



# TEXAS Standards Correlations

## Component Codes

ACT-A: Chapter Activity A	PTT: Posttest
ACT-B: Chapter Activity B	SF: Science Focus
CA: Chapter Assessment	TC: Thinking Critically
CI: Chapter Investigation	TIAT: Tying It All Together
CS: Case Study	U: Unit
EAW: Explorers at Work	UEP: Unit Engineering Project
EF: Engineering Focus	UO: Unit Opener
LA: Lesson Assessment	

*Bold blue numbers indicate chapters or lessons.*

Texas Essential Knowledge and Skills (TEKS) .....TX1

English Language Proficiency Standards (ELPS).....TX23

## Texas Essential Knowledge and Skills

ENVIRONMENTAL SCIENCE		
STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(b) Introduction.</b>		
<b>(1) Environmental Systems.</b> In Environmental Systems, students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include biotic and abiotic factors in habitats, ecosystems and biomes, interrelationships among resources and an environmental system, sources and flow of energy through an environmental system, relationship between carrying capacity and changes in populations and ecosystems, natural changes in the environment, and human activities that impact the natural environment.		
	<b>U1 UO</b> p. 13; <b>1.1</b> p. 19; <b>2.1</b> p. 49; <b>2.1 EAW</b> p. 51; <b>U2 UO</b> p. 103; <b>U3 UO</b> p. 207; <b>8.3</b> p. 257 #1, p. 261; <b>8.4</b> p. 263, p. 265; <b>8.4 LA</b> p. 265 #1; <b>8 CA</b> p. 274 #4, #15, #19; <b>U4 UO</b> p. 279; <b>9.1 LA</b> p. 289 #4; <b>9.2 LA</b> p. 301 #4; <b>9.3</b> p. 311 #1; <b>10 CA</b> p. 358 #24; <b>U5 UO</b> p. 469	<b>CI 9</b> ; <b>CI 11</b>
<b>(2) Nature of science.</b> Science, as defined by the National Academy of Sciences, is the “use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process.” This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.		
	<b>1.1</b> p. 19; <b>2.1</b> p. 49, p. 54; <b>7.2</b> p. 227; <b>7.3 SF</b> p. 235 TC	<b>7 PTT</b> #3
<b>(3) Scientific hypotheses and theories.</b> Students are expected to know that:		
<b>(A)</b> hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and	<b>2.1</b> p. 49, p. 54 #2; <b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #4; <b>2 CA</b> pp. 64 #8	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<p><b>(B)</b> scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.</p>	<p><b>2.1</b> p. 49, p. 54; <b>2.1 EAW</b> p. 51; <b>2 CA</b> p. 64 #12</p>	<p><b>2 PTT</b> #4, #5</p>
<p><b>(4) Scientific inquiry.</b> Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.</p>		
<p><b>(A)</b> Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.</p>	<p><b>2.1</b> p. 49; <b>2.1 EAW</b> p. 51; <b>2 TIAT</b> p. 62 #5; <b>2 CA</b> pp. 64–65 #2, #18, ACT-A #1, #2; <b>3.5</b> p. 92, p. 94; <b>3.5 LA</b> p. 96 #1; <b>8 CA</b> p. 275 ACT-A #1, #2, #5; <b>9.1 LA</b> p. 289 #2; <b>10 CA</b> p. 359 ACT-A #3, #6; <b>11.1 LA</b> p. 370 #3; <b>11.3 LA</b> p. 382 #4; <b>11 TIAT</b> p. 386 #1–4; <b>11 CA</b> pp. 388–389 #21, ACT-A #1, #5; <b>18 EAW</b> p. 614 TC; <b>18 CA</b> p. 641 ACT-B</p>	<p><b>CI</b> 1; <b>CI</b> 2; <b>CI</b> 3; <b>3 PTT</b> #13, #14; <b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 18</p>
<p><b>(B)</b> Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.</p>	<p><b>2.1 EF</b> p. 50; <b>8.3 LA</b> p. 261 #4; <b>U3 UEP</b> p. 277 #5; <b>9.5 LA</b> p. 321 #5; <b>9 TIAT</b> p. 322 #1–5; <b>9 CA</b> pp. 324–325 #25, ACT-A Develop Models #1–3, Questions #1–4, ACT-B #1–3; <b>10.2 LA</b> p. 338 #5; <b>10.3 LA</b> p. 342 #4; <b>10 CA</b> pp. 358–359 #20, #22, ACT-A #1, #2, #4–9; <b>13 CA</b> p. 455 ACT-A #1–9</p>	<p><b>9 PTT</b> #10; <b>CI</b> 12</p>
<p><b>(5) Science and social ethics.</b> Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).</p>		
	<p><b>1.3</b> pp. 34–35; <b>2.1</b> p. 54; <b>2 CA</b> p. 64 #1; <b>7 CA</b> p. 240 #22; <b>13 CA</b> p. 454 #21, #22; <b>18.2</b> p. 625; <b>18 CA</b> p. 640 #6, #18, #19</p>	
<p><b>(6) Science consists of recurring themes and making connections between overarching concepts.</b> Recurring themes include systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide tools for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.</p>		
	<p><b>1.1</b> pp. 19–20; <b>2.1</b> p. 49; <b>2.4</b> pp. 61–62; <b>8 EAW</b> p. 244 TC; <b>8.4 LA</b> p. 265 #5</p>	<p><b>CI</b> 2</p>
<p><b>(c) Knowledge and skills.</b></p>		
<p><b>(1) Scientific and engineering practices.</b> The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to explain phenomena or design solutions using appropriate tools and models. The student is expected to:</p>		

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<b>(A)</b> ask questions and define problems based on observations or information from text, phenomena, models, or investigations;		
(i) ask questions based on observations or information from text, phenomena, models, or investigations	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #1; <b>2 CA</b> p. 65 ACT-A #8; <b>4.1 LA</b> p. 115 #4; <b>4 CA</b> p. 131 ACT-A #6; <b>6 CA</b> p. 193 ACT-A #1; <b>U2 UEP</b> pp. 194–195 #1, #25; <b>7 EAW</b> p. 210 TC; <b>7 TIAT</b> p. 238 #1; <b>7 CA</b> p. 241 ACT-A #3; <b>8 CA</b> p. 275 ACT-B Citizen Science; <b>9 EAW</b> p. 282 TC; <b>9.1 LA</b> p. 289 #4; <b>9.3 SF</b> p. 303 TC; <b>10 CA</b> p. 359 ACT-B #3; <b>11.1</b> pp. 366–367; <b>11.1 LA</b> p. 370 #4; <b>11.2</b> p. 371, p. 373; <b>11 CA</b> pp. 388–389 #1, #2, #8, #9, #13, ACT-A #2, #3; <b>18.2 LA</b> p. 625 #6	<b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 6; <b>CI</b> 10; <b>CI</b> 11; <b>11 PTT</b> #1–3, #6, #12–14; <b>CI</b> 12; <b>CI</b> 18
(ii) define problems based on observations or information from text, phenomena, models, or investigations	<b>1.2</b> p. 24; <b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2.1 EAW</b> p. 51; <b>2 CA</b> p. 65 ACT-A #8; <b>U1 UEP</b> p. 101 #1–3; <b>U2 UEP</b> p. 194 #1; <b>7.2 SF</b> p. 223 TC; <b>U3 UEP</b> p. 276 #1–4; <b>9 CA</b> p. 324 #24, #25; <b>10.2 LA</b> p. 338 #5; <b>11.1 LA</b> p. 370 #4; <b>11.2 LA</b> p. 376 #1; <b>11 CA</b> p. 388 #8, #13; <b>U4 UEP</b> p. 456 #1–4 ; <b>14 CA</b> p. 496 #20; <b>16.3 EF</b> p. 565 TC	<b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 6; <b>9 PTT</b> #3, #10; <b>11 PTT</b> #11; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 16; <b>CI</b> 17
<b>(B)</b> apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;		
(i) apply scientific practices to plan descriptive investigations	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2 CA</b> p. 64 #18, #32; <b>3.5</b> p. 92, p. 94; <b>4 CA</b> p. 131 ACT-A #1; <b>6 CA</b> p. 193 ACT-A #5; <b>7 CA</b> p. 241 ACT-B; <b>10 CA</b> p. 359 ACT-A #1, #2, ACT-B #3; <b>18 CA</b> p. 641 ACT-A #1–4	<b>2 PTT</b> #3; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 14; <b>CI</b> 15
(ii) apply scientific practices to plan comparative investigations	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2 CA</b> p. 64 #18, #32; <b>3.5</b> p. 92, p. 94; <b>4 CA</b> p. 131 ACT-A #5; <b>8 CA</b> p. 275 ACT-A #1, #2, #5; <b>10 CA</b> p. 359 ACT-B #3	<b>2 PTT</b> #3; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13
(iii) apply scientific practices to plan experimental investigations	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2 CA</b> p. 64 #18, #32; <b>3.5</b> p. 92, p. 94; <b>U1 UEP</b> p. 101 #7; <b>4 TIAT</b> p. 128 #5; <b>5 TIAT</b> p. 152 #4; <b>6.3 LA</b> p. 185 #5	<b>2 PTT</b> #3
(iv) apply scientific practices to conduct descriptive investigations	<b>2.1</b> p. 49, p. 54 #1; <b>2.1 EF</b> p. 50; <b>3.5</b> p. 92, p. 94; <b>U2 UEP</b> p. 194 #3–6, #8, #9; <b>7 CA</b> p. 241 ACT-B; <b>10 CA</b> p. 359 ACT-A #3–5, ACT-B #3; <b>18 CA</b> p. 641 ACT-A #1–4	<b>CI</b> 5; <b>CI</b> 6; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 15
(v) apply scientific practices to conduct comparative investigations	<b>2.1</b> p. 49, p. 54 #1; <b>2.1 EF</b> p. 50; <b>3.5</b> p. 92, p. 94; <b>9 TIAT</b> p. 322 #1, #2; <b>10 CA</b> p. 359 ACT-B #3; <b>13 CA</b> p. 455 ACT-A #1–9	<b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 11; <b>CI</b> 12; <b>CI</b> 13
(vi) apply scientific practices to conduct experimental investigations	<b>2.1</b> p. 49, p. 54 #1; <b>2.1 EF</b> p. 50; <b>2 CA</b> p. 65 ACT-A #9; <b>3.5</b> p. 92, p. 94; <b>10 CA</b> p. 359 ACT-A #3–5; <b>17 CA</b> p. 611 ACT-A #1, #2, #5	<b>CI</b> 4; <b>CI</b> 16
(vii) use engineering practices to design solutions to problems	<b>2.1 EF</b> p. 50; <b>2.1 LA</b> p. 54 #3; <b>6.2 SF</b> p. 169 TC; <b>U2 UEP</b> p. 194 #2; <b>U3 UEP</b> p. 277 #9, #12, #18, #19; <b>9.5 LA</b> p. 321 #5; <b>9 CA</b> p. 324 #22, #25; <b>10 CA</b> p. 359 ACT-A #1–5; <b>13 CA</b> p. 455 ACT-A #1–9; <b>U4 UEP</b> p. 457 #10–13, #24; <b>U5 UEP</b> p. 642 #1–4	<b>CI</b> 10; <b>CI</b> 16; <b>CI</b> 17
<b>(C)</b> use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;		
(i) use appropriate safety equipment during laboratory investigations as outlined in Texas Education Agency-approved safety standards	<b>U1 UEP</b> p. 101 #9; <b>6.1 LA</b> p. 166 #6; Student Lab Manual pp. 1–6	<b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 14
(ii) use appropriate safety equipment during classroom investigations as outlined in Texas Education Agency-approved safety standards	<b>U1 UEP</b> p. 101 #9; <b>U5 UEP</b> p. 643 #14; Student Lab Manual pp. 1–6	<b>CI</b> 9; <b>CI</b> 10; <b>CI</b> 11; <b>CI</b> 16
(iii) use appropriate safety equipment during field investigations as outlined in Texas Education Agency-approved safety standards	Student Lab Manual pp. 1–6	<b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 6; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 17

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(iv) use appropriate safety practices during laboratory investigations as outlined in Texas Education Agency-approved safety standards	<b>U1 UEP</b> p. 101 #9; Student Lab Manual pp. 1–6	<b>CI</b> 14
(v) use appropriate safety practices during classroom investigations as outlined in Texas Education Agency-approved safety standards	<b>U1 UEP</b> p. 101 #9; <b>U3 UEP</b> p. 277 #10; <b>U5 UEP</b> p. 643 #14; Student Lab Manual pp. 1–6	<b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 6; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 17
(vi) use appropriate safety practices during field investigations as outlined in Texas Education Agency-approved safety standards	Student Lab Manual pp. 1–6	<b>CI</b> 14
<b>(D)</b> use appropriate tools such as meter sticks, metric rulers, pipettes, graduated cylinders, standard laboratory glassware, balances, timing devices, pH meters or probes, various data collecting probes, thermometers, calculators, computers, internet access, turbidity testing devices, hand magnifiers, work and disposable gloves, compasses, first aid kits, binoculars, field guides, water quality test kits or probes, soil test kits or probes, 30 meter tape measures, tarps, shovels, trowels, screens, buckets, rock and mineral samples equipment, air quality testing devices, cameras, flow meters, Global Positioning System (GPS) units, Geographic Information System (GIS) software, computer models, densimeters, spectrophotometers, stereomicroscopes, compound microscopes, clinometers, field journals, various prepared slides, hand lenses, hot plates, Petri dishes, sampling nets, waders, leveling grade rods (Jason sticks), protractors, inclination and height distance calculators, samples of biological specimens or structures, core sampling equipment, and kick nets;		
(i) use appropriate tools	<b>2.1 EF</b> p. 50; <b>3.5</b> p. 92, p. 94; <b>4 CA</b> p. 130 #6; <b>U3 UEP</b> p. 277 #10, #12; <b>15.4</b> pp. 517–518	<b>CI</b> 1; <b>CI</b> 2; <b>CI</b> 3; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 9; <b>CI</b> 10; <b>CI</b> 11; <b>CI</b> 12; <b>CI</b> 13; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 16; <b>CI</b> 17
<b>(E)</b> collect quantitative data using the International System of Units (SI) and qualitative data as evidence;		
(i) collect quantitative data using the International System of Units (SI)	<b>2.1</b> p. 49; <b>2 CA</b> p. 65 ACT-A #8; <b>U1 UEP</b> p. 101 #10; <b>4 CA</b> p. 131 ACT-A #2; <b>7 TIAT</b> p. 238 #2; <b>12.2 LA</b> p. 407 #3	<b>CI</b> 1; <b>CI</b> 2; <b>CI</b> 3; <b>CI</b> 4; <b>CI</b> 5; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 10; <b>CI</b> 11; <b>CI</b> 13; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 16; <b>CI</b> 17
(ii) collect qualitative data as evidence	<b>2.1</b> p. 49; <b>U1 UEP</b> p. 101 #10; <b>4 CA</b> p. 131 ACT-A #2; <b>7 TIAT</b> p. 238 #2; <b>11.1 LA</b> p. 370 #4; <b>11.3 LA</b> p. 382 #4; <b>11 TIAT</b> p. 386 #4; <b>17 CA</b> p. 611 ACT-A #3, #4; <b>U5 UEP</b> p. 643 #8, #9, #11	<b>CI</b> 1; <b>CI</b> 5; <b>CI</b> 11; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 17
<b>(F)</b> organize quantitative and qualitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper, computers, or cellphone applications;		
(i) organize quantitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper, computers, or cellphone applications	<b>2.1</b> p. 49; <b>4.2</b> p. 119; <b>4.2 LA</b> p. 119 #2; <b>4 CA</b> pp. 130–131 #21, ACT-A #2, ACT-B #2, #3; <b>5 CA</b> p. 155 ACT-A #6; <b>6.2 LA</b> p. 179 #5; <b>U3 UEP</b> p. 277 #13; <b>9 CA</b> p. 325 ACT-A Develop Models #2, #3, Questions #1; <b>11 TIAT</b> p. 386 #1, #2; <b>11 CA</b> p. 389 ACT-A #1; <b>14 TIAT</b> p. 494 #4; <b>16 TIAT</b> p. 572 #1–3	<b>CI</b> 1; <b>CI</b> 4; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 10; <b>CI</b> 11; <b>CI</b> 13; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 16; <b>CI</b> 17
(ii) organize qualitative data using probeware, spreadsheets, lab notebooks or journals, models, diagrams, graphs paper, computers, or cellphone applications	<b>2.1</b> p. 49; <b>4.2</b> p. 119; <b>4.2 LA</b> p. 119 #2; <b>4 CA</b> pp. 130–131 #21, ACT-A #2, ACT-B #2, #3	<b>CI</b> 1; <b>CI</b> 9; <b>CI</b> 11; <b>CI</b> 12; <b>CI</b> 14; <b>CI</b> 15; <b>CI</b> 17
<b>(G)</b> develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and		
(i) develop models to represent phenomena, systems, processes, or solutions to engineering problems	<b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #1; <b>2 CA</b> p. 64 #13, #29; <b>3.3 LA</b> p. 83 #4; <b>3.4 LA</b> p. 92 #4; <b>3 CA</b> p. 99 ACT-A #1–4; <b>U1 UEP</b> p. 101 #4–6; <b>5 CA</b> p. 155 ACT-A #2–4; <b>U2 UEP</b> p. 195 #12, #18; <b>7.1 LA</b> p. 220 #6; <b>7.2 LA</b> p. 231 #5; <b>7 TIAT</b> p. 238 #3; <b>7 CA</b> p. 241 ACT-A #2; <b>8.5 LA</b> p. 272 #5; <b>U3 UEP</b> p. 277 #8; <b>10 CA</b> p. 359 ACT-A #3–7, #9; <b>11.1 LA</b> p. 370 #3; <b>11.3 LA</b> p. 382 #4; <b>11 CA</b> pp. 388–389 #21, ACT-A #5; <b>12.3 LA</b> p. 415 #5; <b>12 CA</b> p. 419 ACT-A #3, #5, ACT-B; <b>13.1 LA</b> p. 433 #4; <b>13 CA</b> p. 455 ACT-A #1–10; <b>U5 UEP</b> p. 642 #5–7	<b>CI</b> 2; <b>CI</b> 6; <b>CI</b> 7; <b>CI</b> 8; <b>CI</b> 10; <b>CI</b> 12; <b>CI</b> 14; <b>CI</b> 16; <b>CI</b> 17; <b>CI</b> 18

