



STANDARDS	PAGE REFERENCES
<p><b>STATE GOAL 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.</b></p>	
<p><b>Why This Goal Is Important:</b> 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.</p>	
<p><b>A. Know and apply the concepts, principles and processes of scientific inquiry.</b></p>	
<p><b>11.A.3a</b> Formulate hypotheses that can be tested by collecting data.</p>	<p><b>Student Edition:</b> Lab 35, 112-113, 150-151, 360-361, 782-783 NOS 6-7, 24-25, 26, 28-29</p> <p><b>Teacher Edition:</b> E 112-113, 150-151, 360-361, 629, 782-783; NOS 7, 25</p>

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<p><b>11.A.3b</b> Conduct scientific experiments that control all but one variable.</p>	<p><b>Student Edition:</b>  <i>Lab</i> 34-35, 224-225, 290-291, 782-783  <i>Launch Lab</i> 793  <i>MiniLab</i> 30, 57, 145, 221  <i>NOS</i> 20-21, 28-29</p> <p><b>Teacher Edition:</b>  E 30, 34-35, 57, 221, 224-225, 290-291, 782-783, 793; NOS 20-21, 29</p>
<p><b>11.A.3c</b> Collect and record data accurately using consistent measuring and recording techniques and media.</p>	<p><b>Student Edition:</b>  <i>Lab</i> 34-35, 76-77, 188-189, 484-485, 782-783  <i>MiniLab</i> 20, 346, 586, 797  <i>NOS</i> 24-25</p> <p><b>Teacher Edition:</b>  E 20, 34-35, 76-77, 188-189, 346, 484-485, 586, 782-783, 797; NOS 24</p>
<p><b>11.A.3d</b> Explain the existence of unexpected results in a data set.</p>	<p><b>Student Edition:</b>  240-241, 244, 506-507  <i>Careers in Science</i> 397, 573, 623  <i>NOS</i> 6-9, 14-15</p> <p><b>Teacher Edition:</b>  E 240-241, 244, 397, 506-507, 573, 623; NOS 6-9, 14-15</p>
<p><b>11.A.3e</b> 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><b>Student Edition:</b>  4-5  <i>Lab</i> 188-189, 360-361, 484-485, 672-673, 782-783  <i>MiniLab</i> 5, 125  <i>NOS</i> 14-17, 25</p> <p><b>Teacher Edition:</b>  E 4-5, 125, 188-189, 360-361, 484-485, 672-673, 782-783; NOS 14-15, 25</p>
<p><b>11.A.3f</b> Interpret and represent results of analysis to produce findings.</p>	<p><b>Student Edition:</b>  <i>Lab</i> 150-151, 290-291, 360-361, 520-521, 590-591, 632-633, 782-783  <i>MiniLab</i> 30, 176, 358, 394, 516, 813</p> <p><b>Teacher Edition:</b>  E 30, 150-151, 176, 290-291, 358, 360-361, 394, 516, 520-521, 590-591, 632-633, 782-783, 813</p>

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<p><b>11.A.3g</b> Report and display the process and results of a scientific investigation.</p>	<p><b>Student Edition:</b>  <i>Lab</i> 112-113, 150-151, 224-225, 324-325, 520-521, 708-709  <i>MiniLab</i> 124, 220, 402, 516, 630, 796            NOS 28-29</p> <p><b>Teacher Edition:</b>            E 112-113, 124, 150-151, 220, 224-225, 324-325, 402, 516, 520-521, 630, 708-709, 796; NOS 28-29</p>
<p><b>B. Know and apply the concepts, principles and processes of technological design.</b></p>	
<p><b>11.B.3a</b> Identify an actual design problem and establish criteria for determining the success of a solution.</p>	<p><b>Student Edition:</b>  <i>Green Science</i> 274  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751            NOS 28  <i>Science and Society</i> 181, 653</p> <p><b>Teacher Edition:</b>            E 112-113, 181, 188-189, 224-225, 274, 324-325, 484-485, 653, 750-751</p>
<p><b>11.B.3b</b> Sketch, propose and compare design solutions to the problem considering available materials, tools, cost effectiveness and safety.</p>	<p><b>Student Edition:</b>  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751            NOS 29</p> <p><b>Teacher Edition:</b>            E 112-113, 188-189, 224-225, 324-325, 484-485, 750-751; NOS 29</p>
<p><b>11.B.3c</b> Select the most appropriate design and build a prototype or simulation.</p>	<p><b>Student Edition:</b>  <i>Green Science</i> 274  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751            NOS 28  <i>Science and Society</i> 181, 653</p> <p><b>Teacher Edition:</b>            E 112-113, 181, 188-189, 224-225, 274, 324-325, 484-485, 653, 750-751</p>

