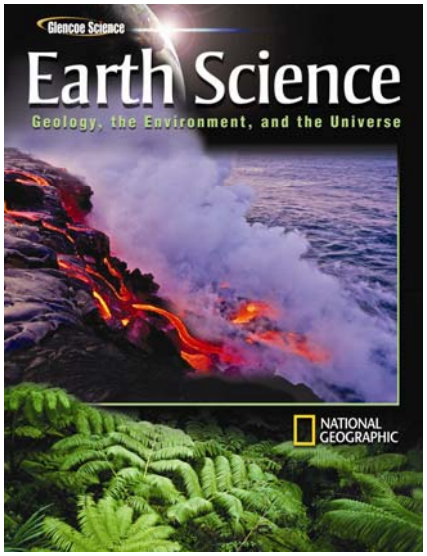
Glencoe

Science Grade 11
Assessment Anchors
and Eligible Content

Pennsylvania



Earth Science

Geology, the Environment, and the Universe

STANDARDS	PAGE REFERENCES
S11.A The Nature of Science	
S11.A.1 Reasoning and Analysis	
S11.A.1.1 Analyze and explain the nature of science in the search for understanding the natural world and its connection to technological systems. ***Reference: 3.1.10.A, 3.2.10.A, 3.1.10.E***	
S11.A.1.1.1 Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the law of gravity, how light travels, formation of moons, stages of ecological succession).	**Student Edition:** 19, 83 #13, 390-392, 394-395, 633-635 *Section Assessment* 19 **Teacher Wraparound Edition:** AC 18; CFU 19; E 595; IM 17; M 470; TCS 391, 468
S11.A.1.1.2 Analyze and explain how to verify the accuracy of scientific facts, principles, theories, and laws.	**Student Edition:** 10-13, 17-19, 468-472, 473-479, 480-485, 486-488 *Reading for Comprehension* 55 *GeoLab* 103 *Share Your Data* 125, 153 *Writing in Earth Science* 490 **Teacher Wraparound Edition:** ESJ 17; ITF 450; TCS 474; TPK 393; UAA 11
S11.A.1.1.3 Evaluate the appropriateness of research questions (e.g., testable vs. not-testable).	**Student Edition:** 10-13, 25 #37 **Teacher Wraparound Edition:** MI 10

Codes used for Teacher Wraparound Edition pages are the initial caps of headings on that page.

STANDARDS	PAGE REFERENCES
S11.A.1.1.4 Explain how specific scientific knowledge or technological design concepts solve practical problems (e.g., momentum, Newton's universal law of gravitation, tectonics, conservation of mass and energy, cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, ideal gas laws).	**Student Edition:** 199-200, 265-268, 324-328 *Earth Science and Technology* 76, 184 *Reading for Comprehension* 191, 341, 435 *Earth Science and Society* 333 *Earth Science and the Environment* 428 *National Geographic Expeditions* 518 **Teacher Wraparound Edition:** A 360; E 116; ITF 177; TCS 324
S11.A.1.1.5 Analyze or compare the use of both direct and indirect observation as means to study the world and the universe (e.g., behavior of atoms, functions of cells, birth of stars).	**Student Edition:** 18-19, 34-40, 41-46, 536-538, 764-769, 770-774, 786-787 *National Geographic Expeditions* 20 *Launch Lab* 29 *Earth Science and Technology* 47 *Earth Science and the Environment* 124 *Reading for Comprehension* 131 **Teacher Wraparound Edition:** CON 41; DI 73; ITP 43; TCS 35
S11.A.1.2 Identify and analyze the scientific or technological challenges of societal issues; propose possible solutions and discuss implications. ***Reference: 3.2.10.A, 4.3.10.B***	
S11.A.1.2.1 Apply and explain scientific concepts to societal issues using case studies (e.g., sea level change, spread of HIV, deforestation, environmental health, energy).	**Student Edition:** 265-268, 678-681 *Reading for Comprehension* 191, 221, 311, 403 *Earth Science and Society* 213, 242, 396, 698 *Earth Science and the Environment* 269, 304 **Teacher Wraparound Edition:** EC 283; TCS 396
S11.A.1.2.2 Use case studies (e.g., Wright brothers' flying machine, Tacoma Narrows Bridge, Henry Petroski's Design Paradigms) to propose possible solutions and analyze economic and environmental implications of solutions for real-world problems.	**Student Edition:** 219 #39, 720-723 *National Geographic Expeditions* 20, 366 *Earth Science and Technology* 47, 184 *Earth Science and the Environment* 724 *GeoLab* 725 **Teacher Wraparound Edition:** AC 201, 230; CL 202; E 99