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) use models to represent phenomena, systems, processes, or solutions to engineering problems	<b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #1; <b>2 CA</b> pp. 64–65 #29, ACT-A #2; <b>3.3 LA</b> p. 83 #4; <b>3.4 LA</b> p. 92 #4; <b>3 CA</b> p. 99 ACT-A #1–4; <b>U1 UEP</b> p. 101 #10; <b>U2 UEP</b> p. 195 #12, #20; <b>7.2 LA</b> p. 231 #5; <b>7 TIAT</b> p. 238 #3; <b>8.5 LA</b> p. 272 #5; <b>U3 UEP</b> p. 277 #11, #21; <b>10 CA</b> p. 359 ACT-A #3–9; <b>13.1 LA</b> p. 433 #3; <b>13 TIAT</b> p. 452 #1–5; <b>U4 UEP</b> pp. 456–457 #5–9, #18; <b>14.2 LA</b> p. 482 #3; <b>15.1 LA</b> p. 504 #3, #4; <b>15.2 LA</b> p. 511 #6; <b>15.4</b> p. 518; <b>15.4 LA</b> p. 521 #1; <b>15 TIAT</b> p. 526 #1–6; <b>15 CA</b> pp. 528–529 #4, ACT-A #1–6; <b>16 CA</b> p. 575 ACT-A #1–8; <b>U5 UEP</b> p. 643 #13	<b>CI 2</b> ; <b>CI 4</b> ; <b>CI 6</b> ; <b>CI 7</b> ; <b>CI 8</b> ; <b>CI 9</b> ; <b>CI 10</b> ; <b>CI 12</b> ; <b>CI 14</b> ; <b>CI 16</b> ; <b>CI 17</b> ; <b>CI 18</b>
<b>(H)</b> distinguish between scientific hypotheses, theories, and laws.		
(i) distinguish between scientific hypotheses, theories, and laws	<b>2.1</b> p. 49, p. 54; <b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #4; <b>2 CA</b> p. 64 #8, #12; <b>4 CA</b> p. 131 ACT-A #6	<b>2 PTT</b> #2, #4
<b>(2) Scientific and engineering practices.</b> The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:		
<b>(A)</b> identify advantages and limitations of models such as their size, scale, properties, and materials;		
(i) identify advantages of models	<b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #2; <b>2 CA</b> p. 65 ACT-A #10; <b>3.3</b> p. 81; <b>3.3 LA</b> p. 83 #5; <b>3.5</b> p. 94; <b>3.5 LA</b> p. 96 #2; <b>3 CA</b> p. 99 ACT-A #3; <b>U1 UEP</b> p. 101 #13, #14; <b>7 EAW</b> p. 210 TC; <b>U3 UEP</b> p. 277 #7, #20; <b>10 CA</b> p. 359 ACT-A #4–7, #9; <b>U4 UEP</b> p. 456 #8; <b>15.4</b> pp. 517–518; <b>16.2 SF</b> p. 552; <b>16.2 LA</b> p. 562 #4; <b>16.3</b> p. 568	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 3</b> ; <b>CI 4</b> ; <b>CI 6</b> ; <b>CI 10</b> ; <b>CI 14</b> ; <b>CI 16</b> ; <b>CI 17</b>
(ii) identify limitations of models	<b>2.1 EAW</b> p. 51; <b>2.1</b> p. 54; <b>2.1 LA</b> p. 54 #2; <b>2 CA</b> p. 65 ACT-A #10; <b>3.3</b> p. 81; <b>3.3 LA</b> p. 83 #5; <b>3.5 LA</b> p. 96 #2; <b>3 CA</b> p. 99 ACT-A #3; <b>U1 UEP</b> p. 101 #13, #14; <b>U2 UEP</b> p. 195 #14; <b>U3 UEP</b> p. 277 #7, #20; <b>10 CA</b> p. 359 ACT-A #4–7, #9; <b>12 CA</b> p. 419 ACT-A #4; <b>U4 UEP</b> p. 456 #8; <b>15.4</b> pp. 517–518; <b>16.2 SF</b> p. 552; <b>16.2 LA</b> p. 562 #4; <b>16.3</b> p. 568	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 3</b> ; <b>CI 4</b> ; <b>CI 6</b> ; <b>CI 7</b> ; <b>CI 8</b> ; <b>CI 10</b> ; <b>CI 11</b> ; <b>CI 14</b> ; <b>CI 16</b> ; <b>16 PTT</b> #8; <b>CI 17</b>
<b>(B)</b> analyze data by identifying significant statistical features, patterns, sources of error, and limitations;		
(i) analyze data by identifying significant statistical features	<b>2.1</b> p. 49, p. 54; <b>2.1 LA</b> p. 54 #1; <b>7 CA</b> p. 241 ACT-A #1; <b>U3 UEP</b> p. 277 #14; <b>12 TIAT</b> p. 416 #2, #4–6; <b>U4 UEP</b> p. 457 #14; <b>15.1</b> p. 503; <b>15.4</b> p. 518	
(ii) analyze data by identifying patterns	<b>1.4 LA</b> p. 39 #5; <b>2.1</b> p. 49; <b>2.1 LA</b> p. 54 #1; <b>U1 UEP</b> p. 101 #11; <b>4 TIAT</b> p. 128 #2–4; <b>4 CA</b> p. 131 ACT-A #3; <b>6 CA</b> p. 193 ACT-B #2; <b>U2 UEP</b> p. 195 #13; <b>7.2</b> p. 227; <b>7 CA</b> p. 241 ACT-A #1; <b>8.4 LA</b> p. 265 #5; <b>8 TIAT</b> p. 272 #1–4; <b>U3 UEP</b> p. 277 #14; <b>9 CA</b> p. 325 ACT-A Questions #2, #3, ACT-B #1; <b>10 CA</b> p. 359 ACT-B #2; <b>13.3 LA</b> p. 451 #3; <b>U4 UEP</b> p. 457 #14; <b>14.1</b> p. 475; <b>14.1 LA</b> p. 476 #1, #2, #4; <b>14.2</b> p. 480; <b>14 TIAT</b> p. 494 #1–3; <b>14 CA</b> pp. 496–497 #15, ACT-B #1, #3; <b>16.2 SF</b> p. 552; <b>16.2 LA</b> p. 562 #7; <b>16 TIAT</b> p. 572 #6, #7; <b>18 CA</b> p. 641 ACT-A #5, #7; <b>U5 UEP</b> p. 643 #10	<b>CI 1</b> ; <b>CI 2</b> ; <b>2 PTT</b> #1; <b>CI 4</b> ; <b>CI 12</b> ; <b>CI 13</b> ; <b>CI 14</b> ; <b>CI 15</b> ; <b>CI 16</b> ; <b>CI 17</b> ; <b>CI 18</b>
(iii) analyze data by identifying sources of error	<b>2.1</b> p. 49, p. 54; <b>2.1 LA</b> p. 54 #1; <b>4 CA</b> p. 131 ACT-A #4; <b>5 CA</b> p. 155 ACT-A #8; <b>U4 UEP</b> p. 457 #15	
(iv) analyze data by identifying limitations	<b>2.1</b> p. 54; <b>2.1 LA</b> p. 54 #1; <b>U2 UEP</b> p. 195 #14; <b>U3 UEP</b> p. 277 #15	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(C)</b> use mathematical calculations to assess quantitative relationships in data; and		
(i) use mathematical calculations to assess quantitative relationships in data; and	<b>1.3 LA</b> p. 35 #4; <b>1 TIAT</b> p. 40 #2; <b>1 CA</b> p. 43 ACT-A #2, #3; <b>2.1</b> p. 49; <b>2.1 LA</b> p. 54 #1; <b>3.4 LA</b> p. 92 #3; <b>3.5</b> p. 94; <b>3 TIAT</b> p. 96 #3–5; <b>9 CA</b> p. 325 ACT-A Develop Models #1; <b>10 TIAT</b> p. 356 #2; <b>10 CA</b> p. 359 ACT-B #1; <b>11 TIAT</b> p. 386 #2; <b>14.2 LA</b> p. 482 #5; <b>16.2 SF</b> p. 552; <b>16 TIAT</b> p. 572 #4, #5; <b>17 TIAT</b> p. 608 #3, #4	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 13</b> ; <b>CI 16</b> ; <b>CI 18</b>
<b>(D)</b> evaluate experimental and engineering designs.		
(i) evaluate experimental designs	<b>2 CS</b> p. 48; <b>2.1</b> p. 54; <b>2 TIAT</b> p. 62 #4; <b>2 CA</b> p. 65 ACT-A #4; <b>U1 UEP</b> p. 101 #5, #8; <b>4 CA</b> p. 131 ACT-A #5, ACT-B #6; <b>U3 UEP</b> p. 277 #16, #17; <b>U4 UEP</b> p. 457 #16–18; <b>18.1 SF</b> p. 619	<b>CI 1</b>
(ii) evaluate engineering designs	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>U2 UEP</b> pp. 194–195 #3, #4, #6, #8, #10, #11, #14–17, #20, #23, #24; <b>U3 UEP</b> p. 277 #16, #17, #20; <b>10.2 LA</b> p. 338 #4; <b>10.4 EF</b> p. 354 TC; <b>13 CA</b> p. 455 ACT-A #10; <b>U4 UEP</b> p. 457 #16–18; <b>18.1 SF</b> p. 619	<b>CI 10</b> ; <b>CI 14</b> ; <b>CI 16</b> ; <b>CI 17</b>
<b>(3) Scientific and engineering practices.</b> The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:		
<b>(A)</b> develop explanations and propose solutions supported by data and models consistent with scientific ideas, principles, and theories;		
(i) develop explanations supported by data consistent with scientific ideas	<b>2.1</b> p. 49; <b>2.1 LA</b> p. 54 #5; <b>2 TIAT</b> p. 62 #1–5; <b>U1 UEP</b> p. 101 #11; <b>4.1 LA</b> p. 115 #1–3; <b>4.2</b> p. 119; <b>4.2 LA</b> p. 119 #1–4; <b>4.3 LA</b> p. 123 #2, #5; <b>4.4 SF</b> p. 126 TC; <b>4.4 LA</b> p. 127 #1–4; <b>4 TIAT</b> p. 128 #2–4; <b>4 CA</b> p. 130 #1–15; <b>5.1</b> p. 139; <b>5.1 LA</b> p. 141 #2–5; <b>5.2</b> p. 143; <b>5.2 LA</b> p. 144 #1–5; <b>5 TIAT</b> p. 152 #1, #2; <b>5 CA</b> pp. 154–155 #1–20, #22–32; <b>6 EAW</b> p. 159 TC; <b>6.1</b> p. 161, p. 164, p. 166; <b>6.1 SF</b> p. 165 TC; <b>6.1 LA</b> p. 166 #1–6; <b>6.2</b> p. 168, p. 170, p. 172, p. 175, pp. 178–179; <b>6.2 SF</b> p. 169 TC; <b>6.2 LA</b> p. 179 #1–5; <b>6.3</b> pp. 180–181, p. 184; <b>6.3 LA</b> p. 185 #1, #2, #4, #5; <b>6.4</b> p. 187, p. 189 #1, #2; <b>6.4 LA</b> p. 189 #1–6; <b>6 TIAT</b> p. 190 #1–6; <b>6 CA</b> pp. 192–193 #1–27, ACT-A #4, #6, #7, ACT-B #4; <b>U2 UEP</b> p. 195 #18, #19, #21; <b>7.1</b> p. 213, p. 215 #1, p. 220; <b>7.1 LA</b> p. 220 #1, #4; <b>7.2 SF</b> p. 223 TC; <b>7 TIAT</b> p. 238 #2; <b>8.4 LA</b> p. 265 #3; <b>8.5 LA</b> p. 272 #4; <b>U3 UEP</b> p. 277 #22; <b>9.1</b> p. 288; <b>9 CA</b> p. 325 ACT-A Questions #2, #4; <b>12.2 LA</b> p. 407 #5; <b>12.3 SF</b> p. 409 TC; <b>12 TIAT</b> p. 416 #3, #6; <b>13 EAW</b> p. 422 TC; <b>13.3 LA</b> p. 451 #3; <b>13 CA</b> p. 455 ACT-B; <b>18.1 SF</b> p. 619 TC; <b>18.2 LA</b> p. 625 #4; <b>18.3 LA</b> p. 634 #4, #5; <b>18 CA</b> pp. 640–641 #17, ACT-A #6, #7	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 3</b> ; <b>CI 4</b> ; <b>4 PTT</b> #1, #4–10, #12–15; <b>CI 5</b> ; <b>5 PTT</b> #4, #5, #7, #8; <b>6 PTT</b> #1–15; <b>CI 7</b> ; <b>CI 8</b> ; <b>9 PTT</b> #3; <b>CI 12</b> ; <b>CI 13</b>
(ii) develop explanations supported by data consistent with scientific principles	<b>2.1</b> p. 49; <b>2.1 LA</b> p. 54 #5; <b>2 TIAT</b> p. 62 #1–5; <b>U1 UEP</b> p. 101 #11; <b>U2 UEP</b> p. 195 #24; <b>U3 UEP</b> p. 277 #22; <b>12.2 LA</b> p. 407 #5; <b>12.3 SF</b> p. 409 TC; <b>12 TIAT</b> p. 416 #6; <b>14.1 SF</b> p. 476 TC; <b>14 TIAT</b> p. 494 #5–7; <b>15.4 LA</b> p. 521 #3; <b>18.1 SF</b> p. 619 TC; <b>18.2 LA</b> p. 625 #4; <b>18.3 LA</b> p. 634 #4, #5; <b>18 CA</b> pp. 640–641 #17, ACT-A #6, #7	<b>CI 7</b> ; <b>CI 8</b> ; <b>CI 11</b> ; <b>CI 14</b> ; <b>14 PTT</b> #1, #2, #7; <b>CI 15</b> ; <b>CI 16</b>
(iii) develop explanations supported by data consistent with scientific theories	<b>2.1</b> p. 49; <b>2.1 LA</b> p. 54 #5; <b>2 TIAT</b> p. 62 #1–5; <b>U1 UEP</b> p. 101 #11; <b>4.3</b> p. 120, p. 123; <b>4.3 LA</b> p. 123 #1, #3, #4; <b>4.4</b> pp. 126–127; <b>4 TIAT</b> p. 128 #1; <b>5 CA</b> p. 155 ACT-B Citizen Science; <b>7 TIAT</b> p. 238 #3; <b>8 CA</b> p. 274 #17–19; <b>11 CA</b> p. 388 #24; <b>12 CA</b> p. 419 ACT-A #1, #2	<b>CI 4</b> ; <b>5 PTF</b> #9; <b>14 PTT</b> #1, #2

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(iv) develop explanations supported by models consistent with scientific ideas	<b>2.1 EAW</b> p. 51; <b>2.1 LA</b> p. 54 #5; <b>2 TIAT</b> p. 62 #1–5; <b>U1 UEP</b> p. 101 #11; <b>5 EAW</b> p. 134 TC; <b>5.1</b> p. 138, p. 141 #1, #2; <b>5.1 LA</b> p. 141 #1, #4; <b>5.2</b> p. 142; <b>5.3</b> pp. 150–151; <b>5.3 LA</b> p. 151 #1–6; <b>5 TIAT</b> p. 152 #3; <b>5 CA</b> p. 154 #21; <b>6.3 LA</b> p. 185 #3; <b>7 TIAT</b> p. 238 #3; <b>U3 UEP</b> p. 277 #22; <b>10 CA</b> p. 359 ACT-A #7, #8; <b>11 CA</b> p. 388 #21; <b>12 CA</b> pp. 418–419 #21, #22, ACT-A #1, #2; <b>U4 UEP</b> p. 457 #19–21; <b>17.1</b> p. 582; <b>17.1 LA</b> p. 586 #2, #3; <b>17.2</b> p. 590; <b>17.4 LA</b> p. 607 #4, #5	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 3</b> ; <b>5 PTT</b> #1–3, #6, #10–15; <b>CI 7</b> ; <b>CI 8</b> ; <b>CI 12</b> ; <b>CI 13</b>
(v) develop explanations supported by models consistent with scientific principles	<b>2.1 EAW</b> p. 51; <b>11 CA</b> p. 388 #21; <b>12 CA</b> p. 418 #21, #22; <b>13.1 LA</b> p. 433 #3; <b>U4 UEP</b> p. 457 #19–21; <b>14.1</b> p. 476; <b>14.2</b> p. 479; <b>14.2 LA</b> p. 482 #1; <b>14.4 LA</b> p. 494 #3; <b>14 CA</b> p. 496 #16, #17; <b>15.2</b> p. 511; <b>15.2 LA</b> p. 511 #5; <b>15.3 LA</b> p. 515 #2; <b>15.5 LA</b> p. 526 #2, #4; <b>15 CA</b> p. 528 #18; <b>16.1</b> p. 538 #2, p. 543; <b>16.1 LA</b> p. 545 #2, #3; <b>16.2 LA</b> p. 562 #6; <b>16.3 LA</b> p. 569 #5, #6; <b>16 CA</b> p. 574 #12, #15, #17–19	<b>CI 6</b> ; <b>CI 7</b> ; <b>CI 8</b> ; <b>CI 9</b> ; <b>CI 12</b> ; <b>CI 13</b> ; <b>CI 14</b> ; <b>CI 16</b> ; <b>16 PTT</b> #15
(vi) develop explanations supported by models consistent with scientific theories	<b>2.1 EAW</b> p. 51	
(vii) propose solutions supported by data consistent with scientific ideas	<b>2.1</b> p. 49; <b>U1 UEP</b> p. 101 #4, #16; <b>9 TIAT</b> p. 322 #3–5; <b>9 CA</b> pp. 324–325 #22, #24, ACT-B #2, #3; <b>10.2 LA</b> p. 338 #5; <b>10.3 LA</b> p. 342 #4; <b>10.4 LA</b> p. 355 #2, #6; <b>10 CA</b> pp. 358–359 #20, #22, ACT-A #1, #2; <b>11 CA</b> p. 389 ACT-B; <b>12 EAW</b> p. 392 TC; <b>U4 UEP</b> p. 457 #24	<b>CI 1</b> ; <b>CI 3</b> ; <b>CI 6</b> ; <b>CI 7</b> ; <b>CI 8</b> ; <b>CI 13</b> ; <b>CI 15</b> ; <b>CI 16</b> ; <b>CI 17</b> ; <b>CI 18</b>
(viii) propose solutions supported by data consistent with scientific principles	<b>2.1</b> p. 51; <b>U1 UEP</b> p. 101 #4, #16; <b>8.3 LA</b> p. 261 #4; <b>8 CA</b> p. 274 #17; <b>9 TIAT</b> p. 322 #3–5; <b>9 CA</b> pp. 324–325 #24, ACT-B #2, #3; <b>10.3 LA</b> p. 342 #4; <b>12 EAW</b> p. 392 TC; <b>U4 UEP</b> p. 457 #24; <b>14 CA</b> pp. 496–497 #22, #23, ACT-B #4, #5; <b>15.2 SF</b> p. 505 TC; <b>15.3 LA</b> p. 515 #3	<b>CI 7</b> ; <b>CI 8</b> ; <b>CI 13</b> ; <b>CI 18</b>
(ix) propose solutions supported by data consistent with scientific theories	<b>2.1</b> p. 49; <b>U1 UEP</b> p. 101 #4, #16; <b>14.2 LA</b> p. 482 #2	
(x) propose solutions supported by models consistent with scientific ideas	<b>2.1</b> p. 49; <b>U1 UEP</b> p. 101 #4, #16; <b>9 TIAT</b> p. 322 #3–5; <b>10 CA</b> p. 359 ACT-A #7–9; <b>17 CA</b> p. 611 ACT-B; <b>U5 UEP</b> p. 643 #15	<b>CI 1</b> ; <b>CI 3</b> ; <b>CI 16</b> ; <b>CI 17</b>
(xi) propose solutions supported by models consistent with scientific principles	<b>2.1</b> p. 49; <b>9 TIAT</b> p. 322 #3–5; <b>14.2 LA</b> p. 482 #4; <b>14 CA</b> p. 496 #24; <b>16.1 SF</b> p. 544 TC; <b>16.1 LA</b> p. 545 #5; <b>16 CA</b> p. 575 ACT-A #8	
(xii) propose solutions supported by models consistent with scientific theories	<b>2.1 EAW</b> p. 51	<b>CI 1</b> ; <b>CI 3</b>
<b>(B)</b> communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and		
(i) communicate explanations individually in a variety of settings	<b>1.1</b> p. 19; <b>2.1</b> p. 54; <b>2.2 LA</b> p. 58 #5; <b>4 CA</b> p. 131 ACT-B #1, #3–6; <b>5.1 LA</b> p. 141 #5; <b>5 CA</b> p. 155 ACT-A #1–7; <b>6.4 LA</b> p. 189 #5, #6; <b>6 CA</b> p. 193 ACT-A #2; <b>U2 UEP</b> p. 195 #18, #19; <b>7.1</b> p. 213, p. 215 #1, p. 220; <b>7.1 LA</b> p. 220 #1, #4; <b>7.3 SF</b> p. 235 TC; <b>7 TIAT</b> p. 238 #4; <b>8.5 LA</b> p. 272 #5; <b>10 CA</b> p. 359 ACT-A #8; <b>12.2 LA</b> p. 407 #5; <b>12 CA</b> p. 419 ACT-A #3, ACT-B; <b>13.1 LA</b> p. 433 #4; <b>13.2 LA</b> p. 449 #5; <b>13 CA</b> pp. 454–455 #21, #22, #24, ACT-B; <b>18.4 LA</b> p. 638 #4; <b>18 CA</b> p. 640 #20	<b>CI 1</b> ; <b>CI 2</b> ; <b>CI 3</b>

