754
b) technologies, including computers, probeware, and global positioning systems (GPS) are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions;	51, 66, 102, 135, 189, 216, 293, 307, 381, 451, 564, 617, 719, 740, 812–815
c) scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted;	25, 47, 111, 136, 172, 173, 387, 421, 442, 513, 540–541, 594, 719, 806, 808
d) variables are manipulated with repeated trials; and	10, 11, 24–25, 52–53, 202–203, 230–231, 758–759, 803
e) a scientific viewpoint is constructed and defended (the nature of science).	4, 6–7, 8, 9–11, 18–19, 149, 209, 265, 279, 331, 426, 754–756, 757, 801–802, 810–811

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ES.2 The student will demonstrate scientific reasoning and logic by	
a) analyzing how science explains and predicts the interactions and dynamics of complex Earth systems;	272–273, 277, 280–282, 284, 289, 294–295, 305, 462–465
b) recognizing that evidence is required to evaluate hypotheses and explanations;	6–7, 9–11, 18–19, 20, 28–29, 30–31, 53, 208, 277, 295, 355, 662–663, 811
c) comparing different scientific explanations for the same observations about the Earth;	276–277, 282, 284, 289, 405, 412, 419, 685, 702–703, 811
d) explaining that observation and logic are essential for reaching a conclusion; and	8, 9–11, 15, 21, 24–25, 28–29, 88, 140, 295, 408, 420–421, 733, 810–811
e) evaluating evidence for scientific theories.	51, 276–278, 281, 284, 293, 420–421, 456, 511, 672–673, 685, 704, 747–748, 757, 811

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ES.3 The student will investigate and understand how to read and interpret maps, globes, models, charts, and imagery. Key concepts include	
a) maps (bathymetric, geologic, topographic, and weather) and star charts;	155, 166–167, 168, 169, 170–171, 173, 178, 180
b) imagery (aerial photography and satellite images);	154, 172, 178
c) direction and distance measurements on any map or globe; and	418
d) location by latitude and longitude and topographic profiles.	155, 162–163, 168, 169, 180, 181, 491

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ES.4 The student will investigate and understand the characteristics of the Earth and the solar system. Key concepts include	
a) position of the Earth in the solar system;	702–703, 710, 720, 726
b) sun-Earth-moon relationships (seasons, tides, and eclipses);	500, 537, 538, 670–671, 675, 676, 677, 680–682, 696, 698
c) characteristics of the sun, planets, their moons, comets, meteors, and asteroids; and	700E-700F, 700, 702–703, 704–705, 706, 708–713, 714–719, 720–721, 722, 724–725, 730–731, 732–733, 734E, 741, 742–743, 744
d) the history and contributions of the space program.	638E-638F, 638–639, 647–649, 650, 651, 652, 653–654, 655, 656–657, 658, 659, 660–661, 666–667, 668–669

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ES.5 The student will investigate and understand how to identify major rock-forming and ore minerals based on physical and chemical properties. Key concepts include	
a) properties including hardness, color and streak, luster, cleavage, fracture, and unique properties; and	46, 47, 68–72, 80–81, 84–85, 86–87, 111, 119, 770–773
b) uses of minerals.	73–76, 77–79, 84–85, 86–87, 118F, 137, 138–140, 141, 146, 147, 148–149, 150–151

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ES.6 The student will investigate and understand how to identify common rock types based on mineral composition and textures and the rock cycle as it relates to the origin and transformation of rock types. Key concepts include	
a) igneous (intrusive and extrusive);	89, 90–91, 94–96, 97, 98, 114, 115, 116–117, 349, 350
b) sedimentary (clastic and chemical); and	89, 90–91, 103, 104–108, 109, 110–111, 114, 115, 116–117
c) metamorphic (foliated and unfoliated) rocks.	89, 90–91, 99–100, 101–102, 114, 115, 116–117