STANDARDS	PAGE REFERENCES
S11.A.1.3 Describe and interpret patterns of change in natural and human-made systems. ***Reference: 3.1.10.C, 3.1.10.E, 4.8.10.A***	
S11.A.1.3.1 Use appropriate quantitative data to describe or interpret change in systems (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).	**Student Edition:** 247 #39-#41 *Data Analysis Lab* 18, 364, 377, 423, 688, 722 GeoLab 243, 397, 553, 821 *Problem-Solving Lab* 294, 565, 807 *MiniLab* 295
S11.A.1.3.2 Describe or interpret dynamic changes to stable systems (e.g., chemical reactions, human body, food webs, tectonics, homeostasis).	**Student Edition:** 66-72, 75, 88-89, 112-117, 134-140, 164-170, 176-183, 286-288, 297-303, 352-354, 355-360 *Problem-Solving Lab* 70 *GeoLab* 334-335 **Teacher Wraparound Edition:** AC 113; R 303
S11.A.1.3.3 Describe how changes in physical and biological indicators (e.g., soil, plants, animals) of water systems reflect changes in these systems (e.g., changes in bloodworm populations reflect changes in pollution levels in streams).	**Student Edition:** 167, 194-200, 224-231, 238-241, 259-262, 263-268, 693-697 *Reading for Comprehension* 131, 221 *Launch Lab* 163, 193 *Earth Science and Society* 213 **Teacher Wraparound Edition:** CFU 241; EC 167, 239
S11.A.1.3.4 Compare the rate of use of natural resources and their impact on sustainability.	**Student Edition:** 99-101, 121-123, 150, 678-681, 682-686, 687-692, 708-713, 714-719, 720-723 *Earth Science and Technology* 184 *Reading for Comprehension* 191 *Earth Science and Society* 242 **Teacher Wraparound Edition:** D 720; EC 100, 679

STANDARDS	PAGE REFERENCES
S11.A.2 Processes, Procedures and Tools of Scientific Investigations	
S11.A.2.1 Apply knowledge of scientific investigation or technological design to develop or critique aspects of the experimental or design process. ***Reference: 3.2.10.B, 3.2.10.B***	
S11.A.2.1.1 Critique the elements of an experimental design (e.g., raising questions, formulating hypotheses, developing procedures, identifying variables, manipulating variables, interpreting data, and drawing conclusions) applicable to a specific experimental design.	**Student Edition:** 10-13, 25 #37 *MiniLab* 12 *GeoLab* 21, 103, 125, 153, 397, 611 *Inquiry Extension* 243 **Teacher Wraparound Edition:** A 19; DI 13; ESJ 17; P 11
S11.A.2.1.2 Critique the elements of the design process (e.g., identify the problem, understand criteria, create solutions, select solution, test/evaluate, communicate results) applicable to a specific technological design.	**Student Edition:** 331-332, 764-769 *Earth Science and Society* 333 *Reading for Comprehension* 341, 435 *Earth Science and Technology* 638 *GeoLab* 725 **Teacher Wraparound Edition:** A 769; M 716
S11.A.2.1.3 Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.	**Student Edition:** *GeoLab* 21, 77, 103, 125, 153, 185, 243, 303, 397, 429, 611, 639, 667, 853, 883
S11.A.2.1.4 Critique the results and conclusions of scientific inquiry for consistency and logic.	**Student Edition:** *GeoLab* 21, 77, 125, 185, 243, 305, 397, 611, 639, 725, 883 *Writing in Earth Science* 103 *Share Your Data* 153 **Teacher Wraparound Edition:** ESJ 17
S11.A.2.1.5 Communicate results of investigations using multiple representations.	**Student Edition:** 17-19 *Inquiry Extension* 77 *GeoLab* 103, 185, 243, 367, 397, 519, 611, 639, 667, 699 *Share Your Data* 125 *Writing in Earth Science* 305