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) communicate explanations individually in a variety of formats	<b>1.1</b> p. 19; <b>2.1</b> p. 54; <b>4 EAW</b> p. 106 TC; <b>4.1 LA</b> p. 115 #3; <b>4.4</b> p. 124; <b>4.4 SF</b> p. 126 TC; <b>4 CA</b> p. 130 #15–28; <b>5 EAW</b> p. 134 TC; <b>5.1</b> pp. 138–139, p. 141 #1, #2; <b>5.1 LA</b> p. 141 #1–4; <b>5.2</b> pp. 142–143; <b>5.2 LA</b> p. 144 #1–5; <b>5.3</b> pp. 150–151; <b>5.3 LA</b> p. 151 #1–6; <b>5 TIAT</b> p. 152 #1–3; <b>5 CA</b> pp. 154–155 #20, #21, #31, #32; <b>6 EAW</b> p. 159 TC; <b>6.1</b> p. 161, p. 164, p. 166; <b>6.1 SF</b> p. 165 TC; <b>6.1 LA</b> p. 166 #1–6; <b>6.2</b> p. 168, p. 170, p. 172, p. 175, pp. 178–179; <b>6.2 SF</b> p. 169 TC; <b>6.2 LA</b> p. 179 #1–5; <b>6.3</b> pp. 180–181, p. 184; <b>6.3 LA</b> p. 185 #1–5; <b>6.4</b> p. 187, p. 189 #1, #2; <b>6.4 LA</b> p. 189 #1–4; <b>6 TIAT</b> p. 190 #1, #2, #4, #5; <b>6 CA</b> pp. 192–193 #1–27, ACT-A #4–7, ACT-B #4; <b>U2 UEP</b> pp. 194–195 #7, #26; <b>8 CA</b> p. 275 ACT-B Citizen Science; <b>9 CA</b> p. 325 ACT-A Questions #1; <b>10 CA</b> p. 359 ACT-A #8; <b>12.2 LA</b> p. 407 #5; <b>12 CA</b> p. 419 ACT-A #3, ACT-B; <b>13.1 LA</b> p. 433 #4; <b>17 EAW</b> p. 578 TC; <b>17.1 LA</b> p. 586 #4; <b>18.4 LA</b> p. 638 #4; <b>18 CA</b> p. 640 #20	<b>CI 1; CI 2; CI 3; CI 4; CI 5; 6 PTT #1–15; CI 14; CI 15</b>
(iii) communicate explanations collaboratively in a variety of settings	<b>2.1</b> p. 54; <b>3 TIAT</b> p. 96 #6; <b>U1 UEP</b> p. 101 #17, #19; <b>5 CA</b> p. 155 ACT-A #1, ACT-B Citizen Science; <b>7 TIAT</b> p. 238 #4; <b>9 TIAT</b> p. 322 #3; <b>12 CA</b> p. 419 ACT-A #3, #5	<b>CI 1; CI 2; CI 3; CI 5</b>
(iv) communicate explanations collaboratively in a variety of formats	<b>2.1</b> p. 54; <b>3 TIAT</b> p. 96 #6; <b>U1 UEP</b> p. 101 #17, #19; <b>9 TIAT</b> p. 322 #3; <b>9 CA</b> p. 325 ACT-A Questions #1; <b>12 CA</b> p. 419 ACT-A #3	<b>CI 1; CI 2; CI 3; CI 4</b>
(v) communicate solutions individually in a variety of settings	<b>2.1</b> p. 54; <b>U3 UEP</b> p. 277 #23, #25; <b>9 CA</b> p. 324 #21; <b>10 CA</b> p. 359 ACT-A #8; <b>11 CA</b> p. 389 ACT-B; <b>12 CA</b> p. 419 ACT-A #6; <b>U4 UEP</b> p. 457 #25; <b>16 CA</b> p. 575 ACT-B Citizen Science	
(vi) communicate solutions individually in a variety of formats	<b>2.1</b> p. 54; <b>U3 UEP</b> p. 277 #23, #25; <b>9 CA</b> p. 324 #21; <b>10 CA</b> p. 359 ACT-A #8; <b>11 CA</b> p. 389 ACT-B; <b>12 CA</b> p. 419 ACT-A #6; <b>13.2 LA</b> p. 449 #5; <b>U4 UEP</b> p. 457 #25; <b>17.3 LA</b> p. 604 #4	<b>CI 6</b>
(vii) communicate solutions collaboratively in a variety of settings	<b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #17, #19; <b>6 TIAT</b> p. 190 #3, #6; <b>6 CA</b> p. 193 ACT-B #1–3; <b>U2 UEP</b> p. 195 #22, #23; <b>U3 UEP</b> p. 277 #23, #25; <b>9 TIAT</b> p. 322 #4, #5; <b>9 CA</b> p. 325 ACT-B #3; <b>11 CA</b> p. 389 ACT-B; <b>U4 UEP</b> p. 457 #25; <b>U5 UEP</b> p. 643 #19	<b>CI 17</b>
(viii) communicate solutions collaboratively in a variety of formats	<b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #17, #19; <b>U3 UEP</b> p. 277 #23, #25; <b>9 TIAT</b> p. 322 #4, #5; <b>9 CA</b> p. 325 ACT-B #3; <b>11 CA</b> p. 389 ACT-B; <b>U4 UEP</b> p. 457 #25; <b>U5 UEP</b> p. 643 #21	<b>CI 16; CI 17</b>
<b>(C) engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.</b>		
(i) engage respectfully in scientific argumentation using applied scientific explanations	<b>1 EAW</b> p. 16; <b>1.1 LA</b> p. 23 #3; <b>1 CA</b> p. 43 ACT-B; <b>2.1</b> p. 54; <b>2 CA</b> p. 65 ACT-B Citizen Science; <b>3.5 LA</b> p. 96 #4; <b>3 CA</b> p. 98 #25; <b>U1 UEP</b> p. 101 #15; <b>4.2 LA</b> p. 119 #4; <b>4 CA</b> p. 130 #21, #26–28; <b>6 EAW</b> p. 159 TC; <b>6.1 SF</b> p. 165 TC; <b>6 TIAT</b> p. 190 #5; <b>6 CA</b> pp. 192–193 #24–26; <b>7.3 LA</b> p. 238 #5; <b>7 CA</b> p. 240 #22; <b>8.1 LA</b> p. 254 #4; <b>8 CA</b> p. 274 #18, #20; <b>9 CA</b> p. 324 #23; <b>10.4 LA</b> p. 355 #7; <b>10 CA</b> p. 358 #26; <b>11.2 LA</b> p. 376 #5; <b>11.4 SF</b> p. 384 TC; <b>11.4 LA</b> p. 385 #4; <b>15.5 LA</b> p. 526 #5; <b>18.2 LA</b> p. 625 #5	<b>CI 1; CI 2; CI 3; CI 13</b>
(ii) engage respectfully in scientific argumentation using empirical evidence	<b>1 EAW</b> p. 16; <b>1 CA</b> p. 43 ACT-B; <b>2.1</b> p. 54; <b>2 CA</b> p. 65 ACT-B Citizen Science; <b>U1 UEP</b> p. 101 #15; <b>4 EAW</b> p. 106 TC; <b>5 CA</b> p. 154 #22, #30; <b>7.3 LA</b> p. 238 #5; <b>7 CA</b> p. 240 #22; <b>8.1 LA</b> p. 254 #4; <b>8 CA</b> p. 274 #18, #20; <b>10 CA</b> p. 358 #21; <b>11.2 LA</b> p. 376 #6; <b>11.3 LA</b> p. 382 #3; <b>11 TIAT</b> p. 386 #3; <b>16 TIAT</b> p. 572 #8; <b>U5 UEP</b> p. 643 #16–18	<b>CI 1; CI 2; CI 3; CI 9; CI 10; CI 11</b>



STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(4) Scientific and engineering practices.</b> The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:		
<b>(A)</b> analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;		
(i) analyze scientific explanations and solutions by using empirical evidence so as to encourage critical thinking by the student	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2 CA</b> p. 64 #31; <b>3 TIAT</b> p. 96 #6; <b>U1 UEP</b> p. 101 #12; <b>4 EAW</b> p. 106 TC; <b>4.4</b> p. 124; <b>15.5 LA</b> p. 526 #3; <b>U5 UEP</b> p. 643 #12	<b>CI 1; CI 2; CI 3</b>
(ii) analyze scientific explanations and solutions by using logical reasoning so as to encourage critical thinking by the student	<b>1 EAW</b> p. 16; <b>1 CA</b> p. 42 #9; <b>2 EAW</b> p. 46; <b>2.1 LA</b> p. 54 #5; <b>2 CA</b> p. 64 #31; <b>3 EAW</b> p. 68 TC; <b>3.1 SF</b> p. 72; <b>3.2 EF</b> p. 79 TC; <b>3.4 SF</b> p. 87; <b>3.5 SF</b> p. 95; <b>3 TIAT</b> p. 96 #6; <b>3 CA</b> p. 99 #30, #32; <b>U1 UEP</b> p. 101 #12; <b>4 EAW</b> p. 106 TC; <b>4.1 SF</b> p. 114; <b>4.1 LA</b> p. 115 #2; <b>4.3 LA</b> p. 123 #4; <b>4.4 SF</b> p. 126; <b>4 CA</b> p. 130 #21, #27; <b>6.1 SF</b> p. 165; <b>6.2 SF</b> p. 169; <b>7.3 SF</b> p. 235; <b>7 CA</b> p. 240 #19; <b>8.1 SF</b> p. 248; <b>9.3 SF</b> p. 303; <b>10.2</b> p. 335; <b>12.3 SF</b> p. 409; <b>14 EAW</b> p. 472 TC; <b>14.1 SF</b> p. 476; <b>14.3</b> p. 484 #2, p. 485; <b>14.3 LA</b> p. 488 #2–4; <b>15.2 SF</b> p. 505; <b>15.3 SF</b> p. 514; <b>15.4 LA</b> p. 521 #4; <b>16.1 SF</b> p. 544; <b>16.3 LA</b> p. 569 #2; <b>16.4 LA</b> p. 572 #2; <b>16 CA</b> p. 574 #13, #16; <b>17.2</b> p. 592; <b>17 CA</b> p. 610 #17; <b>18.1 SF</b> p. 619	<b>CI 1; CI 2; CI 3; CI 4; CI 5; CI 6; 14 PTT #8, #14</b>
(iii) analyze scientific explanations and solutions by using experimental testing, so as to encourage critical thinking by the student	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>U1 UEP</b> p. 101 #12	<b>CI 1; CI 2; CI 3</b>
(iv) analyze scientific explanations and solutions by using observational testing, so as to encourage critical thinking by the student	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2.1 EAW</b> 51; <b>U1 UEP</b> p. 101 #12; <b>4.3 LA</b> p. 123 #4, #5; <b>6 CA</b> ACT-A p. 193 #3	<b>CI 1; CI 2; CI 3</b>
(v) evaluate scientific explanations and solutions by using empirical evidence so as to encourage critical thinking by the student	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>3 TIAT</b> p. 96 #6; <b>4.4</b> p. 124; <b>15 CA</b> ACT-B p. 529 Citizen Science; <b>18.1 LA</b> p. 620 #5	<b>CI 1; CI 2; CI 3 CI 11</b>
(vi) evaluate scientific explanations and solutions by using logical reasoning so as to encourage critical thinking by the student	<b>1.4 LA</b> p. 39 #5; <b>2 EAW</b> p. 46; <b>2.1 LA</b> p. 54 #5; <b>2.2 LA</b> p. 58 #4; <b>2.3 LA</b> p. 59 #5; <b>3 EAW</b> p. 68 TC; <b>3.1 SF</b> p. 72; <b>3.2 EF</b> p. 79 TC; <b>3.4 SF</b> p. 87; <b>3.5 SF</b> p. 95; <b>3 TIAT</b> p. 96 #6; <b>U1 UEP</b> p. 101 #18; <b>4.1 SF</b> p. 114; <b>4.4 SF</b> p. 126; <b>6.1 SF</b> p. 165; <b>6.2 SF</b> p. 169; <b>7.1 LA</b> p. 220 #5; <b>7.3 SF</b> p. 235; <b>7.3 LA</b> p. 238 #4; <b>7 CA</b> p. 240 #19; <b>8.1 SF</b> p. 248; <b>9.1 SF</b> p. 303; <b>10.2</b> p. 335; <b>12.3 SF</b> p. 409; <b>14.1 SF</b> p. 476; <b>14 EF</b> p. 492 TC; <b>14.4 LA</b> p. 494 #2, #4; <b>15.2 SF</b> p. 505; <b>15.3 SF</b> p. 514; <b>16.1 SF</b> p. 544; <b>16.3 LA</b> p. 569 #3, #4; <b>17.2</b> p. 592; <b>17.2 LA</b> p. 596 #4, #5; <b>17 CA</b> p. 610 #19; <b>18.1 SF</b> p. 619; <b>18.1 LA</b> p. 620 #5	<b>CI 1; CI 2; CI 3; CI 11</b>
(vii) evaluate scientific explanations and solutions by using experimental testing, so as to encourage critical thinking by the student	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>2.2 LA</b> p. 58 #3	<b>CI 1; CI 2; CI 3</b>
(viii) evaluate scientific explanations and solutions by using observational testing, so as to encourage critical thinking by the student	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54	<b>CI 1; CI 2; CI 3</b>
(iv) critique scientific explanations and solutions by using empirical evidence so as to encourage critical thinking by the student	<b>1.1 LA</b> p. 23 #3; <b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #14; <b>U3 UEP</b> p. 277 #24; <b>U4 UEP</b> p. 457 #22, #23	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(x) critique scientific explanations and solutions by using logical reasoning so as to encourage critical thinking by the student	<b>1.1 LA</b> p. 23 #3; <b>1.4 LA</b> p. 39 #5; <b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #14; <b>7.1 LA</b> p. 220 #5; <b>7 CA</b> p. 240 #20, #21; <b>U3 UEP</b> p. 277 #24; <b>U4 UEP</b> p. 457 #22, #23; <b>14 CA</b> pp. 496–497 #21, ACT-A Procedure #1–6, Questions #1–5; <b>15.3 SF</b> p. 514 TC; <b>15.4 LA</b> p. 521 #5; <b>15 CA</b> p. 528 #19, #20; <b>16.1 LA</b> p. 545 #4, #6; <b>16</b> p. 572; <b>16 CA</b> p. 574 #20; <b>17.2</b> p. 592 TC; <b>18.3 LA</b> p. 634 #5	<b>16 PTT</b> #6, #10
(xi) critique scientific explanations and solutions by using experimental testing, so as to encourage critical thinking by the student	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #14; <b>U4 UEP</b> p. 457 #22, #23; <b>U5 UEP</b> p. 643 #20	
(xii) critique scientific explanations and solutions by using observational testing, so as to encourage critical thinking by the student	<b>2.1 EF</b> p. 50; <b>2.1</b> p. 54; <b>U1 UEP</b> p. 101 #14; <b>U4 UEP</b> p. 457 #22, #23	
<b>(B)</b> relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists as related to the content; and		
(i) relate the impact of past research on scientific thought, including research methodology	<b>2.1</b> p. 49, p. 54; <b>3 CA</b> p. 98 #15; <b>4 EAW</b> p. 106; <b>4 CS</b> p. 108; <b>4 CA</b> p. 130 #22; <b>6 CS</b> p. 160	<b>CI</b> 11
(ii) relate the impact of past research on scientific thought, including cost-benefit analysis	<b>2.1 EF</b> p. 50; <b>7.3</b> p. 238; <b>8.1</b> p. 254; <b>8.1 LA</b> p. 254 #4; <b>8.3 LA</b> p. 261 #4	
(iii) relate the impact of past research on scientific thought, including contributions of diverse scientists	<b>1.4</b> p. 39; <b>1.4 LA</b> p. 39 #2, #3; <b>2.1</b> p. 54; <b>4 EAW</b> p. 106; <b>6 EAW</b> p. 158; <b>8 EAW</b> p. 244; <b>8.4 EAW</b> p. 264; <b>10.3 EAW</b> p. 341	<b>4 PTT</b> #11
(iv) relate the impact of past research on society, including research methodology	<b>2.1</b> p. 49; <b>2.1 EF</b> p. 50; <b>2.1 EAW</b> p. 51; <b>7 CA</b> p. 240 #2	
(v) relate the impact of past research on society, including cost-benefit analysis	<b>1.2</b> pp. 23–24; <b>16 CA</b> p. 574 #21	<b>CI</b> 9
(vi) relate the impact of past research on society, including contributions of diverse scientists as related to the content	<b>1.4</b> pp. 38–39; <b>2.1</b> p. 54; <b>4 EAW</b> p. 106; <b>6 EAW</b> p. 158; <b>8 EAW</b> p. 244; <b>8.4 EAW</b> p. 264; <b>10.3 EAW</b> p. 341	
(vii) relate the impact of current research on scientific thought, including research methodology	<b>2.1</b> p. 49; <b>2.1 EAW</b> p. 51; <b>2.1</b> p. 54; <b>3.5</b> p. 92, p. 94; <b>3 CA</b> ACT-B p. 99 #1–4; <b>4 EAW</b> p. 106	
(viii) relate the impact of current research on scientific thought, including cost-benefit analysis	<b>2.1 EF</b> p. 50; <b>7.3</b> p. 238; <b>7.3 LA</b> p. 238 #4; <b>8.1</b> p. 254; <b>8.3 LA</b> p. 261 #4	<b>CI</b> 17
(ix) relate the impact of current research on scientific thought, including contributions of diverse scientists as related to the content	<b>3 CA</b> p. 98 #24, ACT-B p. 99 #1–4; <b>4 EAW</b> p. 106; <b>6 EAW</b> p. 158; <b>8 EAW</b> p. 244; <b>8.4</b> p. 264; <b>10.3 EAW</b> p. 341; <b>11 CA</b> p. 388 #16, #18, #23	<b>11 PTT</b> #10
(x) relate the impact of current research on society, including research methodology	<b>2.1</b> p. 49, p. 54; <b>3.5</b> p. 92; <b>3.5</b> p. 94; <b>4 EAW</b> p. 106; <b>11 EAW</b> p. 362 TC; <b>11</b> p. 383; <b>11.4 LA</b> p. 385 #1, #2; <b>11 CA</b> p. 388 #7, #16, #17, #23	<b>11 PTT</b> #10
(xi) relate the impact of current research on society, including cost-benefit analysis	<b>1.2</b> pp. 23–24; <b>11 EAW</b> p. 362 TC; <b>11</b> p. 383; <b>11.4 LA</b> p. 385 #1, #2; <b>11 CA</b> p. 388 #7; <b>14 CA</b> p. 496 #18; <b>15.3 LA</b> p. 515 #4; <b>17</b> p. 604; <b>17 CA</b> p. 610 #18	<b>CI</b> 3; <b>CI</b> 9
(xii) relate the impact of current research on society, including contributions of diverse scientists as related to the content	<b>3 CA</b> p. 98 #24; <b>4 EAW</b> p. 106; <b>6 EAW</b> p. 158; <b>8 EAW</b> p. 244; <b>8.4</b> p. 264; <b>10.3 EAW</b> p. 341; <b>11 EAW</b> p. 362 TC; <b>11 CA</b> p. 388 #20; <b>15 EAW</b> p. 500 TC; <b>16 EAW</b> p. 532 TC	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(C)</b> research and explore resources such as museums, planetariums, observatories, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers.		
(i) research STEM careers	<b>2 EAW</b> p. 46 TC; <b>3 EAW</b> p. 68 TC; <b>U2</b> p. 199 Partners in Sustainability; <b>18.2</b> p. 620	
(ii) explore resources in order to investigate STEM careers	<b>2 EAW</b> p. 46 TC; <b>3 EAW</b> p. 68 TC; <b>U2</b> p. 197, pp. 199–202 Partners in Sustainability	
<b>(5) Science concepts.</b> The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes. The student is expected to:		
<b>(A)</b> identify native plants and animals within a local ecosystem and compare their roles to those of plants and animals in other biomes, including aquatic, grassland, forest, desert, and tundra;		
(i) identify native plants within a local ecosystem	<b>3 EAW</b> p. 68; <b>6.2 SF</b> p. 169; <b>U4</b> pp. 466–467 Citizen Science	<b>7 PTT</b> #14; <b>CI</b> 14
(ii) identify native animals within a local ecosystem	<b>U4</b> p. 460, pp. 466–467 Citizen Science	<b>CI</b> 14
(iii) compare the roles of local native plants to those of plants in other biomes, including aquatic	<b>3.2</b> p. 75; <b>6.3</b> pp. 180–181; <b>6.4</b> p. 187	
(iv) compare the roles of local native plants to those of plants in other biomes, including grassland	<b>6.2</b> p. 172; <b>8 CA</b> p. 274 #13	<b>8 PTT</b> #10
(v) compare the roles of local native plants to those of plants in other biomes, including forest	<b>6.2</b> p. 173, p. 175	
(vi) compare the roles of local native plants to those of plants in other biomes, including desert	<b>6.2 SF</b> p. 169; <b>6.2</b> p. 170; <b>10.3</b> p. 340	
(vii) compare the roles of local native plants to those of plants in other biomes, including tundra	<b>6.2</b> p. 172	
(viii) compare the roles of local native animals to those of animals in other biomes, including aquatic	<b>4 CA</b> p. 130 #26; <b>6.3</b> pp. 180–181; <b>6.4</b> pp. 186–187; <b>6.4</b> p. 189; <b>6 TIAT</b> p. 190	<b>4 PTT</b> #4
(ix) compare the roles of local native animals to those of animals in other biomes, including grassland	<b>6.2</b> p. 172; <b>8 CA</b> p. 274 #13	<b>8 PTT</b> #10
(x) compare the roles of local native animals to those of animals in other biomes, including forest	<b>6.2</b> pp. 174–175	<b>8 PTT</b> #6
(xi) compare the roles of local native animals to those of animals in other biomes, including desert	<b>6.2 SF</b> p. 169; <b>6.2</b> p. 170	
(xii) compare the roles of local native animals to those of animals in other biomes, including tundra	<b>6.2</b> p. 172	
<b>(B)</b> explain the cycling of water, phosphorus, carbon, silicon, and nitrogen through ecosystems, including sinks, and the human interactions that alter these cycles using tools such as models;		
(i) explain the cycling of water through ecosystems, including sinks, using tools	<b>1.1</b> p. 20 #1; <b>1.1 LA</b> p. 23 #2, #3; <b>1 CA</b> p. 42 #10, #13; <b>2 CA</b> p. 64 #22; <b>3.2 LA</b> p. 80 #4; <b>3.4</b> pp. 84–85; <b>3.4 LA</b> p. 92 #1, #5; <b>3 CA</b> p. 98 #10, #12, #22, #23; <b>5 CA</b> p. 154 #4; <b>6.2</b> p. 178; <b>6.4</b> pp. 186–187; <b>10.1 LA</b> p. 333 #2; <b>10.2</b> p. 334; <b>10.4</b> p. 347; <b>10.4 LA</b> p. 355 #4; <b>10 CA</b> p. 358 #1, #3, #8, #17, #18; <b>12.2</b> p. 405	<b>1 PTT</b> #2, #4; <b>3 PTT</b> #10; <b>CI</b> 6; <b>10 PTT</b> #2, #3, #6, #11

