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PA Core Integrated Science Curriculum Map

177 items · Pennsylvania State Core Standards

Arranged by subject (Science), then PA domain, then item ID. Each row lists the PA Core standard, its CCRS code and grade-level grouping, and the matching Pace Prescription lesson(s). Note that Integrated Science standards grades 6-12 carry no PDE codes; their IDs (e.g. SCI.6-8.PS.SPM.1 = grades 6-8, Physical Science, Structure and Properties of Matter, statement 1) are Pace working labels.

PA Core Science (177 items)

Integrated Science: Earth and Space Science (34 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-38	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.SS.1** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	Science 602, The Solar System Science 600, History of Astronomy	**Science 602** Understanding the seasons (frames 110 – 123); Knowing the physical characteristics of Earth (frames 27 – 32) **Science 600** Knowing about Galileo (frames 17 – 20); Knowing about Eratosthenes (frames 1–3)
PA-SCI-39	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HE.2** **Grade level:** D (6th-8th) **CCRS:** —	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Science 612, Geologic Processes Science 611, Plate Tectonics	**Science 612** Understanding the Mohs Hardness Scales (frames 54 – 63); Identifying types of igneous rock (frames 3–7; 5–8) **Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Knowing the Earth's layers (frames 6 – 20)
PA-SCI-40	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.WC.1** **Grade level:** D (6th-8th) **CCRS:** —	Collect data to provide evidence for how the motion and complex interactions of air masses result in changes in weather conditions.	Science 621, Weather and Climate	**Science 621** Understanding weather (frames 43 – 70; 43 – 71); Understanding climate (frames 71 – 84)
PA-SCI-41	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HI.2** **Grade level:** D (6th-8th) **CCRS:** —	Apply scientific principles to design a method for monitoring and minimizing human impact on the environment.	Science 630, Environmental Issues Science 640, Earth's Natural Resources Lessons in Things 215, Bees	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55) **Science 640** Understanding sustainable development (frames 7 – 15); Understanding non-renewable resources (frames 4–6) **Lessons in Things 215** Keystone species; Colony Collapse Disorder
PA-SCI-74	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.SS.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe the role of gravity in the motion within galaxies and the solar system.	Science 601, The Universe Science 602, The Solar System	**Science 601** Understanding gravity and star formation (frames 14 – 20); Knowing the number of galaxies in the **Science 602** Understanding our solar system (frames 1 – 16); Understanding the Sun is at the solar system's center (frames 1 – 16)

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PA-SCI-75	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.SS.3** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data to determine scale properties of objects in the solar system.	Science 602, The Solar System *Not yet covered: scale properties of solar-system objects from data*	**Science 602** Understanding our solar system (frames 1 – 16); Understanding the Sun is at the solar system's center (frames 1 – 16)
PA-SCI-76	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HE.1** **Grade level:** D (6th-8th) **CCRS:** —	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	Science 610, History of Earth	**Science 610** Understanding geologic time (frames 35 – 77); Understanding the formation of Earth (frames 1 – 12)
PA-SCI-77	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HE.3** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.	Science 611, Plate Tectonics Science 610, History of Earth	**Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Understanding plate tectonics (frames 33 – 37) **Science 610** Understanding the formation of Earth (frames 1 – 12); Understanding the fossil record (frames 41 – 77)
PA-SCI-78	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.ES.1** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	Science 612, Geologic Processes Science 611, Plate Tectonics	**Science 612** Identifying types of igneous rock (frames 3–7; 5–8); Understanding erosion and weathering (frames 10 – 13) **Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Knowing the Earth's layers (frames 6 – 20)
PA-SCI-79	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.ES.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	Science 620, Water Cycles and the Ocean	**Science 620** Understanding the water cycle (frames 4 – 16); Knowing properties of ocean water (frames 17 – 21)
PA-SCI-80	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.ES.3** **Grade level:** D (6th-8th) **CCRS:** —	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Science 640, Earth's Natural Resources Science 611, Plate Tectonics	**Science 640** Understanding distribution of natural resources (frames 15 – 19); Defining nuclear energy (frames 56 – 62) **Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Knowing the Earth's layers (frames 6 – 20)
PA-SCI-81	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.WC.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	Science 621, Weather and Climate Science 620, Water Cycles and the Ocean	**Science 621** Identifying the layers of the atmosphere (frames 1 – 14; 34 – 42); Knowing the atmospheric gasses (frames 15 – 19) **Science 620** Understanding the circulation of water in the oceans (frames 32 – 51); Knowing problems in studying the ocean (frames 22 – 31)
PA-SCI-82	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.WC.3** **Grade level:** D (6th-8th) **CCRS:** —	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	Science 630, Environmental Issues Science 621, Weather and Climate	**Science 630** Knowing causes of global warming (frames 6 – 11); Understanding the meaning of environmental mottos (frames 42 – 55) **Science 621** Understanding climate (frames 71 – 84); Understanding the greenhouse effect (frames 28 – 34)
PA-SCI-83	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HI.1** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	Science 611, Plate Tectonics Science 621, Weather and Climate *Not yet covered: forecasting natural hazards and mitigation technology*	**Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Knowing the Earth's layers (frames 6 – 20) **Science 621** Understanding the greenhouse effect (frames 28 – 34); Knowing the natural gases necessary for life (frames 15 – 20)