STANDARDS	PAGE REFERENCES
S11.A.2.2 Evaluate appropriate technologies for a specific purpose, or describe the information the instrument can provide. ***Reference: 3.7.10.B, 3.8.10.B***	
S11.A.2.2.1 Evaluate appropriate methods, instruments, and scale for precise quantitative and qualitative observations (e.g., to compare properties of materials, water quality).	**Student Edition:** *GeoLab* 21, 77, 103, 153, 185, 305, 397, 821 *Writing in Earth Science* 103 *Share Your Data* 125 *Data Analysis Lab* 543 *MiniLab* 631 *Try at Home* 699 **Teacher Wraparound Edition:** ESJ 17; TR 429
S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meters, probe, interfaces, imaging technology, telescope) is used to extend human abilities and precision.	**Student Edition:** 473-479 *Earth Science and Technology* 47, 184, 610, 638, 751, 820 *Earth Science and Society* 333 *National Geographic Expeditions* 366, 518 *Earth Science and the Environment* 724 **Teacher Wraparound Edition:** ESJ 455; TCS 4; 474
S11.A.3 Systems, Models and Patterns	
S11.A.3.1 Analyze the parts of a simple system, their roles, and their relationships to the system as a whole. ***Reference: 3.1.10.A, 3.1.10.E, 4.3.10.C***	
S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, decision trees, dichotomous keys, mind map), input and output, and measurements to explain a system and its parts.	**Student Edition:** 108 #7-#8, 128 #20, 129 #33, 157 #38, 189 #38, 247 #36, 275 #34, 309 #43, 339 #42, 401 #39, 433 #42, 495 #42, 523 #39, 583 #36 *Skillbuilder Handbook* 948
S11.A.3.1.2 Analyze and predict the effect of making a change in one part of a system on the system as a whole.	**Student Edition:** 66-72, 75, 115-117, 148-149, 164-170, 171-175, 194-200, 224-231, 232-237, 238-241 *Problem-Solving Lab* 148 *Launch Lab* 163 **Teacher Wraparound Edition:** CFU 241; DI 194; TCS 58

STANDARDS	PAGE REFERENCES
S11.A.3.1.3 Use appropriate quantitative data to describe or interpret a system (e.g., biological indices, electrical circuit data, automobile diagnostic systems data).	**Student Edition:** 63-65 *Problem-Solving Lab* 122, 294, 330, 449 *GeoLab* 243, 305, 397, 699 *Data Analysis Lab* 377 **Teacher Wraparound Edition:** CFU 65; DI 414; TCS 63, 120, 255
S11.A.3.1.4 Apply the universal systems model of inputs, processes, outputs, and feedback to a working system (e.g., heating systems, motor, food production) and identify the resources necessary for operation of the system.	**Student Edition:** 263-265, 324-328, 714-719, 765-766 *Earth Science and Technology* 76 *MiniLab* 265 *GeoLab* 725 **Teacher Wraparound Edition:** A 769; CFU 328, 697; TCS 767
S11.A.3.2 Compare observations of the real world to observations of a constructed model. ***Reference: 3.1.10.B, 3.2.10.B, 4.1.10.B, 4.6.10.A***	
S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior.	**Student Edition:** *National Geographic Expeditions* 20 *GeoLab* 125, 185, 725 *MiniLab* 481 *Earth Science and Technology* 751 **Teacher Wraparound Edition:** A 65; D 165; ITI 61
S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes.	**Student Edition:** 18-19, 35-40 *National Geographic Expeditions* 20 *Earth Science and Technology* 762 *GeoLab* 821 **Teacher Wraparound Edition:** ACT 537; D 34; MM 3
S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of the solar system, life spans, size of atomic particles, topographic maps).	**Student Edition:** 18-19, 34-40 *National Geographic* 20, 69 *GeoLab* 185, 305 *Launch Lab* 193, 281, 313, 375 *MiniLab* 210, 240, 394 **Teacher Wraparound Edition:** M 8; TCS 36