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<p><b>11.B.3d</b> Test the prototype using available materials, instruments and technology and record the data.</p>	<p><b>Student Edition:</b>  <i>Green Science</i> 274  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751  <i>NOS</i> 28  <i>Science and Society</i> 181, 653</p> <p><b>Teacher Edition:</b>  <i>E</i> 112-113, 181, 188-189, 224-225, 274, 324-325, 484-485, 653, 750-751</p>
<p><b>11.B.3e</b> Evaluate the test results based on established criteria, note sources of error and recommend improvements.</p>	<p><b>Student Edition:</b>  <i>Green Science</i> 274  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751  <i>NOS</i> 29  <i>Science and Society</i> 181, 653</p> <p><b>Teacher Edition:</b>  <i>E</i> 112-113, 181, 188-189, 224-225, 274, 324-325, 484-485, 653, 750-751</p>
<p><b>11.B.3f</b> Using available technology, report the relative success of the design based on the test results and criteria.</p>	<p><b>Student Edition:</b>  <i>Green Science</i> 274  <i>Lab</i> 112-113, 188-189, 224-225, 324-325, 484-485, 750-751  <i>NOS</i> 29  <i>Science and Society</i> 181, 653</p> <p><b>Teacher Edition:</b>  <i>E</i> 112-113, 181, 188-189, 224-225, 274, 324-325, 484-485, 653, 750-751</p>
<p><b>STATE GOAL 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.</b></p>	
<p><b>Why This Goal Is Important:</b> 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><b>A. Know and apply concepts that explain how living things function, adapt and change.</b></p>	
<p><b>12.A.3a</b> Explain how cells function as “building blocks” of organisms and describe the requirements for cells to live.</p>	<p><b>Student Edition:</b> 769</p> <p><b>Teacher Edition:</b> <i>E</i> 769</p>

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<p><b>12.A.3b</b> Compare characteristics of organisms produced from a single parent with those of organisms produced by two parents.</p>	<p><b>Student Edition:</b> 792-795, 798 <i>MiniLab</i> 797</p> <p><b>Teacher Edition:</b> E 792-794, 797-798</p>
<p><b>12.A.3c</b> 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><b>Student Edition:</b> 811-814</p> <p><b>Teacher Edition:</b> E 810-815</p>
<p><b>B. Know and apply concepts that describe how living things interact with each other and with their environment.</b></p>	
<p><b>12.B.3a</b> 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><b>Student Edition:</b> 647-648, 658, 719-720 <i>MiniLab</i> 658</p> <p><b>Teacher Edition:</b> E 647, 658-659, 718-721</p>
<p><b>12.B.3b</b> Compare and assess features of organisms for their adaptive, competitive and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures).</p>	<p><b>Student Edition:</b> 810-816 <i>Launch Lab</i> 811</p> <p><b>Teacher Edition:</b> E 810-816</p>
<p><b>C. Know and apply concepts that describe properties of matter and energy and the interactions between them.</b></p>	
<p><b>12.C.3a</b> Explain interactions of energy with matter including changes of state and conservation of mass and energy.</p>	<p><b>Student Edition:</b> 96-98, 123-125, 128-129, 132-137, 164-169, 176-177, 199-204, 210-214, 306-308 <i>MiniLab</i> 125 <i>Skill Practice</i> 103, 139, 171</p> <p><b>Teacher Edition:</b> E 96-98, 103, 123-125, 128-129, 132-137, 139, 164-169, 171, 176, 199-204, 210-214, 306-308</p>
<p><b>12.C.3b</b> Model and describe the chemical and physical characteristics of matter (e.g., atoms, molecules, elements, compounds, mixtures).</p>	<p><b>Student Edition:</b> 234-244, 249, 267-272, 276-280, 286-288, 301-303, 313-314, 335-339 <i>Launch Lab</i> 276, 301 <i>MiniLab</i> 280 <i>Skill Practice</i> 282</p> <p><b>Teacher Edition:</b> E 237, 243-244, 249, 267-272, 276-280, 282, 286-288, 301-303, 313-314, 335-339</p>

