



Earth Science

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STANDARDS

PAGE REFERENCES

STATE GOAL 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.

Why This Goal Is Important: The inquiry process prepares learners to engage in science and apply methods of technological design. This understanding will enable students to pose questions, use models to enhance understanding, make predictions, gather and work with data, use appropriate measurement methods, analyze results, draw conclusions based on evidence, communicate their methods and results, and think about the implications of scientific research and technological problem solving.

A. Know and apply the concepts, principles and processes of scientific inquiry.

11.A.3a Formulate hypotheses that can be tested by collecting data.

Student Edition:

29 #25

Design Your Own Lab 52-53, 200-201, 228-229, 350-351, 444-445, 532-533, 746-747

Lab 136, 260-261, 680-681

Teacher Wraparound Edition:

A 291; IL 193

11.A.3b Conduct scientific experiments that control all but one variable.

Student Edition:

9-11

Design Your Own Lab 52-53, 200-201, 228-229, 444-445

Lab 24-25, 136, 260-261, 503, 680-681

MiniLAB 11

Teacher Wraparound Edition:

IL 193

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| <p>11.A.3c Collect and record data accurately using consistent measuring and recording techniques and media.</p> | <p>Student Edition: <i>Design Your Own Lab</i> 200-201, 228-229, 444-445 <i>Lab</i> 24-25, 67, 80-81, 136, 221, 260-261, 503, 680-681 <i>Use the Internet Lab</i> 290-291, 650-651</p> |
| <p>11.A.3d Explain the existence of unexpected results in a data set.</p> | <p>Student Edition: <i>Communicating Your Data</i> 98 <i>Design Your Own Lab</i> 228-229, 350-351, 444-445 Teacher Wraparound Edition: CYD 259; EA 25, 81, 261, 617</p> |
| <p>11.A.3e Use data manipulation tools and quantitative (e.g., mean, mode, simple equations) and representational methods (e.g., simulations, image processing) to analyze measurements.</p> | <p>Student Edition: <i>Design Your Own Lab</i> 228-229 <i>Lab</i> 80-81, 260-261, 279, 407, 503, 695 <i>MiniLAB</i> 412, 456, 471, 632 <i>Use the Internet Lab</i> 650-651</p> |
| <p>11.A.3f Interpret and represent results of analysis to produce findings.</p> | <p>Student Edition: <i>Design Your Own Lab</i> 200-201, 228-229, 350-351, 444-445, 532-533, 746-747 <i>Lab</i> 136, 260-261, 320-321, 503, 504-505, 675, 680-681</p> |
| <p>11.A.3g Report and display the process and results of a scientific investigation.</p> | <p>Student Edition: <i>Communicating Your Data</i> 23, 53, 143, 291, 351, 434, 445, 533, 617, 747 <i>Design Your Own Lab</i> 200-201 Teacher Wraparound Edition: IL 464</p> |
| <p>B. Know and apply the concepts, principles and processes of technological design.</p> | |
| <p>11.B.3a Identify an actual design problem and establish criteria for determining the success of a solution.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475 Teacher Wraparound Edition: DI 516; IL 308, 515; R 319</p> |
| <p>11.B.3b Sketch, propose and compare design solutions to the problem considering available materials, tools, cost effectiveness and safety.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475 Teacher Wraparound Edition: ACT 133; IL 515</p> |

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| <p>11.B.3c Select the most appropriate design and build a prototype or simulation.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475 Teacher Wraparound Edition: DI 516; IL 133, 308, 515; MM 132; R 319</p> |
| <p>11.B.3d Test the prototype using available materials, instruments and technology and record the data.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475 Teacher Wraparound Edition: DI 516; IL 133, 308, 515; MM 132; R 319</p> |
| <p>11.B.3e Evaluate the test results based on established criteria, note sources of error and recommend improvements.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475 Teacher Wraparound Edition: DI 516</p> |
| <p>11.B.3f Using available technology, report the relative success of the design based on the test results and criteria.</p> | <p>Student Edition: <i>Model and Invent Lab</i> 142-143, 474-475</p> |
| <p>STATE GOAL 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.</p> | |
| <p>Why This Goal Is Important: This goal is comprised of key concepts and principles in the life, physical and earth/space sciences that have considerable explanatory and predictive power for scientists and non-scientists alike. These ideas have been thoroughly studied and have stood the test of time. Knowing and being able to apply these concepts, principles and processes help students understand what they observe in nature and through scientific experimentation. A working knowledge of these concepts and principles allows students to relate new subject matter to material previously learned and to create deeper and more meaningful levels of understanding.</p> | |
| <p>A. Know and apply concepts that explain how living things function, adapt and change.</p> | |
| <p>12.A.3a Explain how cells function as “building blocks” of organisms and describe the requirements for cells to live.</p> | <p>See Glencoe’s <i>Life Science</i> © 2008 Student Edition: 14, 38, 45, 51 Teacher Wraparound Edition: TBI 36</p> |
| <p>12.A.3b Compare characteristics of organisms produced from a single parent with those of organisms produced by two parents.</p> | <p>See Glencoe’s <i>Life Science</i> © 2008 Student Edition: 101-102, 104-105, 210, 224, 272-273 <i>MiniLab</i> 273 <i>Reading Check</i> 101 <i>Section Review</i> 102 (#2); 109 (#4); 275 (#2, #3) Teacher Wraparound Edition: IL 102; VL 17</p> |