STANDARDS	PAGE REFERENCES
S11.A.3.3 Compare and analyze repeated processes or recurring elements in patterns. ***Reference: 3.1.10.C, 3.2.10.B***	
S11.A.3.3.1 Describe or interpret recurring patterns that form the basis of biological classification, chemical periodicity, geological order, or astronomical order.	**Student Edition:** 151, 224, 277 #11-#13, 318-323, 361-365, 387-392, 421-427, 604 *National Geographic* 689 **Teacher Wraparound Edition:** A 151; AC 74; DIS 150; IM 390; TCS 320
S11.A.3.3.2 Compare stationary physical patterns (e.g., crystals, layers of rocks, skeletal systems, tree rings, atomic structure) to the object's properties.	**Student Edition:** 60-65, 73-74, 86-95, 96-101, 282-286, 536-538 *Launch Lab* 85, 111 *MiniLab* 92, 115 *GeoLab* 153 *National Geographic* 285 **Teacher Wraparound Edition:** AC 100; ACT 94; CON 64
S11.A.3.3.3 Analyze physical patterns of motion to make predictions or draw conclusions (e.g., solar system, tectonic plates, weather systems, atomic motion, waves).	**Student Edition:** 60-65, 303, 315-317, 318-323, 346, 421-427, 486-488, 775-784 *GeoLab* 334-335, 367 *Data Analysis Lab* 423 *MiniLab* 801 **Teacher Wraparound Edition:** A 427; R 303; TCS 319
S11.D Earth and Space Sciences	
S11.D.1 Earth Features and Processes that Change Earth and Its Resources	
S11.D.1.1 Explain and analyze the forces in the lithosphere that continually shape Earth. ***Reference: 3.5.10.A, 4.4.10.B, 4.1.10.B***	
S11.D.1.1.1 Classify and describe major types of rocks (i.e., igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss) and minerals (e.g., quartz, calcite, dolomite, clay, feldspar, mica, halite, pyrite) by their origin and formation.	**Student Edition:** 112-117, 118-123, 134-140, 141-144, 145-151 *MiniLab* 115, 136 *GeoLab* 125, 153 *National Geographic* 139 *Problem-Solving Lab* 148 **Teacher Wraparound Edition:** A 115, 144; DIS 150; M 146

STANDARDS	PAGE REFERENCES
S11.D.1.1.2 Explain the processes that take place at plate boundaries and how these processes continue to shape Earth (e.g., volcanic activity, earthquakes, mountain building, mid-ocean ridges, deep-sea trenches, new land being formed).	**Student Edition:** 447, 468-472, 473-479, 480-485, 500-507, 517, 528-533, 543-544, 567-573 *Launch Lab* 467 *National Geographic* 478 *Earth Science and the Environment* 489 **Teacher Wraparound Edition:** IM 469; ITI 501; TCS 483
S11.D.1.1.3 Analyze features created by the interaction of processes that change Earth's surface (e.g., wind and moving water help break down rock into soil; plate movement, earthquakes, and volcanic activity help cause mountains and valleys to form; flowing water and deposition of material help form deltas).	**Student Edition:** 164-170, 171-175, 194-200, 201-206, 207-212, 232-237, 259-262, 481-485 *MiniLab* 172, 210 *GeoLab* 185 *Launch Lab* 193 **Teacher Wraparound Edition:** CL 197; DI 164
S11.D.1.2 Analyze how human-made systems impact the management and distribution of natural resources. ***Reference: 4.2.10.C, 3.5.10.B, 3.6.10.A***	
S11.D.1.2.1 Evaluate factors affecting availability, location, extraction, and use of natural resources.	**Student Edition:** 99-101, 121-123, 678-681, 682-686, 693-697, 737-742, 743-747 *Earth Science and Society* 242, 698 *Launch Lab* 677 **Teacher Wraparound Edition:** CON 100; DI 678; EC 100; TCS 149, 693
S11.D.1.2.2 Explain the impact of obtaining and using natural resources for the production of energy and materials (e.g., resource renewal, amount of pollution, deforestation).	**Student Edition:** 99-101, 265-268, 682-686, 687-692, 708-713, 714-719, 720-723, 737-742, 743-747, 748-750 *Earth Science and the Environment* 269 *Earth Science and Society* 698 **Teacher Wraparound Edition:** A 101; TCS 749