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<b>D. Know and apply concepts that describe force and motion and the principles that explain them.</b>	
<b>12.D.3a</b> Explain and demonstrate how forces affect motion (e.g., action/reaction, equilibrium conditions, free-falling objects).	<b>Student Edition:</b> 57-58, 62-66, 70-72 <i>Lab 76-77</i> <i>Launch Lab 70</i> <i>MiniLab 57</i> <i>Skill Practice 60, 68</i> <b>Teacher Edition:</b> E 57-58, 60, 62-66, 68, 70-72, 76-77
<b>12.D.3b</b> Explain the factors that affect the gravitational forces on objects (e.g., changes in mass, distance).	<b>Student Edition:</b> 47-48, 89 <b>Teacher Edition:</b> E 47-48, 89
<b>E. Know and apply concepts that describe the features and processes of the Earth and its resources.</b>	
<b>12.E.3a</b> 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).	<b>Student Edition:</b> 92, 179, 511-518, 531-540, 545-552 <i>Lab 520-521</i> <i>Launch Lab 531</i> <i>MiniLab 516, 530</i> <b>Teacher Edition:</b> E 92, 179, 511-518, 520-521, 531-540, 545-552
<b>12.E.3b</b> Describe interactions between solid earth, oceans, atmosphere and organisms that have resulted in ongoing changes of Earth (e.g., erosion, El Nino).	<b>Student Edition:</b> 504-507, 699, 703-706 <i>Skill Lab 509</i> <b>Teacher Edition:</b> E 504-507, 509, 699, 703-706
<b>12.E.3c</b> Evaluate the biodegradability of renewable and nonrenewable natural resources.	<b>Student Edition:</b> 90, 721, 729-731, 735, 748 <i>Green Science 741</i> <i>Skill Practice 732</i> <b>Teacher Edition:</b> E 90, 721, 729-731, 732, 735, 741, 748

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<b>F. Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.</b>	
<p><b>12.F.3a</b> 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><b>Student Edition:</b> 66, 378-379 <i>MiniLab</i> 378 <i>Science and Society</i> 52</p> <p><b>Teacher Edition:</b> E 52, 66, 378-379</p>
<p><b>12.F.3b</b> Describe the organization and physical characteristics of the solar system (e.g., sun, planets, satellites, asteroids, comets).</p>	<p><b>Student Edition:</b> 375-377, 385-387, 391-395, 399-402 <i>Careers in Science</i> 380, 397 <i>Lab</i> 404-405 <i>Launch Lab</i> 383, 391, 399 <i>MiniLab</i> 386, 395, 402 <i>Science and Society</i> 52 <i>Skill Practice</i> 388</p> <p><b>Teacher Edition:</b> E 52, 375-377, 380, 383, 385-387, 388, 391-395, 397, 399-402, 404-405</p>
<p><b>12.F.3c</b> 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><b>Student Edition:</b> 423-427, 431-435, 441-444 <i>How it Works</i> 429 <i>Launch Lab</i> 415, 423, 431 <i>MiniLab</i> 424, 434 <i>Skill Practice</i> 421, 437</p> <p><b>Teacher Edition:</b> E 415, 421, 423-427, 429, 431-435, 437, 441-444</p>