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| <p>12.A.3c Compare and contrast how different forms and structures reflect different functions (e.g., similarities and differences among animals that fly, walk or swim; structures of plant cells and animal cells).</p> | <p>Teacher Wraparound Edition: IL 551 Also see Glencoe's <i>Life Science</i> © 2008</p> <p>Student Edition: 39-44, 241, 252-255, 332, 337, 340, 365-367, 370, 380, 399-401, 403, 412-413, 428-432, 436-438 <i>Lab</i> 343, 379 <i>Launch Lab</i> 427 <i>MiniLab</i> 288, 381, 403, 430</p> <p>Teacher Wraparound Edition: UAA 39, 243</p> |
| <p>B. Know and apply concepts that describe how living things interact with each other and with their environment.</p> | |
| <p>12.B.3a Identify and classify biotic and abiotic factors in an environment that affect population density, habitat and placement of organisms in an energy pyramid.</p> | <p>Student Edition: 549-556</p> <p>Teacher Wraparound Edition: V 555</p> |
| <p>12.B.3b Compare and assess features of organisms for their adaptive, competitive and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures).</p> | <p>Student Edition: 397-399, 488-491 <i>Lab</i> 407</p> <p>Teacher Wraparound Edition: A 399; ACT 396, 555; CFU 491; DI 489; FF 489; MM 490; SCB 540F</p> |
| <p>C. Know and apply concepts that describe properties of matter and energy and the interactions between them.</p> | |
| <p>12.C.3a Explain interactions of energy with matter including changes of state and conservation of mass and energy.</p> | <p>Student Edition: 46-51, 93 <i>Integrate Chemistry</i> 97 <i>Launch Lab</i> 33 <i>National Geographic</i> 49</p> <p>Teacher Wraparound Edition: A 437; R 51; TFYI 47</p> |
| <p>12.C.3b Model and describe the chemical and physical characteristics of matter (e.g., atoms, molecules, elements, compounds, mixtures).</p> | <p>Student Edition: 34-38, 39-44, 62-66, 426-427 <i>National Geographic</i> 64</p> <p>Teacher Wraparound Edition: A 67; MM 432; QD 36; R 38; UAA 436; VL 36</p> |

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| D. Know and apply concepts that describe force and motion and the principles that explain them. | |
| <p>12.D.3a Explain and demonstrate how forces affect motion (e.g., action/reaction, equilibrium conditions, free-falling objects).</p> | <p>Student Edition: 637 <i>Integrate Physics</i> 213 <i>MiniLAB</i> 641</p> <p>Teacher Wraparound Edition: CFU 214</p> |
| <p>12.D.3b Explain the factors that affect the gravitational forces on objects (e.g., changes in mass, distance).</p> | <p>See Glencoe's <i>Introduction to Physical Science</i> © 2008</p> <p>Student Edition: 317-318, 321, 348-351</p> |
| E. Know and apply concepts that describe the features and processes of the Earth and its resources. | |
| <p>12.E.3a Analyze and explain large-scale dynamic forces, events and processes that affect the Earth's land, water and atmospheric systems (e.g., jetstream, hurricanes, plate tectonics).</p> | <p>Student Edition: 272-275, 276-278, 280-289, 300-303, 330-335, 439-443, 465-469, 518-523</p> <p><i>Lab</i> 279 <i>National Geographic</i> 441 <i>Use the Internet Lab</i> 290-291</p> <p>Teacher Wraparound Edition: DIS 520</p> |
| <p>12.E.3b Describe interactions between solid earth, oceans, atmosphere and organisms that have resulted in ongoing changes of Earth (e.g., erosion, El Nino).</p> | <p>Student Edition: 188-194, 210-214, 215-220, 222-227, 238-248, 253-254, 492-502, 518-523</p> <p><i>Integrate Environment</i> 468 <i>National Geographic</i> 494-495</p> <p>Teacher Wraparound Edition: CC 219; DI 521; MM 254; R 523</p> |
| <p>12.E.3c Evaluate the biodegradability of renewable and nonrenewable natural resources.</p> | <p>Student Edition: 120-129, 130-135, 137-141, 557-561</p> <p><i>Applying Science</i> 140 <i>Integrate Physics</i> 582 <i>Science and Society</i> 592</p> <p>Teacher Wraparound Edition: CB 592; DIS 128, 134, 592; SJ 123; V 126</p> |