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) explain the cycling of phosphorous through ecosystems, including sinks, using tools	<b>1.1</b> p. 20 #1; <b>1.1 LA</b> p. 23 #2, #3; <b>1 CA</b> p. 42 #10, #13; <b>2 CA</b> p. 64 #22; <b>3.2 LA</b> p. 80 #4; <b>3.4</b> pp. 90–91; <b>3.4 LA</b> p. 92 #5; <b>3 CA</b> p. 98 #12, #22, #23	<b>1 PTT</b> #2, #4
(iii) explain the cycling of carbon through ecosystems, including sinks, using tools	<b>1.1 LA</b> p. 23 #3; <b>2 CA</b> p. 64 #22; <b>3.2 LA</b> p. 80 #1, #4; <b>3.4</b> pp. 87–88; <b>3.4 LA</b> p. 92 #4, #5; <b>3 CA</b> p. 98 #8, #12, #17–19, #22, #23; <b>8.1</b> p. 247; <b>8.1 LA</b> p. 254 #2; <b>8.5</b> p. 270; <b>8.5 LA</b> p. 272 #2; <b>8 CA</b> p. 275 ACT-A #3–5; <b>18 TIAT</b> p. 638 #4	<b>2 PTT</b> #10, #11; <b>3 PTT</b> #3, #6, #11; <b>13 PTT</b> #4
(iv) explain the cycling of silicon through ecosystems, including sinks, using tools	<b>3.4</b> pp. 90–91; <b>3.4 LA</b> p. 92	
(v) explain the cycling of nitrogen through ecosystems, including sinks, using tools	<b>1.1 LA</b> p. 23 #3; <b>2 CA</b> p. 64 #22; <b>3.2 LA</b> p. 80 #4; <b>3.4</b> p. 89; <b>3.4</b> p. 90; <b>3.4 LA</b> p. 92 #5; <b>3 CA</b> p. 98 #12, #17, #22, #23	<b>3 PTT</b> #12
(vi) explain the human interactions that alter [the cycling of water] using tools	<b>1.1</b> p. 20 #1; <b>1.1 LA</b> p. 23 #2; <b>1 CA</b> p. 42 #10, #13; <b>3.4</b> p. 85; <b>3.4 SF</b> p. 87; <b>3.4 LA</b> p. 92 #2; <b>10 CS</b> p. 330; <b>10.1</b> pp. 331–333; <b>10.1 LA</b> p. 333 #1, #3, #5; <b>10.2</b> p. 334; <b>10.2 SF</b> p. 335 TC; <b>10.2</b> p. 338 #1; <b>10.2 LA</b> p. 338 #1, #2, #4; <b>10.3 LA</b> p. 342 #2–4; <b>10.4</b> p. 347; <b>10.4 LA</b> p. 355 #3, #4; <b>10 CA</b> p. 358 #8, #15, #17, #18, #22; <b>12.2</b> p. 405; <b>13.2</b> pp. 440–442; <b>16.2</b> p. 560	<b>1 PTT</b> #2, #4; <b>CI</b> 6; <b>CI</b> 10; <b>10 PTT</b> #1, #6, #9, #11
(vii) explain the human interactions that alter [the cycling of phosphorus] using tools	<b>1.1</b> p. 20 #1; <b>1.1 LA</b> p. 23 #2; <b>1 CA</b> p. 42 #10, #13; <b>3.4</b> p. 91; <b>3.4 LA</b> p. 92 #2	<b>1 PTT</b> #2, #4
(viii) explain the human interactions that alter [the cycling of carbon] using tools	<b>3.4</b> p. 88; <b>1 TIAT</b> p. 40 #5–7; <b>3.4 LA</b> p. 92 #2; <b>18 TIAT</b> p. 638 #4	<b>2 PTT</b> #10, #11; <b>3 PTT</b> #11
(ix) explain the human interactions that alter [the cycling of silicon] using tools	<b>3.4</b> pp. 90–91; <b>3.4 LA</b> p. 92 #1–2	
(x) explain the human interactions that alter [the cycling of nitrogen] using tools	<b>3.4</b> p. 90; <b>3.4 LA</b> p. 92 #2	
<b>(C) evaluate the effects of fluctuations in abiotic factors on local ecosystems and local biomes;</b>		
(i) evaluate the effects of fluctuations in abiotic factors on local ecosystems	<b>3.2</b> pp. 74–75; <b>3 CA</b> p. 98 #16; <b>4.4 LA</b> p. 127 #1; <b>5 CA</b> p. 154 #26; <b>6.1 SF</b> p. 165 TC; <b>6.1 LA</b> p. 166 #5; <b>6.2 LA</b> p. 179 #1; <b>6.3</b> p. 180; <b>6.3</b> p. 184; <b>6.3 LA</b> p. 185 #1, #3; <b>6.4 LA</b> p. 189 #1; <b>6 CA</b> pp. 192–193 #15, #25, #27, ACT-A #7; <b>U4</b> p. 467 Citizen Science	<b>6 PTT</b> #6, #14; <b>CI</b> 7; <b>CI</b> 14
(ii) evaluate the effects of fluctuations in abiotic factors on local biomes	<b>3 CA</b> p. 98 #16; <b>4.4 LA</b> p. 127 #1; <b>6.2</b> pp. 170–171, pp. 174–175, pp. 178–179	<b>CI</b> 7; <b>CI</b> 14
<b>(D) measure the concentration of dissolved substances such as dissolved oxygen, chlorides, and nitrates and describe their impacts on an ecosystem;</b>		
(i) measure the concentration of dissolved substances	<b>2 CS</b> p. 48; <b>3.4 LA</b> p. 92 #3	<b>CI</b> 10
(ii) describe [the] impact of [dissolved substances] on an ecosystem	<b>3.4</b> p. 84, p. 87; <b>5 EAW</b> p. 134; <b>5.3</b> p. 147; <b>6.3</b> pp. 180–181; <b>6.4</b> p. 186, p. 189; <b>8.5</b> p. 270; <b>9.3 SF</b> p. 303; <b>9.3</b> p. 306; <b>10.2</b> p. 334, p. 338; <b>10.4</b> pp. 345–346, p. 353	
<b>(E) use models to predict how the introduction of an invasive species may alter the food chain and affect existing populations in an ecosystem;</b>		
(i) use models to predict how the introduction of an invasive species may alter the food chain	<b>3.2 EF</b> p. 79 TC; <b>4.2</b> p. 116; <b>4.4 LA</b> p. 127 #4; <b>6 EAW</b> p. 158; <b>7.2</b> pp. 221–226; <b>7.2 LA</b> p. 231 #2; <b>7 CA</b> p. 240 #17; <b>8.5</b> p. 266	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) use models to predict how the introduction of an invasive species may affect existing populations in an ecosystem	<b>3.2 EF</b> p. 79 TC; <b>4.2</b> p. 116; <b>4.4 LA</b> p. 127 #4; <b>6 EAW</b> p. 158; <b>7.2</b> pp. 221–226; <b>7.2 LA</b> p. 231 #2; <b>7 CA</b> p. 240 CA #15, #17; <b>8.5</b> p. 266	
<b>(F)</b> use models to predict how species extinction may alter the food chain and affect existing populations in an ecosystem; and		
(i) use models to predict how species extinction may alter the food chain in an ecosystem	<b>3.2 LA</b> p. 80 #2; <b>3 TIAT</b> p. 96 #1; <b>4.2</b> p. 117; <b>4.4</b> p. 125; <b>4 CA</b> p. 130 #14, #25; <b>7.1</b> pp. 213–216; <b>5 CA</b> p. 154 #29	
(ii) use models to predict how species extinction may affect existing populations in an ecosystem	<b>3.2 LA</b> p. 80 #2; <b>3 TIAT</b> p. 96 #1; <b>4.2</b> p. 117; <b>4.4</b> p. 125; <b>4 CA</b> p. 130 #25; <b>5 CA</b> p. 154 #29; <b>7.1</b> pp. 213–216	<b>7 PTT</b> #4; <b>CI</b> 9
<b>(G)</b> predict changes that may occur in an ecosystem if genetic diversity is increased or decreased.		
(i) predict changes that may occur in an ecosystem if genetic diversity is increased or decreased	<b>1.1</b> p. 20 #1; <b>1 CA</b> p. 42 #10, #12; <b>3 EAW</b> p. 68 TC; <b>3.1 SF</b> p. 72 TC; <b>3.2 EF</b> p. 79 TC; <b>3 TIAT</b> p. 96 #2; <b>3 CA</b> p. 99 #30, #31; <b>4.1</b> p. 110; <b>4.3</b> p. 122; <b>4.4</b> p. 127; <b>7.3</b> p. 236; <b>7.3 LA</b> p. 238 #3; <b>7 CA</b> p. 240 #6; <b>9.2</b> p. 299 #2; <b>9.3</b> p. 308; <b>9.4</b> p. 311 #1; <b>9 CA</b> p. 324 #9, #19	<b>1 PTT</b> #1; <b>4 PTT</b> #2; <b>5 PTT</b> #2; <b>CI</b> 9; <b>9 PTT</b> #8
<b>(6) Science concepts.</b> The student knows the interrelationships among the resources within the local environmental system. The student is expected to:		
<b>(A)</b> compare and contrast land use and management methods and how they affect land attributes such as fertility, productivity, economic value, and ecological stability;		
(i) compare and contrast land use methods	<b>3.4</b> p. 85; <b>6.2</b> pp. 178–179; <b>7.2</b> p. 221; <b>8.1</b> pp. 249–250; <b>8.1 LA</b> p. 254 #3; <b>8.2 LA</b> p. 256 #1, #3, #4; <b>8.3</b> p. 257; <b>8.3 LA</b> p. 261 #1–3; <b>8.5</b> p. 271 #2; <b>8 TIAT</b> p. 272 #5; <b>8 CA</b> p. 274 #5–8; <b>9.1</b> p. 290; <b>9.2</b> p. 294; <b>9.2 LA</b> p. 301 #1; <b>9.3 LA</b> p. 311 #1; <b>9.4</b> p. 312; <b>9.4 LA</b> p. 314 #1, #3; <b>9 CA</b> p. 324 #12, #14; <b>13.2 LA</b> p. 449 #2; <b>14.3</b> p. 484; <b>18.3</b> p. 630 #1; <b>18.3 LA</b> p. 634 #2	<b>8 PTT</b> #4, #5, #7; <b>9 PTT</b> #13
(ii) compare and contrast land management methods	<b>6.2</b> p. 179; <b>8.1</b> pp. 249–250; <b>8.2 LA</b> p. 256 #3, #4; <b>8.3 LA</b> p. 261 #1–3; <b>8.4</b> p. 265; <b>8.5</b> p. 271 #2; <b>8 TIAT</b> p. 272 #5; <b>8 CA</b> p. 274 #5–8; <b>18.3 LA</b> p. 634 #2	<b>CI</b> 6; <b>8 PTT</b> #5, #7; <b>CI</b> 9
(iii) compare and contrast how [land use methods] affect land attributes	<b>3.4</b> p. 85; <b>6.2</b> pp. 178–179; <b>7.2</b> p. 221; <b>8.1 SF</b> p. 248 TC; <b>8.1</b> pp. 249–250; <b>8.2 LA</b> p. 256 #4; <b>8.3</b> p. 257; <b>8.3 LA</b> p. 261 #1, #2; <b>9.2 LA</b> p. 301 #3; <b>9.3</b> p. 304; <b>9.4</b> p. 312; <b>9.4 LA</b> p. 314 #1, #3; <b>9.5</b> p. 318; <b>9 CA</b> p. 324 #12; <b>14.3</b> p. 484	<b>CI</b> 9
<b>(B)</b> relate how water sources, management, and conservation affect water uses and quality;		
(i) relate how water sources affect water uses	<b>10.1</b> pp. 331–333; <b>10.1 LA</b> p. 333 #2–4; <b>10 TIAT</b> p. 356 #9; <b>10 CA</b> p. 358 #4, #11, #16–18, #24; <b>12.2</b> p. 405	<b>CI</b> 10; <b>10 PTT</b> #1, #12
(ii) relate how water management affect[s] water uses	<b>10.1</b> p. 331; <b>10.1 LA</b> p. 333 #1; <b>10.2</b> pp. 334–338; <b>10.3 EAW</b> p. 341; <b>10 TIAT</b> p. 356 #1–4, #7, #8; <b>10 CA</b> p. 358 #4, #6, #7, #9–11, #16–19, #21; <b>12.2</b> p. 405	<b>CI</b> 10; <b>10 PTT</b> #1, #4, #5, #7, #8, #12
(iii) relate how water conservation affect[s] water uses	<b>10 EAW</b> p. 328 TC; <b>10.1</b> pp. 332–333; <b>10.1 LA</b> p. 333 #3–5; <b>10.2</b> p. 336; <b>10.2 LA</b> p. 338 #2, #4, #5; <b>10.3</b> pp. 338–340; <b>10.3 LA</b> p. 342 #1–5; <b>10 TIAT</b> p. 356 #1–3, #7–9; <b>10 CA</b> pp. 358–359 #4, #5, #9, #11, #16, #25, ACT-B #1, #2	<b>10 PTT</b> #1, #10, #12
(iv) relate how water sources affect water quality	<b>1 CA</b> p. 42 #2; <b>10 EAW</b> p. 328 TC; <b>10.1</b> p. 331; <b>10.1 LA</b> p. 333 #1; <b>10.2</b> p. 336, p. 338 #1, #2; <b>10.2 LA</b> p. 338 #2–5; <b>10.4</b> pp. 342–347, pp. 350–351; <b>10.4 EF</b> p. 354 TC; <b>10.4</b> p. 355; <b>10.4 LA</b> p. 355 #5; <b>12.2</b> p. 405	<b>CI</b> 10