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<p><b>STATE GOAL 13: Understand the relationships among science, technology and society in historical and contemporary contexts.</b></p>	
<p><b>Why This Goal Is Important:</b> 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><b>A. Know and apply the accepted practices of science.</b></p>	
<p><b>13.A.3a</b> Identify and reduce potential hazards in science activities (e.g., ventilation, handling chemicals).</p>	<p><b>Student Edition:</b> 160-161, 353-355, 729, 739 <i>Green Science</i> 274 <i>Science Skill Handbook</i> SR11-SR13 <b>Teacher Edition:</b> E 160-161, 274, 353-355, 729, 739; T1</p>
<p><b>13.A.3b</b> Analyze historical and contemporary cases in which the work of science has been affected by both valid and biased scientific practices.</p>	<p><b>Student Edition:</b> 235-244, 499, 642-643, 665-670, 796-797, 802-803, 806-807 <i>Lab</i> 324-325 <i>MiniLab</i> 242, 643 <b>Teacher Edition:</b> E 235-244, 324-325, 642-643, 665-670, 796-797, 802-803, 806-807</p>
<p><b>13.A.3c</b> Explain what is similar and different about observational and experimental investigations.</p>	<p><b>Student Edition:</b> <i>Lab</i> 224-225, 324-325 NOS 6-7, 20-21, 23 SR 6-10 <b>Teacher Edition:</b> E 224-225, 324-325, 499; NOS 7, 20-21</p>
<p><b>B. Know and apply concepts that describe the interaction between science, technology and society.</b></p>	
<p><b>13.B.3a</b> Identify and explain ways that scientific knowledge and economics drive technological development.</p>	<p><b>Student Edition:</b> <i>Green Science</i> 274 <i>How it Works</i> 15, 131, 206, 316 <i>How Nature Works</i> 340 <i>Lab</i> 112-113, 750-751 <i>Science and Society</i> 95, 181, 800 <i>Skill Practice</i> 663, 733 <b>Teacher Edition:</b> E 15, 95, 112-113, 131, 181, 206, 274, 316, 340, 663, 733, 750-751, 800</p>

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<p><b>13.B.3b</b> Identify important contributions to science and technology that have been made by individuals and groups from various cultures.</p>	<p><b>Student Edition:</b> 57-58, 129, 160-161, 168, 220-222, 235-244, 271, 306, 495-496, 566, 796-798, 802 <i>Careers in Science</i> 381, 397, 501, 573, 623</p> <p><b>Teacher Edition:</b> E 57-58, 129, 160-161, 168, 220-222, 235-244, 271, 306, 381, 397, 495-496, 501, 566, 573, 623, 796-798, 802</p>
<p><b>13.B.3c</b> Describe how occupations use scientific and technological knowledge and skills.</p>	<p><b>Student Edition:</b> <i>Careers in Science</i> 381, 397, 501, 573, 623 <i>Green Science</i> 274 <i>Lab NOS</i> 28-29; 324-325, 484-485, 750-751 <i>Skill Practice</i> 663, 733</p> <p><b>Teacher Edition:</b> E 274, 324-325, 381, 397, 501, 573, 623, 663, 733, 750-751</p>
<p><b>13.B.3d</b> Analyze the interaction of resource acquisition, technological development and ecosystem impact (e.g., diamond, coal or gold mining; deforestation).</p>	<p><b>Student Edition:</b> 725-731, 735-739, 743-748 <i>Green Science</i> 741 <i>Lab</i> 750-751 <i>MiniLab</i> 727, 738, 747 <i>Skill Practice</i> 733</p> <p><b>Teacher Edition:</b> E 725-731, 733, 735-739, 741, 743-748, 750-751</p>
<p><b>13.B.3e</b> Identify advantages and disadvantages of natural resource conservation and management programs.</p>	<p><b>Student Edition:</b> 721, 725-727, 730-731, 738-739, 748, 816 <i>Lab</i> 750-751 <i>Launch Lab</i> 725 <i>MiniLab</i> 727 <i>Skill Practice</i> 722, 733</p> <p><b>Teacher Edition:</b> E 721, 722, 725-727, 730-731, 733, 748, 750-751, 816</p>

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<p><b>13.B.3f</b> 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><b>Student Edition:</b>  665-670, 725-731, 738-739, 748  <i>Launch Lab</i> 665, 725  <i>MiniLab</i> 727  <i>Science and Society</i> 653  <i>Skill Practice</i> 663, 722, 733</p> <p><b>Teacher Edition:</b>  E 653, 663, 665-670, 723, 725-731, 733, 738-739, 748</p>