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| <p>F. Know and apply concepts that explain the composition and structure of the universe and Earth’s place in it.</p> | |
| <p>12.F.3a Simulate, analyze and explain the effects of gravitational force in the solar system (e.g., orbital shape and speed, tides, spherical shape of the planets and moons).</p> | <p>Student Edition: 527-530, 637, 690-694, 703, 712 <i>Lab</i> 695 <i>MiniLAB</i> 641, 699 Teacher Wraparound Edition: A 699; DIS 530; QD 527; TFYI 529; V 693</p> |
| <p>12.F.3b Describe the organization and physical characteristics of the solar system (e.g., sun, planets, satellites, asteroids, comets).</p> | <p>Student Edition: 660-665, 666-674, 676-679, 690-694, 696-701, 702-709, 710-713 <i>Launch Lab</i> 689 <i>MiniLAB</i> 704 <i>National Geographic</i> 672 <i>Science Online</i> 691 Teacher Wraparound Edition: ACT 708; CFU 713; DI 692; QD 698</p> |
| <p>12.F.3c Compare and contrast the sun as a star with other objects in the Milky Way Galaxy (e.g., nebulae, dust clouds, stars, black holes).</p> | <p>Student Edition: 729-732, 734-739, 740-745 <i>MiniLAB</i> 742 <i>Science Online</i> 736 <i>Science Stats</i> 748 Teacher Wraparound Edition: CFU 739; DIS 739, 748; IM 688F; R 739; TFYI 736; VL 737</p> |
| <p>STATE GOAL 13: Understand the relationships among science, technology and society in historical and contemporary contexts.</p> | |
| <p>Why This Goal Is Important: Understanding the nature and practices of science such as ensuring the validity and replicability of results, building upon the work of others and recognizing risks involved in experimentation gives learners a useful sense of the scientific enterprise. In addition, the relationships among science, technology and society give humans the ability to change and improve their surroundings. Learners who understand this relationship will be able to appreciate the efforts and effects of scientific discovery and applications of technology on their own lives and on the society in which we live.</p> | |
| <p>A. Know and apply the accepted practices of science.</p> | |
| <p>13.A.3a Identify and reduce potential hazards in science activities (e.g., ventilation, handling chemicals).</p> | <p>Student Edition: <i>Design Your Own Lab</i> 52-53, 200-201, 228-229, 444-445, 616-617 <i>Lab</i> 45, 80-81, 221, 260-261, 503, 680-681, 733 <i>Science Skill Handbook</i> 765-767 Teacher Wraparound Edition: SJ 110</p> |

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| <p>13.A.3b Analyze historical and contemporary cases in which the work of science has been affected by both valid and biased scientific practices.</p> | <p>Student Edition: 272-275, 276-278, 280-289, 690-694 <i>Science Online</i> 273</p> <p>Teacher Wraparound Edition: A 275; CFU 694; DIS 273; SJ 281, 692</p> |
| <p>13.A.3c Explain what is similar and different about observational and experimental investigations.</p> | <p>Student Edition: <i>Science Skill Handbook</i> 759-764</p> |
| <p>B. Know and apply concepts that describe the interaction between science, technology and society.</p> | |
| <p>13.B.3a Identify and explain ways that scientific knowledge and economics drive technological development.</p> | <p>Student Edition: 12-14, 170, 313-319 <i>National Geographic</i> 126 <i>Science and Society</i> 262, 476</p> |
| <p>13.B.3b Identify important contributions to science and technology that have been made by individuals and groups from various cultures.</p> | <p>Student Edition: 381, 395-396, 488-489, 690-694 <i>Integrate Social Studies</i> 77 <i>Science and History</i> 82, 618</p> <p>Teacher Wraparound Edition: CC 466, 636; CD 332, 636, 661; SJ 281</p> |
| <p>13.B.3c Describe how occupations use scientific and technological knowledge and skills.</p> | <p>Student Edition: 15-17, 628-633, 635-642, 643-649 <i>Integrate Career</i> 239, 287, 315, 522, 638, 671 <i>Science Online</i> 168</p> <p>Teacher Wraparound Edition: CC 240; CD 332; DI 166</p> |
| <p>13.B.3d Analyze the interaction of resource acquisition, technological development and ecosystem impact (e.g., diamond, coal or gold mining; deforestation).</p> | <p>Student Edition: 120-129, 130-135, 137-141, 432-433, 578-584, 600-607, 609-615 <i>Applying Science</i> 581 <i>Science Online</i> 501</p> <p>Teacher Wraparound Edition: CFU 615; QD 125; SJ 251, 611; UAA 124</p> |
| <p>13.B.3e Identify advantages and disadvantages of natural resource conservation and management programs.</p> | <p>Student Edition: 198-199, 213-214, 561, 578-584, 586-589, 605-607, 612-615 <i>Science and Society</i> 112</p> <p>Teacher Wraparound Edition: ACT 588; CD 558, 580; DIS 112; R 199</p> |

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| <p>13.B.3f Apply classroom-developed criteria to determine the effects of policies on local science and technology issues (e.g., energy consumption, landfills, water quality).</p> | <p>Student Edition: <i>MiniLAB</i> 127 <i>Science Online</i> 197</p> <p>Teacher Wraparound Edition: ACT 197; DIS 607; IL 605; V 603</p> |