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(v) relate how water management affect[s] water quality	<b>10 EAW</b> p. 328 TC; <b>10.1</b> p. 331, p. 333; <b>10.1 LA</b> p. 333 #5; <b>10.2</b> pp. 334–335; <b>10.2 LA</b> p. 338 #5; <b>10.3</b> pp. 338–340; <b>10.3 LA</b> p. 342 #1–4; <b>10.4</b> pp. 342–347, pp. 350–351, p. 353, p. 355; <b>10.4 EF</b> p. 354; <b>10.4 LA</b> p. 355 #2; <b>10 TIAT</b> p. 356 #1, #4; <b>10 CA</b> p. 358 #6, #19; <b>12.2</b> p. 405	<b>CI</b> 6; <b>10 PTT</b> #4, #5, #7, #11
(vi) relate how water conservation affect[s] water quality	<b>10 EAW</b> p. 328 TC; <b>10.1</b> pp. 331–332; <b>10.1 LA</b> p. 333 #1; <b>10.2</b> p. 334, p. 336; <b>10.2 LA</b> p. 338 #5; <b>10.3</b> pp. 339–340; <b>10.4 EF</b> p. 354 TC; <b>10.4</b> p. 335; <b>10 TIAT</b> p. 356 #1, #9	
<b>(C)</b> document the use and conservation of both renewable and non-renewable resources as they pertain to sustainability;		
(i) document the use of renewable resources as they pertain to sustainability	<b>1 CA</b> p. 42 #1, #4, #14; <b>8.2 LA</b> p. 256 #2; <b>8 CA</b> p. 274 #12; <b>9.1 LA</b> p. 289 #3; <b>9.2</b> p. 301; <b>9.5</b> p. 319, p. 321; <b>9.5 LA</b> p. 321 #2; <b>9 TIAT</b> p. 322 #1–5; <b>9 CA</b> p. 325 ACT-A Develop Models #1, #3, Questions #1–4, ACT-B #1–3; <b>10 TIAT</b> p. 356 #1; <b>10 CA</b> pp. 358–359 #5, #16, #24, ACT-B #1, #2; <b>12.1 LA</b> p. 396 #2; <b>12.3</b> p. 410, p. 415 #2; <b>12.3 LA</b> p. 415 #1, #2, #4, #5; <b>12 TIAT</b> p. 416 #1; <b>12 CA</b> p. 418 #3, #18; <b>13 EAW</b> p. 422; <b>13 CS</b> p. 424; <b>13.1</b> p. 433; <b>13.1 LA</b> p. 433 #1 #2; <b>13.2</b> pp. 433–436, pp. 438–449; <b>13.2 EAW</b> p. 437; <b>13.2 LA</b> p. 449 #1–5; <b>13.3</b> p. 449, p. 451; <b>13.3 EF</b> p. 450; <b>13.3 LA</b> p. 451 #1, #2; <b>13 TIAT</b> p. 452 #1–5; <b>13 CA</b> p. 454 #1–6, #8, #9, #11–20, #23, #24; <b>18.1 LA</b> p. 620 #3; <b>18.4</b> p. 637 #2; <b>18.4 LA</b> p. 638 #1, #3; <b>18 TIAT</b> p. 638 #2	<b>9 PTT</b> #15; <b>10 PTT</b> #8; <b>12 PTT</b> #4, #9, #10, #12; <b>CI</b> 13; <b>13 PTT</b> #2–15; <b>18 PTT</b> #9, #15
(ii) document the use of non-renewable resources as they pertain to sustainability	<b>1 CA</b> p. 42 #1, #14; <b>8.1 LA</b> p. 254 #3; <b>11 EAW</b> p. 362 TC; <b>11.2</b> p. 371, p. 373; <b>11.2 LA</b> p. 376 #2, #4; <b>11.3 LA</b> p. 382 #1, #4; <b>11.4</b> p. 383, p. 385; <b>11.4 LA</b> p. 385 #1–4; <b>11 TIAT</b> p. 386 #1–3; <b>11 CA</b> pp. 388–389 #1–7, #10–12, #14–20, #22–24, ACT-A #1–5, ACT-B; <b>12 EAW</b> p. 392; <b>12 CS</b> p. 394; <b>12.1</b> p. 395; <b>12.1 LA</b> p. 396 #2; <b>12.2</b> pp. 397–407; <b>12.2 LA</b> p. 407 #2–5; <b>12.3</b> p. 408, pp. 410–411, 413–415; <b>12.3 SF</b> p. 409; <b>12.3 EAW</b> p. 412; <b>12.3 LA</b> p. 415; <b>12.3 LA</b> p. 415 #2; <b>12 TIAT</b> p. 416 #1; <b>12 CA</b> p. 418 #2, #6, #8, #9, #15–17, #21, #22; <b>13 EAW</b> p. 422 TC; <b>13.1 LA</b> p. 433 #2; <b>18.1 LA</b> p. 620 #3; <b>18.4</b> p. 637 #2; <b>18.4 LA</b> p. 638 #1, #3; <b>18 TIAT</b> p. 638 #2	<b>CI</b> 11; <b>11 PTT</b> #4, #5, #7–11, #15; <b>12 PTT</b> #2, #6, #7, #12, #13; <b>13 PTT</b> #15; <b>18 PTT</b> #9, #15
(iii) document the conservation of renewable resources as they pertain to sustainability	<b>1 CA</b> p. 42 #4, #14; <b>8 CA</b> p. 274 #12; <b>9.3</b> p. 304; <b>9.5</b> p. 319; <b>9.5 LA</b> p. 321 #4; <b>9 TIAT</b> p. 322 #1–5; <b>9 CA</b> pp. 324–325 #21, ACT-B #1–3; <b>10 TIAT</b> p. 356 #1; <b>10 CA</b> pp. 358–359 #24, #25, ACT-B #1, #2; <b>12.3</b> p. 415 #2; <b>12.3 LA</b> p. 415 #2, #4, #5; <b>12 TIAT</b> p. 416 #1; <b>13 EAW</b> p. 422; <b>13 CS</b> p. 424; <b>13.1</b> pp. 425–433, p. 426 #1, #2; <b>13.2</b> pp. 433–436, pp. 438–448; <b>13.2 EAW</b> p. 437; <b>13.3</b> p. 449, p. 451; <b>13.3 EF</b> p. 450	<b>1 PTT</b> #3; <b>10 PTT</b> #10; <b>CI</b> 13; <b>13 PTT</b> #15
(iv) document the conservation of non-renewable resources as they pertain to sustainability	<b>1 CA</b> p. 42 #14; <b>9 CA</b> p. 324 #21; <b>11 EAW</b> p. 362 TC; <b>11.4</b> p. 383, p. 385; <b>11.4 LA</b> p. 385 #1–3; <b>11 TIAT</b> p. 386 #1–4; <b>11 CA</b> pp. 388–389 #7, #15, #16, #18, #20, #23, #24, ACT-A #3–5, ACT-B; <b>12 EAW</b> p. 392; <b>12 CS</b> p. 394; <b>12.1</b> p. 395; <b>12.2</b> pp. 397–407; <b>12.2 LA</b> p. 407 #2–5; <b>12.3</b> p. 408, pp. 410–411, 413–415; <b>12.3 SF</b> p. 409; <b>12.3 EAW</b> p. 412; <b>12.3 LA</b> p. 415 #2; <b>12 TIAT</b> p. 416 #1; <b>12 CA</b> p. 418 #21, #22; <b>13.1</b> p. 426 #1, #2, p. 427	<b>11 PTT</b> #4, #10, #11; <b>12 PTT</b> #2; <b>13 PTT</b> #15

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(D)</b> identify how changes in limiting resources such as water, food, and energy affect local ecosystems;		
(i) identify how changes in limiting resources affect local ecosystems	<b>1.1</b> p. 22; <b>1.1 LA</b> p. 23 #2; <b>1 TIAT</b> p. 40 #2; <b>4.2</b> p. 118; <b>5.3 LA</b> p. 151 #6; <b>7.2</b> pp. 221–222; <b>9.5</b> p. 321; <b>9.5 LA</b> p. 321 #1; <b>9 CA</b> p. 324 #7; <b>10 EAW</b> p. 328 TC; <b>10.1</b> p. 331, p. 333; <b>10.1 LA</b> p. 333 #1, #3, #5; <b>10.2</b> p. 334, p. 338 #1; <b>10.2 LA</b> p. 338 #1	
<b>(E)</b> analyze and evaluate the economic significance and interdependence of resources within the local environmental system; and		
(i) analyze the economic significance of resources within the local environmental system	<b>1.1</b> p. 22; <b>1 CA</b> p. 42 #8; <b>6.3</b> p. 180; <b>6.4 LA</b> p. 189 #3; <b>8.1</b> p. 247; <b>9.1 LA</b> p. 289 #1, #2; <b>9.3 LA</b> p. 311 #2; <b>9 CA</b> p. 324 #24; <b>10.2</b> p. 334; <b>10 TIAT</b> p. 356 #2; <b>10 CA</b> p. 358 #23; <b>11.2</b> p. 376; <b>11.2 LA</b> p. 376 #1, #2; <b>11 CA</b> pp. 388–389 #14, #24, ACT-A #4; <b>18.1</b> p. 620	<b>CI</b> 9; <b>11 PTT</b> #8; <b>CI</b> 17
(ii) analyze the interdependence of resources within the local environmental system	<b>1 CA</b> p. 42 #8; <b>4.2</b> p. 115; <b>6.3</b> p. 180; <b>7.2</b> p. 221; <b>8.1</b> p. 247; <b>9 CA</b> p. 324 #16, #24; <b>10 CA</b> p. 358 #23	
(iii) evaluate the economic significance of resources within the local environmental system	<b>1.1</b> p. 22; <b>1 CA</b> p. 42 #8; <b>4 CA</b> p. 130 #17, #24; <b>6.3</b> p. 180; <b>8.1</b> p. 247; <b>9.1</b> p. 285 #1, #2, p. 286, p. 288; <b>9.1 LA</b> p. 289 #3–5; <b>9.2</b> p. 296; <b>9.5 LA</b> p. 321 #3; <b>9 CA</b> p. 324 #1, #4, #5, #10; <b>10.1</b> p. 331; <b>10.2</b> p. 334; <b>10.2 SF</b> p. 335 TC; <b>10.3 LA</b> p. 342 #5; <b>10 TIAT</b> p. 356 #1, #3–6, #8, #9; <b>10 CA</b> p. 358 #19, #21, #23; <b>11.2</b> p. 376; <b>11.2 LA</b> p. 376 #2–4, #6; <b>11.3 LA</b> p. 382 #2; <b>11.4 LA</b> p. 385 #4; <b>11 CA</b> p. 388 #3, #10, #17	<b>4 PTT</b> #3; <b>9 PTT</b> #1, #2; <b>CI</b> 11; <b>11 PTT</b> #4, #5, #11; <b>CI</b> 17
(iv) evaluate the interdependence of resources within the local environmental system	<b>1 CA</b> p. 42 #8; <b>4.2</b> p. 115; <b>4 CA</b> p. 130 #24; <b>5 TIAT</b> p. 152 #1; <b>6.3</b> p. 180; <b>7.2</b> p. 221; <b>8.1</b> p. 247; <b>9.3</b> p. 309; <b>9.5 LA</b> p. 321 #4; <b>9 CA</b> p. 324 #2, #7, #16; <b>10.1</b> p. 331; <b>10.2 SF</b> p. 335 TC; <b>10.3 LA</b> p. 342 #5; <b>10 TIAT</b> p. 356 #1; <b>10 CA</b> p. 358 #21, #23, #24; <b>11.2 LA</b> p. 376 #4; <b>11.3</b> p. 379, p. 382	
<b>(F)</b> evaluate the impact of waste management methods such as reduction, reuse, recycling, upcycling, and composting on resource availability in the local environment.		
(i) evaluate the impact of waste management methods on resource availability in the local environment	<b>11.2 LA</b> p. 376 #6; <b>11.4</b> p. 385; <b>11 TIAT</b> p. 386 #4; <b>11 CA</b> p. 389 ACT-A #4, #5, ACT-B; <b>17 EAW</b> p. 578 TC; <b>17.1</b> pp. 581–582, p. 586 #1, #2; <b>17.1 LA</b> p. 586 #1–4; <b>17.2</b> p. 588, pp. 590–591, pp. 593–594, p. 596; <b>17.2 EAW</b> p. 595; <b>17.2 LA</b> p. 596 #1–5; <b>17.3</b> p. 601; <b>17.3 LA</b> p. 604 #1, #2; <b>17.4 LA</b> p. 607 #1, #2; <b>17 TIAT</b> p. 608 #1–4; <b>17 CA</b> pp. 610–611 #1–15, #19, #20, ACT-A #1–5, ACT-B	<b>CI</b> 17; <b>17 PTT</b> #1–9, #11–13
<b>(7) Science concepts.</b> The student knows the sources and flow of energy through an environmental system. The student is expected to:		
<b>(A)</b> describe the interactions between the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere;		
(i) describe the interactions between the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere	<b>2 TIAT</b> p. 62 #1–5; <b>3.1</b> p. 71, p. 73; <b>3.1 LA</b> p. 73 #1, #3, #4; <b>3.4 LA</b> p. 92 #1, #4; <b>3 CA</b> p. 98 #5–7, #9, #13, #14, #27; <b>4.4</b> p. 126; <b>9.3 LA</b> p. 311 #4; <b>11.1 LA</b> p. 370 #1; <b>11 CA</b> p. 388 #22; <b>16.4</b> p. 570	<b>3 PTT</b> #1, #2; <b>CI</b> 11
<b>(B)</b> relate biogeochemical cycles to the flow of energy in ecosystems, including energy sinks such as oil, natural gas, and coal deposits;		
(i) relate biogeochemical cycles to the flow of energy in ecosystems, including energy sinks	<b>2 CA</b> p. 65 #34; <b>3.4</b> p. 84, p. 87; <b>3 CA</b> p. 98 #26; <b>12.2</b> p. 397, p. 400, p. 402, p. 405, p. 407	<b>18 PTT</b> #2
<b>(C)</b> explain the flow of heat energy in an ecosystem, including conduction, convection, and radiation; and		
(i) explain the flow of heat energy in an ecosystem, including conduction	<b>2 CA</b> p. 64 #9, #26; <b>3.4</b> p. 87; <b>6.1</b> p. 166	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) explain the flow of heat energy in an ecosystem, including convection	<b>2 CA</b> p. 64 #9, #26; <b>3.4</b> p. 87; <b>6.1</b> pp. 162–164; <b>11.1</b> p. 366; <b>11.1 LA</b> p. 370 #2	
(iii) explain the flow of heat energy in an ecosystem, including radiation	<b>2.3</b> p. 58; <b>2 CA</b> p. 64 #26; <b>3.4</b> p. 87; <b>6.1</b> p. 162; <b>6.1 SF</b> p. 165	<b>CI 2</b>
<b>(D)</b> identify and describe how energy is used, transformed, and conserved as it flows through ecosystems.		
(i) identify how energy is used as it flows through ecosystems	<b>1.1 LA</b> p. 23 #1; <b>1 CA</b> p. 42 #10; <b>2.3 LA</b> p. 59 #4; <b>2 CA</b> p. 64 #14, #28, #33; <b>3.2</b> p. 78; <b>3.2 LA</b> p. 80 #3; <b>3.3</b> pp. 81–82; <b>3.3 LA</b> p. 83 #1–4; <b>3 CA</b> p. 98 #2–4, #17–21, #28; <b>9.5</b> p. 321	<b>1 PTT</b> #1, #2, #4; <b>3 PTT</b> #4, #5, #7–9
(ii) identify how energy is transformed as it flows through ecosystems	<b>1 CA</b> p. 42 #10; <b>2.3</b> p. 59 #1, #2; <b>2.3 LA</b> p. 59 #1–3; <b>2 CA</b> p. 64 #4, #14, #27, #28, #33; <b>3.3</b> pp. 81–82; <b>3 CA</b> p. 98 #11, #29	<b>1 PTT</b> #4; <b>2 PTT</b> #12, #13
(iii) identify how energy is conserved as it flows through ecosystems	<b>1.1</b> p. 20 #1; <b>1 CA</b> p. 42 #10; <b>2.3 LA</b> p. 59 #5; <b>2 CA</b> p. 64 #14, #28, #33; <b>3.3</b> pp. 81–82; <b>3 CA</b> p. 98 #29	<b>1 PTT</b> #4; <b>3 PTT</b> #7
(iv) describe how energy is used as it flows through ecosystems	<b>1 CA</b> p. 42 #11; <b>2.3 LA</b> p. 59 #4; <b>2 CA</b> p. 65 #35; <b>3.2</b> p. 78; <b>3.2 LA</b> p. 80 #3, #4; <b>3.3</b> pp. 81–82; <b>3.3 LA</b> p. 83 #1–4; <b>3 CA</b> p. 98 #2–4, #17–21, #28; <b>9.2 LA</b> p. 301 #4	<b>1 PTT</b> #1, #2, #4; <b>3 PTT</b> #4, #5, #7–9
(v) describe how energy is transformed as it flows through ecosystems	<b>1 CA</b> p. 42 #11; <b>2.3</b> p. 59 #1, #2; <b>2.3 LA</b> p. 59 #1–3; <b>2 CA</b> p. 65 #35; <b>3.2 LA</b> p. 80 #4; <b>3.3</b> pp. 81–82; <b>3 CA</b> p. 98 #11, #29; <b>9.2 LA</b> p. 301 #4	<b>2 PTT</b> #12, #13
(vi) describe how energy is conserved as it flows through ecosystems	<b>1.1</b> p. 20 #1; <b>1 CA</b> p. 42 #11; <b>2.3 LA</b> p. 59 #5; <b>2 CA</b> p. 65 #35; <b>3.3</b> pp. 81–82; <b>3 CA</b> p. 98 #29	<b>3 PTT</b> #7
<b>(8) Science concepts.</b> The student knows the relationship between carrying capacity and changes in populations and ecosystems. The student is expected to:		
<b>(A)</b> compare exponential and logistical population growth using graphical representations;		
(i) compare exponential and logistical population growth using graphical representations	<b>1.3</b> p. 28, p. 30; <b>5.3</b> p. 147, p. 150; <b>5 CA</b> p. 154 #16; <b>7.2</b> p. 227; <b>14.1 LA</b> p. 476 #1, #4	
<b>(B)</b> identify factors that may alter carrying capacity such as disease; natural disaster; available food, water, and livable space; habitat fragmentation; and periodic changes in weather;		
(i) identify factors that may alter carrying capacity	<b>5.3</b> p. 147, p. 150; <b>7.2</b> p. 222; <b>7 CA</b> p. 240 #1; <b>8.2</b> p. 255; <b>9.1 LA</b> p. 289 #4; <b>9.4</b> p. 311 #2; <b>10.1</b> p. 331, p. 333; <b>10.1 LA</b> p. 333 #1, #3; <b>10.4 LA</b> p. 355 #2; <b>14 CS</b> p. 474, <b>14.1 SF</b> p. 476; <b>14 CA</b> p. 496 #13	<b>7 PTT</b> #8
<b>(C)</b> calculate changes in population size in ecosystems; and		
(i) calculate changes in population size in ecosystems	<b>1.3</b> p. 30; <b>1.3 LA</b> p. 35 #4; <b>5.3</b> p. 145; <b>14.1</b> pp. 475–476; <b>14.1 LA</b> p. 476 #3; <b>14 TIAT</b> p. 494 #1–3; <b>14 CA</b> p. 497 ACT-B #1, #3	
<b>(D)</b> analyze and make predictions about the impact on populations of geographic locales due to diseases, birth and death rates, urbanization, and natural events such as migration and seasonal changes.		
(i) analyze the impact on populations of geographic locales due to diseases	<b>5.3</b> p. 147; <b>14 CS</b> p. 474; <b>14.1</b> p. 476; <b>14.1 LA</b> p. 476 #2; <b>14.2</b> p. 478; <b>14 CA</b> pp. 496–497 #11, #14, #20, #21, ACT-B #2; <b>15.2 SF</b> p. 505 TC; <b>15.2</b> p. 506, pp. 510–511; <b>15.2 LA</b> p. 511 #1–6; <b>15 CA</b> pp. 528–529 #2, #3, #7, #10, #12, #13, #20, ACT-A #1–6, ACT-B Citizen Science	<b>15 PTT</b> #4–6, #15
(ii) analyze the impact on populations of geographic locales due to birth	<b>5.3</b> p. 145; <b>14.1</b> p. 475–476; <b>14.1 LA</b> p. 476 #2; <b>14.2</b> p. 477, pp. 479–480; <b>14.2 LA</b> p. 482 #1, #5; <b>14 CA</b> pp. 496–497 #11, #12, #14–17, #20, #21, ACT-B #2	<b>7 PTT</b> #5; <b>14 PTT</b> #4, #6
(iii) analyze the impact on populations of geographic locales due to death rates	<b>5.3</b> p. 145, p. 147; <b>14 CS</b> p. 474; <b>14.1</b> p. 476; <b>14.1 LA</b> p. 476 #2; <b>14.2</b> p. 478, p. 480; <b>14.2 LA</b> p. 482 #1; <b>14 CA</b> pp. 496–497 #11, #12, #14, #17, #20, #21, ACT-B #2	<b>7 PTT</b> #5; <b>14 PTT</b> #7



STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(iv) analyze the impact on populations of geographic locales due to urbanization	<b>14.1</b> p. 476; <b>14.1 LA</b> p. 476 #2; <b>14.3</b> pp. 482–488; <b>14.3 LA</b> p. 488 #1–4; <b>14 CA</b> pp. 496–497 #11, #14, #20–22, ACT-B #2	<b>14 PTT</b> #3, #10, #11, #13
(v) analyze the impact on populations of geographic locales due to natural events	<b>7.1</b> p. 213; <b>14.1</b> p. 476; <b>14.1 LA</b> p. 476 #2; <b>14 CA</b> pp. 496–497 #11, #14, #20, #21, ACT-B #2	
(vi) make predictions about the impact on populations of geographic locales due to diseases	<b>5.3</b> p. 147; <b>14 CS</b> p. 474; <b>14.1 SF</b> p. 476 TC; <b>14.2</b> p. 478; <b>14 TIAT</b> p. 494 #7	
(vii) make predictions about the impact on populations of geographic locales due to birth	<b>5.3</b> p. 145; <b>14.1</b> p. 475; <b>14.1 SF</b> p. 476 TC; <b>14.2</b> p. 477, p. 479–480; <b>14 TIAT</b> p. 494 #5–7	
(viii) make predictions about the impact on populations of geographic locales due to death rates	<b>5.3</b> p. 145, p. 147; <b>14 CS</b> p. 474; <b>14.1 SF</b> p. 476 TC; <b>14.2</b> p. 478, p. 480; <b>14 TIAT</b> p. 494 #5–7	
(ix) make predictions about the impact on populations of geographic locales due to urbanization	<b>14.1 SF</b> p. 476 TC; <b>14.3</b> pp. 482–488; <b>14 TIAT</b> p. 494 #7	
(x) make predictions about the impact on populations of geographic locales due natural events	<b>4.1</b> p. 111 #1; <b>7.1</b> p. 213; <b>14.1 SF</b> p. 476 TC; <b>14 TIAT</b> p. 494 #7	
<b>(9) Science concepts.</b> The student knows that environments change naturally. The student is expected to:		
<b>(A)</b> analyze and describe how natural events such as tectonic movement, volcanic events, fires, tornadoes, hurricanes, flooding, and tsunamis affect natural populations;		
(i) analyze how natural events affect natural populations	<b>1.1 LA</b> p. 23 #4; <b>5.2</b> pp. 142–143; <b>6.2 SF</b> p. 169; <b>6.2</b> p. 172; <b>8.1</b> p. 247, p. 249, p. 253; <b>8.1 LA</b> p. 254 #1; <b>8 CA</b> p. 274 #3, #10; <b>9.5 LA</b> p. 321 #4; <b>11.1 LA</b> p. 370 #4	<b>11 PTT</b> #13
(ii) describe how natural events affect natural populations	<b>1.2</b> p. 26; <b>4.4</b> pp. 124–125; <b>4.4 SF</b> p. 126; <b>5.2</b> p. 142; <b>5.3</b> p. 150; <b>6.1</b> p. 161; <b>6.2</b> p. 172; <b>6.4</b> p. 186; <b>7.1</b> p. 213; <b>7.2</b> p. 221; <b>8.1</b> p. 247, p. 249, p. 253; <b>8.1 LA</b> p. 254 #1; <b>8 CA</b> p. 274 #3, #10; <b>11.1</b> p. 367; <b>11.1 LA</b> p. 370 #4; <b>11.2</b> p. 375; <b>11.3 EAW</b> p. 377; <b>16.1</b> p. 536; <b>16.2</b> p. 546, p. 551	
<b>(B)</b> explain how regional changes in the environment may have global effects;		
(i) explain how regional changes in the environment may have global effects	<b>3 CS</b> p. 70; <b>9.4</b> p. 313; <b>9 CA</b> p. 324 #20	
<b>(C)</b> examine how natural processes such as succession and feedback loops can restore habitats and ecosystems;		
(i) examine how natural processes can restore habitats	<b>1.1 LA</b> p. 23 #4; <b>2.4</b> pp. 61–62; <b>2.4 LA</b> p. 62 #4; <b>2 CA</b> p. 64 #17, #30; <b>4.1</b> p. 111 #1; <b>5.2</b> pp. 142–143; <b>8.4</b> p. 264; <b>8.4 LA</b> p. 265 #2, #4	<b>8 PTT</b> #1
(ii) examine how natural processes can restore ecosystems	<b>1.1 LA</b> p. 23 #4; <b>2.4</b> pp. 61–62; <b>2.4 LA</b> p. 62 #4; <b>2 CA</b> p. 64 #17, #30; <b>4.1</b> p. 111 #1; <b>5.2</b> pp. 142–143; <b>5.2 LA</b> p. 144 #1–5; <b>8.4</b> p. 264; <b>8.4 LA</b> p. 265 #2, #4	<b>2 PTT</b> #15; <b>8 PTT</b> #1
<b>(D)</b> describe how temperature inversions have short-term and long-term effects, including El Niño and La Niña oscillations, ice cap and glacial melting, and changes in ocean surface temperatures; and		
(i) describe how temperature inversions have short-term effects, including El Niño oscillations	<b>6.1</b> p. 164	
(ii) describe how temperature inversions have short-term effects, including La Niña oscillations	<b>6.1</b> p. 164	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(iii) describe how temperature inversions have short-term effects, including ice cap melting	<b>6.1</b> p. 165; <b>16.2</b> pp. 554–555	
(iv) describe how temperature inversions have short-term effects, including glacial melting	<b>6.1</b> p. 165; <b>16.2</b> pp. 554–555	
(v) describe how temperature inversions have short-term effects, including changes in ocean surface temperatures	<b>6.1</b> p. 165	
(vi) describe how temperature inversions have long-term effects, including El Niño oscillations	<b>6.1</b> p. 164	
(vii) describe how temperature inversions have long-term effects, including La Niña oscillations	<b>6.1</b> p. 164	
(viii) describe how temperature inversions have long-term effects, including ice cap melting	<b>6.1</b> p. 165; <b>16.2</b> pp. 554–555	<b>10 PTT</b> #9
(ix) describe how temperature inversions have long-term effects, including glacial melting	<b>6.1</b> p. 165; <b>16.2</b> pp. 554–555	<b>10 PTT</b> #9
(x) describe how temperature inversions have long-term effects, including changes in ocean surface temperatures	<b>6.1</b> p. 165	<b>10 PTT</b> #9
<b>(E)</b> analyze the impact of natural global climate change on ice caps, glaciers, ocean currents, and surface temperatures.		
(i) analyze the impact of natural global climate change on ice caps	<b>16.2</b> pp. 546–547, pp. 554–555, p. 562; <b>16.2 SF</b> p. 552 TC; <b>16.2 LA</b> p. 562 #3	<b>16 PTT</b> #5, #14
(ii) analyze the impact of natural global climate change on glaciers	<b>16.2</b> pp. 546–547, pp. 554–555; <b>16.2 LA</b> p. 562 #2, #3, #5; <b>16 TIAT</b> p. 572 #1–8; <b>16 CA</b> pp. 574–575 #4, #14, #17–19, ACT-A #1–8	<b>16 PTT</b> #5, #13, #14
(iii) analyze the impact of natural global climate change on ocean currents	<b>16.2</b> pp. 546–560	<b>16 PTT</b> #5, #14
(iv) analyze the impact of natural global climate change on surface temperatures	<b>16.2</b> pp. 546–551, pp. 554–560, p. 562; <b>16 SF</b> pp. 552–553; <b>16.2 LA</b> p. 562 #1, #3–7; <b>16 CA</b> pp. 574–575 #4, #14, #19, ACT-A #1–8	<b>16 PTT</b> #5, #11, #14
<b>(10) Science concepts.</b> The student knows how humans impact environmental systems through emissions and pollutants. The student is expected to:		
<b>(A)</b> identify sources of emissions in air, soil, and water, including point and nonpoint sources;		
(i) identify sources of emissions in air including point sources	<b>1.2</b> p. 26; <b>1.2 LA</b> p. 28 #1; <b>1 TIAT</b> p. 40 #3–6; <b>7.2 LA</b> p. 231 #3; <b>9.3</b> p. 307 #2; <b>9.3 LA</b> p. 311 #3; <b>11.3</b> pp. 378–379, p. 382; <b>11.3 LA</b> p. 382 #2, #3; <b>11.4</b> p. 383; <b>11 CA</b> p. 388 #6, #12, #15; <b>16.1</b> pp. 536–542; <b>16.1 SF</b> p. 544 TC; <b>16.1 LA</b> p. 545 #2, #3, #5, #7; <b>16 CA</b> p. 574 #8, #9, #11–13	<b>1 PTT</b> #5; <b>16 PTT</b> #2
(ii) identify sources of emissions in soil including point sources	<b>1.2</b> p. 26; <b>1.2 LA</b> p. 28 #1; <b>1 TIAT</b> p. 40 #3, #4; <b>U1 UEP</b> p. 101 #1; <b>7.2 LA</b> p. 231 #3; <b>9.3 EAW</b> p. 306; <b>9.3</b> p. 307; <b>9.3 LA</b> p. 311 #2; <b>9 CA</b> p. 324 #8, #17; <b>11.3</b> pp. 378–379, p. 382; <b>11.3 LA</b> p. 382 #2, #3; <b>11.4</b> p. 383; <b>11 CA</b> p. 388 #12	<b>1 PTT</b> #5; <b>9 PTT</b> #7, #11, #15; <b>CI</b> 12

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(iii) identify sources of emissions in water, including point sources	<b>1.2</b> p. 26; <b>1.2 LA</b> p. 28 #1; <b>6.4</b> p. 189 #1; <b>7.2 LA</b> p. 231 #3; <b>10.4</b> pp. 342–351, p. 355; <b>10.4 LA</b> p. 355 #1, #3–6; <b>10 CA</b> pp. 358–359 #2, #12–14, #19, #20, #22, #23, #26, ACT-A #1–3, ACT-B #3; <b>11.3</b> pp. 378–379, p. 382; <b>11.3 LA</b> p. 382 #2, #3; <b>11.4</b> p. 383; <b>11 CA</b> p. 388 #12, #15	<b>CI</b> 1; <b>1 PTT</b> #5; <b>CI</b> 3; <b>9 PTT</b> #5; <b>CI</b> 10; <b>10 PTT</b> #11, #13–15; <b>11 PTT</b> #9; <b>CI</b> 12
(iv) identify sources of emissions in air including nonpoint sources	<b>1.2</b> p. 26; <b>1.2 LA</b> p. 28 #1; <b>7.2 LA</b> p. 231 #3; <b>9.3</b> p. 307 #2; <b>9.3 LA</b> p. 311 #3; <b>9.5 LA</b> p. 321 #1; <b>16.1</b> pp. 536–542; <b>16.1</b> p. 538 #1 p. 540; <b>16.1 SF</b> p. 544 TC; <b>16.1 LA</b> p. 545 #2, #3, #5, #7	
(v) identify sources of emissions in soil including nonpoint sources	<b>1.2</b> p. 26; <b>U1 UEP</b> p. 101 #1; <b>7.2 LA</b> p. 231 #3; <b>9.3</b> p. 304, p. 307; <b>9.3 EAW</b> p. 306; <b>9.3 LA</b> p. 311 #2; <b>9 CA</b> p. 324 #8, #17	<b>9 PTT</b> #7; <b>CI</b> 12
(vi) identify sources of emissions in water including nonpoint sources	<b>1.2</b> p. 26; <b>7.2 LA</b> p. 231 #3; <b>10.4</b> pp. 342–351, p. 355; <b>10.4 LA</b> p. 355 #1, #3–5; <b>10 CA</b> pp. 358–359 #2, #12, #22, #26, ACT-B #3	<b>CI</b> 1; <b>9 PTT</b> #5, #11; <b>CI</b> 10; <b>10 PTT</b> #11, #15; <b>CI</b> 12
<b>(B)</b> distinguish how an emission becomes a pollutant based on its concentration, toxicity, reactivity, and location within the environment;		
(i) distinguish how an emission becomes a pollutant based on its concentration	<b>8.5</b> p. 267, p. 270; <b>8.5 LA</b> p. 272 #2; <b>16.1</b> pp. 537–539; <b>16 CA</b> p. 574 #2, #3, #20	<b>CI</b> 12; <b>CI</b> 16; <b>16 PTT</b> #9
(ii) distinguish how an emission becomes a pollutant based on its toxicity	<b>9.3</b> p. 307; <b>12.2</b> p. 405, p. 407; <b>12 CA</b> p. 418 #15–17; <b>16.1</b> pp. 537–538; <b>16 CA</b> p. 574 CA #20	
(iii) distinguish how an emission becomes a pollutant based on its reactivity	<b>12.2</b> p. 405; <b>16.1</b> pp. 537–540; <b>16.1 LA</b> p. 545 #3	
(iv) distinguish how an emission becomes a pollutant based on its location within the environment	<b>7.2 LA</b> p. 231 #5; <b>8.5</b> p. 270; <b>9.3</b> p. 307; <b>12.2</b> p. 405; <b>16.1</b> pp. 537–538, pp. 540–543	
<b>(C)</b> investigate the effects of pollutants such as chlorofluorocarbons, greenhouse gases, pesticide runoff, nuclear waste, aerosols, metallic ions, and heavy metals, as well as thermal, light, and noise pollution;		
(i) investigate the effects of pollutants	<b>1.2</b> p. 26; <b>1 CA</b> p. 42 #6; <b>3.1</b> p. 73 #2; <b>3.1 LA</b> p. 73 #2; <b>3 CA</b> pp. 98–99 #1, ACT-A #4; <b>U1 UEP</b> p. 101 #1; <b>4 CA</b> p. 130 #27; <b>7.2 LA</b> p. 231 #5; <b>9.3 LA</b> p. 311 #3; <b>12.2</b> p. 407; <b>12.3</b> pp. 410–411, p. 414; <b>14.3</b> p. 485; <b>15 CS</b> p. 502; <b>15.3</b> p. 512, p. 515 #1, #2; <b>15.3 SF</b> p. 514 TC; <b>15.3 LA</b> p. 515 #2–4; <b>15.4</b> p. 517, p. 520; <b>15.4 LA</b> p. 521 #2–5; <b>15 CA</b> p. 528 #1, #5, #6, #8, #9, #12, #15–19; <b>16.1</b> p. 543; <b>16.1 LA</b> p. 545#1; <b>16.2</b> p. 551, pp. 554–562; <b>16.4</b> pp. 569–570	<b>CI</b> 1; <b>CI</b> 2; <b>7 PTT</b> #9; <b>9 PTT</b> #11; <b>11 PTT</b> #9; <b>CI</b> 12; <b>12 PTT</b> #3; <b>15 PTT</b> #7–12; <b>16 PTT</b> #3, #7
<b>(D)</b> evaluate indicators of air, soil, and water quality against regulatory standards to determine the health of an ecosystem; and		
(i) evaluate indicators of air quality against regulatory standards to determine the health of an ecosystem	<b>11.4 SF</b> p. 384 TC; <b>16.1</b> pp. 541–543, p. 545; <b>16.1 LA</b> p. 545 #6; <b>16.3</b> pp. 567–568	
(ii) evaluate indicators of soil quality against regulatory standards to determine the health of an ecosystem	<b>8.2</b> pp. 255–256; <b>8.3</b> p. 257; <b>8 CA</b> p. 274 #11; <b>11.4 SF</b> p. 384 TC; <b>16.1</b> pp. 541–543	
(iii) evaluate indicators of water quality against regulatory standards to determine the health of an ecosystem	<b>2 CA</b> p. 65 ACT-B Citizen Science; <b>6.4</b> p. 189 #1; <b>8.2</b> p. 256; <b>10.4</b> p. 351, p. 353; <b>10 CA</b> p. 358 #23; <b>11.4 SF</b> p. 384 TC	<b>CI</b> 10