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ES.7 The student will investigate and understand the differences between renewable and nonrenewable resources. Key concepts include	
a) fossil fuels, minerals, rocks, water, and vegetation;	73, 77–79, 118E-118F, 120, 121–123, 124–125, 128, 133, 134–135, 137, 138, 146, 148–149, 516, 553
b) advantages and disadvantages of various energy sources;	120, 124, 127, 128, 130–131, 132, 135, 147, 608F
c) resources found in Virginia;	The opportunity to address this objective is available. See the following: 118E-118F, 120, 121–123, 128, 134–135, 137, 138, 148–149, 516, 553
d) making informed judgments related to resource use and its effects on Earth systems; and	120, 121, 124–125, 127, 130–132, 134, 141, 142–143, 144–145, 149, 509, 567, 574, 582E, 621
e) environmental costs and benefits.	124, 126, 128, 134, 139, 140, 141, 144–145, 509, 516, 567, 574, 621, 624–625, 634

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ES.8 The student will investigate and understand geologic processes including plate tectonics. Key concepts include	
a) how geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau;	The opportunity to address this objective is available. See the following: 182–183, 184, 200–201, 202–203, 210–211, 212, 224–225, 332E, 333–334, 351–353
b) processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation) and their resulting features; and	182E, 185–186, 188–189, 200–201, 202–203, 208–209, 210E, 210–211, 212, 213–214, 215–216, 224–225, 227–229, 332E, 351–353
c) tectonic processes (subduction, rifting and sea floor spreading, and continental collision).	274E-274F, 274–275, 276–278, 279, 280–282, 283, 284, 285–286, 288, 289, 298–299

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ES.9 The student will investigate and understand how freshwater resources are influenced by geologic processes and the activities of humans. Key concepts include	
a) processes of soil development;	190, 191, 192, 193–194, 195–196
b) development of karst topography;	The opportunity to address this objective is available. See the following: 238F, 256, 267
c) identification of groundwater zones including water table, zone of saturation, and zone of aeration;	251–252, 253–254, 255, 266
d) identification of other sources of fresh water including rivers, springs, and aquifers with reference to the hydrologic cycle;	238F, 244, 245, 246–247, 255, 266, 267
e) dependence on freshwater resources and the effects of human usage on water quality; and	610–612, 613, 614, 615, 616–617
f) identification of the major watershed systems in Virginia including the Chesapeake Bay and its tributaries.	The opportunity to address this objective is available. See the following: 244, 245, 246–247, 248, 249–250, 257–260, 264–265, 266–267, 268–269, 270–271

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ES.10 The student will investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils. Key concepts include	
a) traces or remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks;	366E, 366–367, 368, 369, 370–372, 373, 374–375, 388–389, 392, 393, 394–395, 398–399
b) superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating bodies of rock;	366E, 373, 376, 377, 378, 380, 382, 383, 384, 385–386, 392, 394–395, 408, 429
c) absolute and relative dating have different applications but can be used together to determine the age of rocks and structures; and	366E, 380, 394
d) rocks and fossils from many different geologic periods and epochs are found in Virginia.	The opportunity to address this objective is available. See the following: 366E-366F, 373, 374–375, 396–397, 398–399, 400–402, 406–407, 408–412, 414–417, 418–419

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ES.11 The student will investigate and understand that oceans are complex, interactive physical, chemical, and biological systems and are subject to long- and short-term variations. Key concepts include	
a) physical and chemical changes (tides, waves, currents, sea level and ice cap variations, upwelling, and salinity concentrations);	494, 520E-520F, 520, 523–525, 526–528, 529, 532–534, 536–538, 554–555
b) importance of environmental and geologic implications;	522
c) systems interactions (density differences, energy transfer, weather, and climate);	493–494, 501–503, 520F, 526–527, 529–531, 557–559, 578, 579
d) features of the sea floor (continental margins, trenches, mid-ocean ridges, and abyssal plains) reflect tectonic processes; and	548E-548F, 550–551, 552–553, 556
e) economic and public policy issues concerning the oceans and the coastal zone including the Chesapeake Bay.	157, 522, 524–525, 548E-548F, 553–555, 561–562, 563, 564, 565–567, 568, 569