STANDARDS	PAGE REFERENCES
S11.D.1.3 Explain the significance and contribution of water as a resource to living things and the shaping of the land. ***Reference: 3.5.10.D, 4.1.10.B, 4.3.10.B***	
S11.D.1.3.1 Explain the multiple functions of different water systems in relation to landforms (e.g., buffer zones, nurseries, food production areas, habitat, water quality control, biological indicators).	**Student Edition:** 238-241, 693-697 *Section Assessment* 241 *Reading for Comprehension* 759 **Teacher Wraparound Edition:** CFU 268
S11.D.1.3.2 Explain relationships among physical characteristics, vegetation, topography, and flow as it relates to water systems.	**Student Edition:** 194-200, 224-231, 232-237, 238-241, 252-258, 259-262 *Launch Lab* 193, 223 *Problem-Solving Lab* 227 *National Geographic* 235 **Teacher Wraparound Edition:** D 236; M 227, 234; P 236; TCS 232, 261
S11.D.1.3.3 Explain factors (e.g., nutrient loading, turbidity, rate of flow, rate of deposition, biological diversity) that affect water quality and flow through a water system.	**Student Edition:** 224-231, 232-237, 255-258 *Launch Lab* 223 *Problem-Solving Lab* 227 *GeoLab* 243 **Teacher Wraparound Edition:** ACT 230; CFU 231; CON 228; D 225, 228; DI 226; DIS 228; TCS 229, 233
S11.D.2 Weather, Climate, and Atmospheric Processes	
S11.D.2.1 Analyze how the transfer of energy and substances between Earth's atmosphere and its surface influences regional or global weather or climate. ***Reference: 3.5.10.C***	
S11.D.2.1.1 Describe how changes in concentration of minor components (e.g., O_2, CO_2, ozone, dust, pollution) in Earth's atmosphere are linked to climate change.	**Student Edition:** 283, 392, 393-395, 688, 743-747 *Earth Science and the Environment* 304 *Reading for Comprehension* 311, 403 *Earth Science and Society* 396 *Earth Science and Technology* 751 **Teacher Wraparound Edition:** A 392; DI 394; EC 283; ESJ 743; IM 744; MI 393

STANDARDS	PAGE REFERENCES
S11.D.2.1.2 Compare the transmission, reflection, absorption, and radiation of solar energy to and by Earth's surface under different environmental conditions (e.g., major volcanic eruptions, greenhouse effect, reduction of ozone layer; increased global cloud cover)	**Student Edition:** 286-288, 309 #44, #46-#48, 314-317, 392, 393-395 *Earth Science and the Environment* 304 *MiniLab* 315, 394 **Teacher Wraparound Edition:** A 288; ACT 293; CFU 288; DI 394; TCS 286; TPK 289
S11.D.2.1.3 Explain weather patterns and seasonal changes using the concepts of heat and density.	**Student Edition:** 290-291, 297-299, 314-317, 318-323, 344-347, 388 *Launch Lab* 313 *MiniLab* 315 **Teacher Wraparound Edition:** A 315; ACT 298; CON 299; DI 321; IM 316; R 345; TCS 291
S11.D.2.1.4 Analyze weather maps and weather data (e.g., air masses, fronts, temperature, air pressure, wind speed, wind direction, precipitation) to predict regional or global weather events.	**Student Edition:** 314-317, 318-323, 324-328, 329-332, 339 #45-#47, 403 #11-#12 *Problem-Solving Lab* 294, 330 *MiniLab* 295 *GeoLab* 305, 334-335, 397 *Earth Science and Society* 333 **Teacher Wraparound Edition:** A 332; ESJ 331
S11.D.3 Composition and Structure of the Universe	
S11.D.3.1 Explain the composition, structure and origin of the universe. ***Reference: 3.4.10.D***	
S11.D.3.1.1 Describe planetary motion and the physical laws that explain planetary motion.	**Student Edition:** 775-778, 799-803, 804 *MiniLab* 801 *Problem-Solving Lab* 807 **Teacher Wraparound Edition:** A 801; AC 799; AES 777; CFU 803; D 802; DI 800; ESJ 801; ITI 800; M 777; TCS 800

STANDARDS	PAGE REFERENCES
S11.D.3.1.2 Describe the structure, formation, and life cycle of stars.	**Student Edition:** 830-836, 837-846, 847-851 *Data Analysis Lab* 835 *GeoLab* 853 **Teacher Wraparound Edition:** A 846, 851; AC 850; CFU 846; DI 848; DIS 834, 844; IM 849; ITP 838; R 846
S11.D.3.1.3 Explain the current scientific theories of the origin of the solar system and universe (e.g., big bang theory, solar nebular theory, stellar evolution).	**Student Edition:** 796-799, 873-877, 878-881 **Teacher Wraparound Edition:** A 881; AC 797; CFU 881; DI 878, 880; MI 796; R 881; TCS 797; UAA 798