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(E)</b> distinguish between the causes and effects of global warming and ozone depletion, including the causes, the chemicals involved, the atmospheric layer, the environmental effects, the human health effects, and the relevant wavelengths on the electromagnetic spectrum (IR and UV).		
(i) distinguish between global warming and ozone depletion, including the causes	<b>7.2 LA</b> p. 231 #1; <b>16.2</b> p. 550; <b>16.4</b> pp. 569–570; <b>16.4 LA</b> p. 572 #1, #3; <b>16 CA</b> p. 574 #10	<b>16 PTT</b> #1, #15
(ii) distinguish between global warming and ozone depletion, including the chemicals involved	<b>16.1</b> p. 535, p. 537; <b>16.2</b> p. 550; <b>16.4</b> pp. 569–570; <b>16.4 LA</b> p. 572 #3; <b>16 CA</b> p. 574 #10	
(iii) distinguish between global warming and ozone depletion, including the atmospheric layer	<b>16.1</b> p. 535; <b>16.1 LA</b> p. 545 #6	
(iv) distinguish between global warming and ozone depletion, including the environmental effects	<b>16.1</b> p. 535, p. 537; <b>16.2</b> p. 551, pp. 554–560, 562; <b>16.2 EAW</b> p. 561; <b>16.4</b> p. 570; <b>16 CA</b> p. 574 #10	
(v) distinguish between global warming and ozone depletion, including the human health effects	<b>6.3 LA</b> p. 185 #3; <b>16.1</b> p. 535, p. 537, p. 540; <b>16.2</b> p. 547, p. 551, p. 562; <b>16.4</b> p. 570	
(vi) distinguish between global warming and ozone depletion, including the relevant wavelengths on the electromagnetic spectrum (IR and UV)	<b>16.1</b> p. 535, p. 538, p. 540; <b>16.4</b> p. 570	
<b>(11) Science concepts.</b> The student understands how individual and collective actions impact environmental systems. The student is expected to:		
<b>(A)</b> evaluate the negative effects of human activities on the environment, including overhunting, overfishing, ecotourism, all-terrain vehicles, and personal watercraft;		
(i) evaluate the negative effects of human activities on the environment, including overhunting	<b>7.2</b> p. 231 #4; <b>7.3</b> pp. 228–229, p. 237; <b>8.3</b> p. 257	
(ii) evaluate the negative effects of human activities on the environment, including overfishing	<b>4.2</b> p. 117; <b>6 EAW</b> p. 158; <b>U2</b> p. 202 Partners in Sustainability; <b>8.5</b> p. 266; <b>8.5 LA</b> p. 272 #1, #3, #4; <b>8 CA</b> p. 274 #2, #14, #16; <b>9.5</b> p. 321	<b>CI</b> 8
(iii) evaluate the negative effects of human activities on the environment, including ecotourism	<b>7.1</b> p. 220; <b>7.2</b> p. 229; <b>7 CA</b> p. 240 #14; <b>8.3</b> p. 257 #1, p. 261; <b>8.4 EAW</b> p. 264; <b>16.2</b> p. 562	
(iv) evaluate the negative effects of human activities on the environment, including all-terrain vehicles	<b>6.2</b> p. 178; <b>7.3</b> p. 234 #2; <b>8.3</b> p. 257, p. 261; <b>18.3</b> p. 627	
(v) evaluate the negative effects of human activities on the environment, including personal watercraft	<b>8.3</b> p. 257; <b>8.5 LA</b> p. 272 #1	
<b>(B)</b> evaluate the positive effects of human activities on the environment, including habitat restoration projects, species preservation efforts, nature conservancy groups, game and wildlife management, and ecotourism; and		
(i) evaluate the positive effects of human activities on the environment, including habitat restoration projects	<b>1 EAW</b> p. 16; <b>1.4</b> p. 39; <b>1.4 LA</b> p. 39 #1, #5; <b>1 TIAT</b> p. 40 #1; <b>1 CA</b> p. 42 #15; <b>2 TIAT</b> p. 62 #2; <b>U2</b> pp. 199–200 Partners in Sustainability; <b>7 CA</b> p. 240 #16; <b>8.3 LA</b> p. 261 #3; <b>8.4</b> pp. 263–264; <b>8.4 LA</b> p. 265 #2, #4; <b>8.5</b> p. 271 #1, #2; <b>8 CA</b> p. 274 #8, #20	<b>7 PTT</b> #15; <b>8 PTT</b> #12, #13, #15

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(ii) evaluate the positive effects of human activities on the environment, including species preservation efforts	<b>1 EAW</b> p. 16; <b>1.4</b> p. 39; <b>1.4 LA</b> p. 39 #1, #5; <b>1 TIAT</b> p. 40 #1; <b>1 CA</b> p. 42 #15; <b>3 CS</b> p. 70; <b>7.3</b> p. 234 #2, p. 237; <b>7.3 LA</b> p. 238 #4; <b>7 CA</b> p. 240 #5, #7, #8, #16; <b>8.3</b> p. 261; <b>8.4 LA</b> p. 265 #2, #4; <b>8.5</b> p. 271 #1, #2; <b>9.3</b> p. 308	<b>7 PTT</b> #13–15; <b>8 PTT</b> #15
(iii) evaluate the positive effects of human activities on the environment, including nature conservancy groups	<b>1 EAW</b> p. 16; <b>1.4</b> p. 39; <b>1.4 LA</b> p. 39 #1, #5; <b>1 TIAT</b> p. 40 #1; <b>1 CA</b> p. 42 #15; <b>7 CA</b> p. 240 #16; <b>16 CA</b> p. 575 ACT-B Citizen Science; <b>18.3</b> p. 632	
(iv) evaluate the positive effects of human activities on the environment, including game and wildlife management	<b>1 EAW</b> p. 16; <b>1.4</b> p. 39; <b>1.4 LA</b> p. 39 #1, #5; <b>1 TIAT</b> p. 40 #1; <b>1 CA</b> p. 42 #15; <b>7.3</b> p. 234 #2, p. 237; <b>7.3 LA</b> p. 238 #4; <b>7 CA</b> p. 240 #5, #7, #8, #16; <b>18.3</b> p. 627	<b>7 PTT</b> #13, #14; <b>CI</b> 14
(v) evaluate the positive effects of human activities on the environment, including ecotourism	<b>7.1</b> p. 220; <b>7.2</b> p. 229; <b>7.3</b> p. 234 #2; <b>7 CA</b> p. 240 #14; <b>8.4 EAW</b> p. 264	<b>CI</b> 17
<b>(C)</b> research the advantages and disadvantages of “going green” such as organic gardening and farming, natural methods of pest control, hydroponics, xeriscaping, energy-efficient homes and appliances, and hybrid cars.		
(i) research the advantages of “going green”	<b>4.1</b> p. 111 #2; <b>4.1 SF</b> p. 114 TC; <b>4.4 LA</b> p. 127 #3; <b>9 EAW</b> p. 282 TC; <b>9 CS</b> p. 284; <b>9.2</b> p. 294; <b>9.4</b> p. 314 #1, #2; <b>9.4 LA</b> p. 314 #1–3; <b>9.5</b> pp. 318–319; <b>9.5 LA</b> p. 321 #2, #3, #5; <b>9 CA</b> p. 324 #14, #15, #21–23, #25; <b>10.4 EF</b> p. 354 TC; <b>10 CA</b> pp. 358–359 #9, #25, ACT-B #1, #2; <b>11 EAW</b> p. 362 TC; <b>11.4</b> p. 385; <b>11.4 LA</b> p. 385 #1; <b>11 CA</b> p. 388 #15; <b>13.1</b> p. 431; <b>13.1 LA</b> p. 433 #1; <b>13.2 LA</b> p. 449 #4; <b>16.3</b> p. 569; <b>16.3 LA</b> p. 569 #3, #4; <b>16 CA</b> p. 574 #7; <b>18.2</b> p. 623 #1	<b>9 PTT</b> #9, #12–14; <b>CI</b> 13; <b>CI</b> 14; <b>16 PTT</b> #4, #12; <b>CI</b> 17
(ii) research the disadvantages of “going green”	<b>4.1</b> p. 111 #2; <b>4.1 SF</b> p. 114 TC; <b>4.4 LA</b> p. 127 #3; <b>9.2</b> p. 295; <b>9.4 LA</b> p. 314 #2, #3; <b>9 CA</b> p. 324 #14, #22, #23, #25; <b>10.4 EF</b> p. 354 TC; <b>13.1 LA</b> p. 433 #1; <b>13.2 LA</b> p. 449 #4; <b>16.3</b> p. 569; <b>16.3 LA</b> p. 569 #3, #4; <b>16 CA</b> p. 574 #7; <b>18.2</b> p. 623 #1	<b>9 PTT</b> #13; <b>CI</b> 13; <b>CI</b> 14; <b>CI</b> 17
<b>(12) Science concepts.</b> The student understands how ethics and economic priorities influence environmental decisions. The student is expected to:		
<b>(A)</b> evaluate cost-benefit trade-offs of commercial activities such as municipal development, food production, deforestation, over-harvesting, mining, and use of renewable and non-renewable energy sources;		
(i) evaluate cost-benefit trade-offs of commercial activities	<b>2 CA</b> p. 64 #31; <b>7.3</b> p. 238; <b>8.1</b> p. 252 #1, p. 254 #1; <b>8 TIAT</b> p. 272 #2–5; <b>8 CA</b> pp. 274–275 #4, #9, #17, #18, ACT-B Citizen Science; <b>9.1</b> p. 285 #1; <b>9.1 LA</b> p. 289 #3, #5; <b>9.2</b> p. 290, pp. 295–296, p. 299 #1, #2, p. 301; <b>9.2 LA</b> p. 301 #1–4; <b>9.3</b> p. 302 #1, #2, p. 304, p. 307 #1, #2, p. 309; <b>9.3 LA</b> p. 311 #1–4; <b>9.4</b> p. 311 #2, pp. 312–313; <b>9.4 LA</b> p. 314 #3; <b>9.5 LA</b> p. 321 #1, #2; <b>9 CA</b> p. 324 #1, #3–14, #17–20, #23, #24; <b>10.2</b> p. 338; <b>10.2 LA</b> p. 338 #2, #4; <b>10.3 LA</b> p. 342 #2, #5; <b>10 CA</b> p. 358 #10, #17, #18, #21, #23; <b>11 CS</b> p. 364; <b>11.2</b> p. 376; <b>11.2 LA</b> p. 376 #4–6; <b>11.3</b> pp. 378–379; <b>11.3 LA</b> p. 382 #1–3; <b>11.4</b> p. 383; <b>11.4 SF</b> p. 384 TC; <b>11.4 LA</b> p. 385 #4; <b>11 CA</b> pp. 388–389 #3–6, #10, #12, #14–16, #18, #19, #23, #24, ACT-A #3, #4; <b>12.2</b> p. 403; <b>13.1</b> p. 427; <b>13.2 LA</b> p. 449 #3; <b>13.3 EF</b> p. 450 TC; <b>13 CA</b> p. 454 #11, #15–17, #19, #20, #24; <b>14.4 EF</b> p. 492 TC; <b>14.4 LA</b> p. 494 #4; <b>14 CA</b> pp. 496–497 #23, #24, ACT-A Procedure #1–6, Questions #1–5, ACT-B #4; <b>16.1 LA</b> p. 545 #4; <b>17.2</b> p. 594; <b>18.1</b> p. 620	<b>1 PTT</b> #9; <b>CI</b> 8; <b>8 PTT</b> #2; <b>CI</b> 9; <b>9 PTT</b> #1, #3–12, #14, #15; <b>11 PTT</b> #7; <b>CI</b> 13; <b>13 PTT</b> #8, #11; <b>14 PTT</b> #14; <b>CI</b> 18; <b>18 PTT</b> #3
<b>(B)</b> evaluate the economic impacts of individual actions on the environment such as overbuilding, habitat destruction, poaching, and improper waste disposal;		
(i) evaluate the economic impacts of individual actions on the environment	<b>1.1</b> p. 20 #2; <b>1.3</b> p. 31 #1, #2; <b>1 CA</b> pp. 42–43 #17, #21, ACT-A #4; <b>3.5 SF</b> p. 95 TC; <b>17 CA</b> p. 610 #16; <b>18.2</b> pp. 623–624; <b>18 CA</b> p. 640 #17	<b>1 PTT</b> #1; <b>CI</b> 8; <b>CI</b> 14; <b>CI</b> 17; <b>CI</b> 18; <b>18 PTT</b> #3

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
<b>(C)</b> analyze how ethical beliefs influence environmental scientific and engineering practices such as methods for food production, water distribution, energy production, and the extraction of minerals;		
(i) analyze how ethical beliefs influence environmental scientific practices	<b>1.3</b> pp. 34–35; <b>1.3 LA</b> p. 35 #2; <b>1 CA</b> pp. 42–43 #3, #5, #7, #10, #16, #18, #22, #23; <b>2 EAW</b> p. 46; <b>5 CS</b> p. 136; <b>6 EAW</b> p. 159 TC; <b>7.1</b> p. 220; <b>15.4</b> p. 520; <b>18.3 LA</b> p. 634 #3; <b>18.4</b> p. 636; <b>18.4 LA</b> p. 638 #2, #4	<b>1 PTT</b> #1, #6, #8, #10, #12–14; <b>13 PTT</b> #1; <b>18 PTT</b> #10
(ii) analyze how ethical beliefs influence environmental engineering practices	<b>1.3</b> pp. 34–35; <b>5 CS</b> p. 136; <b>7.1</b> p. 220; <b>10 EAW</b> p. 328 TC; <b>15.4</b> p. 520; <b>18.4</b> p. 636; <b>18.4 LA</b> p. 638 #2, #4	
<b>(D)</b> discuss the impact of research and technology on social ethics and legal practices in situations such as the design of new buildings, recycling, or emission standards; and		
(i) discuss the impact of research on social ethics in situations	<b>1.1</b> p. 20; <b>1.3</b> p. 34; <b>1.3 LA</b> p. 35 #1; <b>3.5 LA</b> p. 96 #3; <b>14 EAW</b> p. 472 TC; <b>14 CA</b> p. 496 #19	<b>17 PTT</b> #14
(ii) discuss the impact of research on legal practices in situations	<b>1.3 LA</b> p. 35 #1; <b>14.4</b> p. 490, p. 493; <b>14.4 LA</b> p. 494 #1–3; <b>14 CA</b> p. 497 ACT-B #5; <b>18.2</b> pp. 621–624; <b>18.3</b> pp. 625–632, p. 634; <b>18.3 EAW</b> p. 633	
(iii) discuss the impact of technology on social ethics in situations	<b>1.3 LA</b> p. 35 #1; <b>16.1 LA</b> p. 545 #6, #7; <b>17.4</b> p. 607 #2; <b>17.4 LA</b> p. 607 #3, #5; <b>18.2</b> pp. 621–624; <b>18.3</b> pp. 625–632, p. 634; <b>18.3 EAW</b> p. 633	<b>1 PTT</b> #7; <b>14 PTT</b> #15; <b>17 PTT</b> #15
(iv) discuss the impact of technology on legal practices in situations	<b>1.3 LA</b> p. 35 #1; <b>17.4</b> p. 607 #1; <b>17.4 LA</b> p. 607 #4; <b>17 CA</b> p. 610 #20; <b>18.2</b> pp. 621–624; <b>18.3</b> pp. 625–632, p. 634; <b>18.3 EAW</b> p. 633	
<b>(E)</b> argue from evidence whether or not a healthy economy and a healthy environment are mutually exclusive.		
(i) argue from evidence whether or not a healthy economy and a healthy environment are mutually exclusive	<b>1 CA</b> pp. 42–43 #20, #21, ACT-B; <b>15.5 EAW</b> p. 524; <b>16.4</b> p. 572	<b>1 PTT</b> #15; <b>CI</b> 9; <b>CI</b> 18
<b>(13) Science concepts.</b> The student knows how legislation mediates human impacts on the environment. The student is expected to:		
<b>(A)</b> describe past and present state and national legislation, including Texas automobile emissions regulations, the National Park Service Act, the Clean Air Act, the Clean Water Act, the Soil and Water Resources Conservation Act, and the Endangered Species Act; and		
(i) describe past state legislation, including Texas automobile emissions regulations	<b>18 CS</b> p. 616; <b>18 TIAT</b> p. 638 #1–4	
(ii) describe past national legislation, including the National Park Service Act	<b>18 CO</b> p. 612; <b>18.3</b> p. 627, p. 630	
(iii) describe past national legislation, including the Clean Air Act	<b>12.2</b> p. 404; <b>16.1</b> p. 543; <b>16 CA</b> p. 574 #21	
(iv) describe past national legislation, including the Clean Water Act	<b>10.4</b> p. 351, pp. 353–354; <b>10.4 LA</b> p. 355 #7	
(v) describe past national legislation, including the Soil and Water Resources Conservation Act	<b>18.3 LA</b> p. 634 #6	
(vi) describe past national legislation, including the Endangered Species Act	<b>7.3</b> p. 232, p. 234 #1; <b>7.3 LA</b> p. 238 #2; <b>7 CA</b> p. 240 #9; <b>18.3 LA</b> p. 634	
(vii) describe present state legislation	<b>18 CS</b> p. 616; <b>18 TIAT</b> p. 638 #1–4	

STANDARD	STUDENT/TEACHER EDITION	ONLINE RESOURCES
(viii) describe present national legislation	<b>1.4 LA</b> p. 39 #4; <b>1 CA</b> p. 43 ACT-A #4; <b>7.3</b> p. 232; <b>7.3 LA</b> p. 238; <b>8.3 LA</b> p. 261; <b>10.4</b> p. 351, p. 353; <b>10.4 LA</b> p. 355 #7; <b>10 TIAT</b> p. 356 #1, #7; <b>11.4 SF</b> p. 384 TC; <b>12.2</b> p. 404; <b>16.1</b> p. 543; <b>18.2</b> p. 623 #2; <b>18.2 LA</b> p. 625 #3; <b>18.3</b> p. 631; <b>18.3 LA</b> p. 634 #1; <b>18 CA</b> p. 640 #5, #9, #16	<b>18 PTT</b> #4, #6, #8
<b>(B)</b> evaluate the goals and effectiveness of past and present international agreements such as the environmental Antarctic Treaty System, the Montreal Protocol, the Kyoto Protocol, and the Paris Climate Accord.		
(i) evaluate the goals of past international agreements	<b>7.3</b> pp. 231–232; <b>7.3 LA</b> p. 238 #1; <b>7 CA</b> p. 240 #18; <b>9.4</b> p. 313; <b>11.2</b> p. 375; <b>15.4</b> p. 520; <b>16.4</b> p. 571; <b>17.4</b> pp. 604–605	<b>7 PTT</b> #12
(ii) evaluate the goals of present international agreements	<b>4.2 LA</b> p. 119 #4; <b>7.3</b> pp. 231–232; <b>7.3 LA</b> p. 238 #1; <b>9.4</b> p. 313; <b>11.2</b> p. 375; <b>7 CA</b> p. 240 #18; <b>15.4</b> p. 520; <b>16.4</b> p. 571; <b>17.4</b> pp. 604–605	<b>7 PTT</b> #12; <b>17 PTT</b> #10
(iii) evaluate the effectiveness of past international agreements	<b>7.3</b> pp. 231–232; <b>9.4</b> p. 313; <b>11.2</b> p. 375; <b>15.4</b> p. 520; <b>16.4</b> p. 571; <b>17.4</b> pp. 604–605	<b>7 PTT</b> #12
(iv) evaluate the effectiveness of present international agreements	<b>7.3</b> pp. 231–232; <b>9.4</b> p. 313; <b>11.2</b> p. 375; <b>15.4</b> p. 520; <b>16.4</b> p. 571; <b>17.4</b> pp. 604–605; <b>18 TIAT</b> p. 638 #5	<b>7 PTT</b> #12

## English Language Proficiency Standards

The **English Language Proficiency Standards for Science** offer support for second-language acquisition throughout the text using a variety of approaches for reading, writing, speaking, and listening. All breakouts listed in this table are required for science. Supporting **Acquire English Worksheets** available digitally offer opportunities for students to work individually or in small groups on the required ELPS. Breakouts that are teacher-facing only are indicated with an asterisk.