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ES.12 The student will investigate and understand the origin and evolution of the atmosphere and the interrelationship of geologic processes, biologic processes, and human activities on its composition and dynamics. Key concepts include	
a) scientific evidence for atmospheric changes over geologic time;	407, 432E, 434, 608E
b) current theories related to the effects of early life on the chemical makeup of the atmosphere;	407, 428–429, 432E, 434
c) comparison of the Earth’s atmosphere to that of other planets;	446, 709, 712,714, 716, 717, 718, 720–721
d) atmospheric regulation mechanisms including the effects of density differences and energy transfer; and	430–431, 432E, 432, 438, 439, 443–444, 447–448
e) potential atmospheric compositional changes due to human, biologic, and geologic activity.	435, 440–441, 507, 508, 509, 510, 516, 608E, 621

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ES.13 The student will investigate and understand that energy transfer between the sun, Earth, and the Earth's atmosphere drives weather and climate on Earth. Key concepts include	
a) observation and collection of weather data;	4F, 16–17, 460E-460F, 460, 462–465, 466, 467, 468–469, 470, 471–472, 478–480, 481, 482–483, 486–487, 488–489
b) prediction of weather patterns;	16–17, 460F, 478–480, 486, 489
c) severe weather occurrences such as tornadoes, hurricanes, and major storms; and	460F, 472–473, 475, 476–477, 486, 578
d) weather phenomena and the factors that affect climate including radiation and convection.	440–441, 443–444, 446, 447, 448, 449, 456–457, 461, 493–495, 500, 501, 504, 505–506, 507

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ES.14 The student will investigate and understand scientific concepts related to the origin and evolution of the universe. Key concepts include	
a) nebulae;	704, 748–749, 751
b) the origin of stars and star systems;	749, 751
c) stellar evolution;	746, 747, 748–751, 762–763
d) galaxies; and	734F, 752, 753, 760–761, 764
e) cosmology (the Big Bang).	754–755, 756, 757, 762

Science Textbook Adoption Additional Criteria

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<p>Additional Criteria</p>	<p>Evidence Please provide information that will assist the reviewers in identifying support for the following criterion indicators.</p>
<p>1. Safe use of materials and equipment is encouraged.</p>	<p>Emphasis on safety begins inside the front cover with a chart of safety symbols and their meanings. All Explore Activities, MiniLABs, and Activities contain safety symbols and safety precautions as needed. . In the teacher’s edition, laboratory safety and chemical storage and disposal are discussed on pages 34T-35T.</p>
<p>2. Materials emphasize the use of effective instructional practices and learning theories.</p> <ul style="list-style-type: none"> • Students are guided through different approaches such as the learning cycle. • Students are provided the opportunity to conduct scientific inquiry appropriate for their age, grade, and maturity. • Concepts are introduced through concrete experiences. • Students are required to use manipulative materials during investigations and activities. • Multiple opportunities are provided for students to apply concepts. • Learning activities offer opportunities for students to revise their prior knowledge and create new knowledge. • Students are encouraged to pose questions and to identify problems, as well as propose multiple solutions and design and conduct tests of inference. • Students collect and interpret data through a variety of technologies and draw conclusions based on that data. 	<p>The teacher wraparound edition is organized around a three-step learning cycle—1. Motivate, 2. Teach, 3. Assess . Each chapter begins with a Foldables-Reading and Study Skills to help students organize information.</p> <p>All chapters and activities are reviewed by teachers for grade-level appropriateness.</p> <p>The Explore Activity at the beginning of each chapter introduces the lesson and ensuing content.</p> <p>MiniLABs and Activities introduce or reinforce content using a wide variety of materials and equipment.</p> <p>Students apply concepts in MiniLABs, Activities, Problem-Solving Activities, Math Skills Activities, and in the Think Critically questions in Section Assessments and Chapter Assessments.</p> <p>Design Your Own Experiment Activities (such as pages 80-81, 230-231) provide opportunities to use prior knowledge and newly acquired information in order to pose questions, form hypotheses, and design investigations. Data collection and analysis allow students to draw conclusions, create new knowledge, and revise prior knowledge.</p>