<b>SCIENCE</b>	
STANDARD	STUDENT/TEACHER EDITION
<b>(c) Cross-curricular second language acquisition essential knowledge and skills.</b>	
<b>(1) Cross-curricular second language acquisition/learning strategies.</b> The ELL uses language learning strategies to develop an awareness of his or her own learning processes in all content areas. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. The student is expected to:	
<b>(A)</b> use prior knowledge and experiences to understand meanings in English	
(i) use prior knowledge to understand meanings in English	<b>1.1</b> p. 19; <b>15.5</b> p. 522
(ii) use prior experiences to understand meanings in English	<b>6.1</b> p. 161; <b>17.2</b> p. 587
<b>(B)</b> monitor oral and written language production and employ self-corrective techniques or other resources	
(i) monitor oral language production and employ self-corrective techniques or other resources*	<b>6.2</b> p. 168
<b>(C)</b> use strategic learning techniques such as concept mapping, drawing, memorizing, comparing, contrasting, and reviewing to acquire basic and grade-level vocabulary	
	<b>3.2</b> p. 74; <b>5.3</b> p. 145; <b>6.1</b> p. 161; <b>11.1</b> p. 365; <b>12.2</b> p. 397; <b>15.5</b> p. 522
<b>(D)</b> speak using learning strategies such as requesting assistance, employing non-verbal cues, and using synonyms and circumlocution (conveying ideas by defining or describing when exact English words are not known)	
(i) speak using learning strategies	<b>4.1</b> p. 109; <b>16.2</b> p. 559; <b>16.3</b> p. 566

STANDARD	STUDENT/TEACHER EDITION
<b>(E)</b> internalize new basic and academic language by using and reusing it in meaningful ways in speaking and writing activities that build concept and language attainment	
(i) internalize new basic language by using and reusing it in meaningful ways in speaking activities that build concept and language attainment	<b>9.1</b> p. 288; <b>10.3</b> p. 339
(ii) internalize new basic language by using and reusing it in meaningful ways in writing activities that build concept and language attainment	<b>7.3</b> p. 237; <b>13.1</b> p. 431
(iii) internalize new academic language by using and reusing it in meaningful ways in speaking activities that build concept and language attainment	<b>2.3</b> p. 60; <b>15.1</b> p. 503
(iv) internalize new academic language by using and reusing it in meaningful ways in writing activities that build concept and language attainment	<b>1.1</b> p. 19; <b>7.3</b> p. 237
<b>(F)</b> use accessible language and learn new and essential language in the process	
(i) use accessible language and learn new and essential language in the process*	<b>8.5</b> p. 266
<b>(G)</b> demonstrate an increasing ability to distinguish between formal and informal English and an increasing knowledge of when to use each one commensurate with grade-level learning expectations	<b>4 EAW</b> p. 106; <b>14.4</b> p. 493
<b>(H)</b> develop and expand repertoire of learning strategies such as reasoning inductively or deductively, looking for patterns in language, and analyzing sayings and expressions commensurate with grade-level learning expectations	<b>1 EAW</b> p. 16; <b>5 EAW</b> p. 134; <b>9.3</b> p. 302; <b>11.3</b> p. 379; <b>15.4</b> p. 520
<b>(2) Cross-curricular second language acquisition/listening.</b> The ELL listens to a variety of speakers including teachers, peers, and electronic media to gain an increasing level of comprehension of newly acquired language in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in listening. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. The student is expected to:	
<b>(A)</b> distinguish sounds and intonation patterns of English with increasing ease	<b>8.5</b> p. 269; <b>14.4</b> p. 490; <b>15.3</b> p. 513
<b>(B)</b> recognize elements of the English sound system in newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters	<b>5.3</b> p. 149; <b>8.5</b> p. 269; <b>15.3</b> p. 513
<b>(C)</b> learn new language structures, expressions, and basic and academic vocabulary heard during classroom instruction and interactions	
(i) learn new language structures heard during classroom instruction and interactions*	<b>11.3</b> p. 379; <b>13 EAW</b> p. 422
(ii) learn new expressions heard during classroom instruction and interactions*	<b>5 EAW</b> p. 134; <b>15.4</b> p. 520
(iii) learn basic vocabulary heard during classroom instruction and interactions	<b>3.3</b> p. 82
(iv) learn academic vocabulary heard during classroom instruction and interactions	<b>12.2</b> p. 397
<b>(D)</b> monitor understanding of spoken language during classroom instruction and interactions and seek clarification as needed	
(i) monitor understanding of spoken language during classroom instruction and interactions*	<b>10 TIAT</b> p. 356; <b>13.3 EF</b> p. 450
(ii) seek clarification [of spoken language] as needed	<b>10 TIAT</b> p. 356; <b>13.3 EF</b> p. 450
<b>(E)</b> use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language	<b>1.3</b> p. 28; <b>4.3</b> p. 120; <b>5.1</b> p. 139



STANDARD	STUDENT/TEACHER EDITION
(iii) use linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language	<b>4.3</b> p. 120; <b>16 EAW</b> p. 532
<b>(F)</b> listen to and derive meaning from a variety of media such as audio tape, video, DVD, and CD ROM to build and reinforce concept and language attainment	<b>3.3</b> p. 81; <b>4.2</b> p. 117; <b>U4</b> p. 463 Citizen Science
<b>(G)</b> understand the general meaning, main points, and important details of spoken language ranging from situations in which topics, language, and contexts are familiar to unfamiliar	<b>3.3</b> p. 81; <b>4.2</b> p. 117; <b>7.2</b> p. 225; <b>8 EAW</b> p. 244; <b>8.1</b> p. 247; <b>U4</b> p. 463 Citizen Science
<b>(H)</b> understand implicit ideas and information in increasingly complex spoken language commensurate with grade-level learning expectations; and	<b>1.3</b> p. 28; <b>5.1</b> p. 139
<b>(I)</b> demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs	<b>8.1</b> p. 247
(i) demonstrate listening comprehension of increasingly complex spoken English by following directions commensurate with content and grade-level needs	<b>3.3</b> p. 82
(iii) demonstrate listening comprehension of increasingly complex spoken English by responding to questions and requests commensurate with content and grade-level needs	<b>5.1</b> p. 139
(iv) demonstrate listening comprehension of increasingly complex spoken English by collaborating with peers commensurate with content and grade-level needs*	<b>3.3</b> p. 81
(v) demonstrate listening comprehension of increasingly complex spoken English by taking notes commensurate with content and grade-level needs	<b>8 EAW</b> p. 244
<b>(3) Cross-curricular second language acquisition/speaking.</b> The ELL speaks in a variety of modes for a variety of purposes with an awareness of different language registers (formal/informal) using vocabulary with increasing fluency and accuracy in language arts and all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in speaking. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. The student is expected to:	
<b>(A)</b> practice producing sounds of newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters to pronounce English words in a manner that is increasingly comprehensible	<b>5.3</b> p. 149; <b>8.5</b> p. 269; <b>15.3</b> p. 513
<b>(B)</b> expand and internalize initial English vocabulary by learning and using high-frequency English words necessary for identifying and describing people, places, and objects, by retelling simple stories and basic information represented or supported by pictures, and by learning and using routine language needed for classroom communication	<b>4.1</b> p. 113; <b>14.2</b> p. 481
(ii) expand and internalize initial English vocabulary by retelling simple stories and basic information represented or supported by pictures	<b>1.2</b> p. 24
(iii) expand and internalize initial English vocabulary by learning and using routine language needed for classroom communication	<b>4 TIAT</b> p. 128
<b>(C)</b> speak using a variety of grammatical structures, sentence lengths, sentence types, and connecting words with increasing accuracy and ease as more English is acquired	<b>9.1</b> p. 288; <b>10.2</b> p. 334; <b>10.3</b> p. 339; <b>12 EAW</b> p. 393; <b>12.3 SF</b> p. 409

STANDARD	STUDENT/TEACHER EDITION
<b>(D)</b> speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency	
(i) speak using grade-level content area vocabulary in context to internalize new English words	<b>10.3</b> p. 339
(ii) speak using grade-level content area vocabulary in context to build academic language proficiency	<b>2.3</b> p. 60
<b>(E)</b> share information in cooperative learning interactions	
(i) share information in cooperative learning interactions	<b>13.2</b> p. 436
<b>(F)</b> ask and give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments	
(i) ask [for] information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments	<b>4.1</b> p. 113; <b>18.1</b> p. 617
(ii) give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments	<b>4.1</b> p. 113; <b>18.1</b> p. 617
<b>(G)</b> express opinions, ideas, and feelings ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics	<b>7.1 EAW</b> p. 217; <b>14.2</b> p. 481
(i) express opinions ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics*	<b>6.3</b> p. 183; <b>17.2</b> p. 591
(ii) express ideas ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics	<b>6.3</b> p. 183; <b>7.1 EAW</b> p. 217; <b>14.2</b> p. 481
<b>(H)</b> narrate, describe, and explain with increasing specificity and detail as more English is acquired	<b>11.3</b> p. 381
(ii) describe with increasing specificity and detail as more English is acquired	<b>11.3</b> p. 381; <b>12.3 SF</b> p. 409
(iii) explain with increasing specificity and detail as more English is acquired	<b>12 EAW</b> p. 393
<b>(I)</b> adapt spoken language appropriately for formal and informal purposes; and	<b>4 EAW</b> p. 106; <b>16.2</b> p. 559
<b>(J)</b> respond orally to information presented in a wide variety of print, electronic, audio, and visual media to build and reinforce concept and language attainment	<b>7.1 EAW</b> p. 217; <b>U4 UO</b> p. 279; <b>12.3 SF</b> p. 409
<b>(4) Cross-curricular second language acquisition/reading.</b> The ELL reads a variety of texts for a variety of purposes with an increasing level of comprehension in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in reading. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student’s level of English language proficiency. For Kindergarten and Grade 1, certain of these student expectations apply to text read aloud for students not yet at the stage of decoding written text. The student is expected to:	
<b>(A)</b> learn relationships between sounds and letters of the English language and decode (sound out) words using a combination of skills such as recognizing sound-letter relationships and identifying cognates, affixes, roots, and base words	<b>3.2</b> p. 74; <b>5.3</b> p. 149; <b>8.5</b> p. 269; <b>9.3</b> p. 302; <b>13.2</b> p. 446; <b>14.3</b> p. 482

STANDARD	STUDENT/TEACHER EDITION
<b>(B)</b> recognize directionality of English reading such as left to right and top to bottom	<b>11.2</b> p. 373
<b>(C)</b> develop basic sight vocabulary, derive meaning of environmental print, and comprehend English vocabulary and language structures used routinely in written classroom materials	
(i) develop basic sight vocabulary used routinely in written classroom materials	<b>3.2 EF</b> p. 79
(ii) derive meaning of environmental print	<b>15.1</b> p. 503
(iii) comprehend English vocabulary used routinely in written classroom materials	<b>5.3</b> p. 147
(iv) comprehend English language structures used routinely in written classroom materials	<b>1.3</b> p. 30
<b>(D)</b> use prereading supports such as graphic organizers, illustrations, and pretaught topic-related vocabulary and other prereading activities to enhance comprehension of written text	
(i) speak using learning strategies	<b>13.2</b> p. 446; <b>16 EAW</b> p. 532; <b>17.1</b> p. 581
<b>(E)</b> read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned	
(i) read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned*	Okavango p. 5
<b>(F)</b> use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language	
(i) use visual and contextual support to read grade-appropriate content area text	<b>11.2</b> p. 373
(ii) use visual and contextual support to enhance and confirm understanding	<b>6.2</b> p. 172
(iii) use visual and contextual support to develop vocabulary needed to comprehend increasingly challenging language	<b>10 EAW</b> p. 328; <b>17.2</b> p. 587
(v) use visual and contextual support to develop background knowledge needed to comprehend increasingly challenging language	<b>7 EAW</b> p. 210; <b>9.4</b> p. 311
(vi) use support from peers and teachers to read grade-appropriate content area text	Okavango p. 5; <b>3 EAW</b> p. 68; <b>13.2</b> p. 436
(vii) use support from peers and teachers to enhance and confirm understanding	<b>1 EAW</b> p. 16
(viii) use support from peers and teachers to develop vocabulary needed to comprehend increasingly challenging language	<b>3.2</b> p. 74; <b>14.3</b> p. 482
(ix) use support from peers and teachers to develop grasp of language structures needed to comprehend increasingly challenging language	Okavango p. 5; <b>1.3</b> p. 30; <b>7.3</b> p. 232
(x) use support from peers and teachers to develop background knowledge needed to comprehend increasingly challenging language	<b>7 EAW</b> p. 210; <b>9.4</b> p. 311
<b>(G)</b> demonstrate comprehension of increasingly complex English by participating in shared reading, retelling or summarizing material, responding to questions, and taking notes commensurate with content area and grade level needs	
(ii) demonstrate comprehension of increasingly complex English by retelling or summarizing material commensurate with content area and grade level needs	<b>2</b> p. 63; <b>12.3</b> p. 410

STANDARD	STUDENT/TEACHER EDITION
(iii) demonstrate comprehension of increasingly complex English by responding to questions commensurate with content area and grade level needs	<b>6 EAW</b> p. 282
(iv) demonstrate comprehension of increasingly complex English by taking notes commensurate with content area and grade level needs	<b>9.1</b> p. 287; <b>17 EAW</b> p. 578
<b>(H)</b> read silently with increasing ease and comprehension for longer periods	<b>5.3</b> p. 145; <b>6 EAW</b> p. 282; <b>16.2</b> p. 550
<b>(I)</b> demonstrate English comprehension and expand reading skills by employing basic reading skills such as demonstrating understanding of supporting ideas and details in text and graphic sources, summarizing text, and distinguishing main ideas from details commensurate with content area needs	<b>2 EAW</b> p. 46; <b>2</b> p. 63; <b>6.2</b> p. 172; <b>12 EAW</b> p. 393; <b>12.3</b> p. 410; <b>13.2</b> p. 436; <b>18.4</b> p. 635
<b>(J)</b> demonstrate English comprehension and expand reading skills by employing inferential skills such as predicting, making connections between ideas, drawing inferences and conclusions from text and graphic sources, and finding supporting text evidence commensurate with content area needs; and	<b>1 EAW</b> p. 16; <b>1.2</b> p. 24; <b>2 EAW</b> p. 46; <b>4 TIAT</b> p. 128; <b>U4 UO</b> p. 279; <b>10.2</b> p. 334
<b>(K)</b> demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs	<b>4 TIAT</b> p. 128; <b>U5 UO</b> p. 469; <b>15.5</b> p. 525
<b>(5) Cross-curricular second language acquisition/writing.</b> The ELL writes in a variety of forms with increasing accuracy to effectively address a specific purpose and audience in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in writing. In order for the ELL to meet grade-level learning expectations across foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. For Kindergarten and Grade 1, certain of these student expectations do not apply until the student has reached the stage of generating original written text using a standard writing system. The student is expected to:	
<b>(A)</b> learn relationships between sounds and letters of the English language to represent sounds when writing in English	<b>10.4</b> p. 342; <b>15.3</b> p. 513
<b>(B)</b> write using newly acquired basic vocabulary and content-based grade-level vocabulary	
(i) write using newly acquired basic vocabulary	<b>7.3</b> p. 237; <b>13.1</b> p. 431
(ii) write using content-based grade-level vocabulary	<b>7.3</b> p. 237
<b>(C)</b> spell familiar English words with increasing accuracy, and employ English spelling patterns and rules with increasing accuracy as more English is acquired	<b>10.4</b> p. 342; <b>15.3</b> p. 513; <b>17.2</b> p. 594
<b>(D)</b> edit writing for standard grammar and usage, including subject-verb agreement, pronoun agreement, and appropriate verb tenses commensurate with grade-level expectations as more English is acquired	<b>U3 UO</b> p. 207; <b>7 CA</b> p. 240; <b>11.1</b> p. 369; <b>17.2</b> p. 594
<b>(E)</b> employ increasingly complex grammatical structures in content area writing commensurate with grade level expectations such as (i) using correct verbs, tenses, and pronouns/antecedents; (ii) using possessive case (apostrophe -s) correctly; and, (iii) using negatives and contractions correctly	<b>2 CA</b> p. 65; <b>U2 UO</b> p. 103; <b>5 TIAT</b> p. 152; <b>U3 UO</b> p. 207; <b>7 CA</b> p. 240; <b>14.4</b> p. 493; <b>15 CA</b> p. 528; <b>17.2</b> p. 591, p. 594; <b>18 CA</b> p. 641
<b>(F)</b> write using a variety of grade-appropriate sentence lengths, patterns, and connecting words to combine phrases, clauses, and sentences in increasingly accurate ways as more English is acquired; and	<b>U1 UO</b> p. 13; <b>2 CA</b> p. 65; <b>U2</b> p. 204 Partners in Sustainability; <b>14.4</b> p. 490; <b>14</b> p. 495
<b>(G)</b> narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired	<b>U1 UO</b> p. 13; <b>U2 UO</b> p. 103; <b>U2</b> p. 204 Partners in Sustainability; <b>8 CA</b> p. 274; <b>12 CA</b> p. 419; <b>13.1</b> p. 431