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Additional Criteria	Evidence Please provide information that will assist the reviewers in identifying support for the following criterion indicators.
<p>3. Materials present content in an accurate, unbiased manner, and are based on sound science.</p> <ul style="list-style-type: none">• Materials do not contain content errors (omissions of current content, out-of-date content, overgeneralizations, etc.).• Materials do not contain production errors (misspelled words, word omissions, incorrect answers).• Diverse groups (racial, ethnic, cultural, linguistic), males and females, people with disabilities, and people of all ages are represented appropriately.• The materials are free of non-scientific explanation.	<p>All Glencoe student and teacher editions are written and edited by content experts. The chapters are verified by fact-checkers. In addition, the books are reviewed and critiqued by teachers of the appropriate grade level, safety consultants, post-secondary level content consultants, and other specialists.</p> <p>All materials are checked for production errors by experienced proofers and production editors.</p> <p>Art and photos reflect diversity according to percentages based on US Census data. Inclusion Strategies in the teacher edition provide alternatives for meeting individual needs. Cultural Diversity features within the teacher edition broaden student awareness.</p> <p>Explanations are based in scientific fact.</p>

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<p>4. Materials promote student assessment as an integral part of the instructional process.</p> <ul style="list-style-type: none">• Assessment suggestions and scoring criteria for student performances on work such as lab practicals or tasks, concept maps, research projects, observation checklists, etc., are provided.• Assessment items include multiple-choice, short answer, essay and open-ended questions with charts, graphs, and diagrams imbedded within the items.• Options include techniques for assessing students' prior knowledge.• Assessment items reflect the rigor and the intent of the standards. For example, they require students to use higher order thinking skills to apply, analyze, synthesize, evaluate, and make judgments or recommendations.	<p>The student and teacher edition contain numerous opportunities for assessment. Student edition: Reading Checks through out, Science Journal, MiniLAB analysis, Conclude and Apply in Activities, Section Assessment, Skill Builder Activities, caption questions, problem Solving Activity, Chapter Study Guide and Assessment, and Test Practice. Teacher edition: ✓ Assessment (authentic, portfolio, and performance), Discussion, Check for Understanding, and Mini-Quiz. The teacher's edition contains teaching strategies, sample data, and answers to aid teachers in scoring student performance.</p> <p>Chapter Study Guides and Assessments contain a variety of assessment items. For examples see pages 84-87, 298-301, and 486-489.</p> <p>The teacher edition provides opportunities to assess student's' prior knowledge in Tie to Prior Knowledge and Identifying Misconceptions.</p> <p>Correlations to the National Science Standards, NCTM Standards, and Benchmarks are presented on teacher edition pages 4T-8T. Students develop and apply higher order thinking skills throughout. For examples, see pages 109-111,129, 165, and 171.</p>

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<p>5. Materials are presented in an organized, logical manner and are appropriate for the age, grade, and maturity of the students.</p> <ul style="list-style-type: none">• Materials are organized appropriately within and among units of study.• Format design includes titles, subheadings, and appropriate cross-referencing for ease of use.• Writing style, length of sentences, and vocabulary are appropriate.• Graphics and illustrations are appropriate.• Level of abstraction is appropriate, and real life examples, including careers are provided.• Sufficient applications are provided to promote depth of understanding.	<p>Student edition is reviewed by teachers for grade-level appropriateness. Four major themes of energy, systems and interactions, scale and structure, and stability and change are developed in the student edition and discussed throughout the teacher edition.</p> <p>Each chapter is divided into two to four sections. Each section is organized by titles and subheads that help students outline the main ideas.</p> <p>All chapters were checked for grade-level readability by Swinburne Readability Laboratory.</p> <p>Graphics and illustrations (examples provided in parentheses) provide age-appropriate information that helps students visualize the abstract (pages 162-167, 305, 306-307, and 312), connect their everyday lives to science (pages 62, 103, 308-309, and 251) and careers (pages 12, 125, 176-177,478), and demonstrate applications (pages 79, 130-135, 242, and 259). Note National Geographic Visualizing (pages 169, 191, 287, and 310).</p>