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PA-SCI-84	**Integrated Science: Earth and Space Science**	**SCI.6-8.ESS.HI.3** **Grade level:** D (6th-8th) **CCRS:** —	Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth's systems.	Science 630, Environmental Issues Science 640, Earth's Natural Resources	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55) **Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding non-renewable resources (frames 4–6)
PA-SCI-146	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.SS.1** **Grade level:** E (9th-12th) **CCRS:** —	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.	Science 601, The Universe Science 602, The Solar System Science 312, Atomic Energy	**Science 601** Understanding a star's life cycle (frames 61 – 72); Understanding dark matter and dark energy (frames 106 – 110) **Science 602** Knowing the physical characteristics of Earth (frames 27 – 32); Understanding fusion (frames 124 – 131) **Science 312** Understanding nuclear fusion (frames 46 – 68; 48 – 68); Understanding nuclear waste (frames 42 – 47)
PA-SCI-147	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.SS.2** **Grade level:** E (9th-12th) **CCRS:** —	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, the motion of distant galaxies, and the composition of matter in the universe.	Science 601, The Universe	**Science 601** Understanding the Big Bang Theory (frames 80 – 93); Defining light year (frames 2–4)
PA-SCI-148	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.SS.3** **Grade level:** E (9th-12th) **CCRS:** —	Communicate scientific ideas about the way stars, over their life cycle, produce elements.	Science 601, The Universe *Not yet covered: stars producing elements*	**Science 601** Understanding a star's life cycle (frames 61 – 72); Knowing the elements in stars (frames 14 – 19)
PA-SCI-149	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.SS.4** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	Science 600, History of Astronomy Science 602, The Solar System *Not yet covered: calculating orbital motion*	**Science 600** Knowing the laws of planetary motion (frames 26 – 28); Knowing about Galileo (frames 17 – 20) **Science 602** Understanding our solar system (frames 1 – 16); Understanding the Sun is at the solar system's center (frames 1 – 16)
PA-SCI-150	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HE.1** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.	Science 611, Plate Tectonics	**Science 611** Understanding plate tectonics (frames 33 – 37); Knowing the layers of the Earth (frames 21 – 23; 6 – 11)
PA-SCI-151	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HE.2** **Grade level:** E (9th-12th) **CCRS:** —	Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.	Science 610, History of Earth	**Science 610** Understanding the formation of Earth (frames 1 – 12); Identifying prokaryotes (frames 27 – 34)
PA-SCI-152	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HE.3** **Grade level:** E (9th-12th) **CCRS:** —	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.	Science 611, Plate Tectonics Science 612, Geologic Processes	**Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Understanding continental drift (frames 38 – 48) **Science 612** Understanding the Mohs Hardness Scales (frames 54 – 63); Identifying types of igneous rock (frames 3–7; 5–8)

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PA-SCI-153	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.ES.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth systems.	Science 612, Geologic Processes Science 630, Environmental Issues *Not yet covered: feedback between Earth systems*	**Science 612** Understanding causes of erosion (frames 14 – 16); Identifying types of igneous rock (frames 3–7; 5–8) **Science 630** Knowing causes of global warming (frames 6 – 11); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-154	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.ES.2** **Grade level:** E (9th-12th) **CCRS:** —	Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.	Science 611, Plate Tectonics	**Science 611** Knowing the layers of the Earth (frames 21 – 23; 6 – 11); Knowing the Earth's layers (frames 6 – 20)
PA-SCI-155	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.ES.3** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	Science 620, Water Cycles and the Ocean Science 612, Geologic Processes Lessons in Things 120, The Crack in the Road	**Science 620** Knowing properties of ocean water (frames 17 – 21); Understanding the water cycle (frames 4 – 16) **Science 612** Understanding erosion and weathering (frames 10 – 13); Understanding causes of erosion (frames 14 – 16) **Lessons in Things 120** Why water expands; Comparing water to other substances
PA-SCI-156	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.ES.4** **Grade level:** E (9th-12th) **CCRS:** —	Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	Science 532, Life Systems Science 630, Environmental Issues *Not yet covered: a quantitative carbon-cycle model*	**Science 532** Knowing what producers are (frames 2–4); Understanding food webs (frames 19 – 20) **Science 630** Knowing causes of global warming (frames 6 – 11); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-157	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.ES.5** **Grade level:** E (9th-12th) **CCRS:** —	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	Science 610, History of Earth	**Science 610** Understanding the formation of Earth (frames 1 – 12); Understanding the origin of life (frames 13 – 34)
PA-SCI-158	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.WC.1** **Grade level:** E (9th-12th) **CCRS:** —	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	Science 621, Weather and Climate Science 630, Environmental Issues	**Science 621** Understanding climate (frames 71 – 84); Understanding weather (frames 43 – 70; 43 – 71) **Science 630** Knowing causes of global warming (frames 6 – 11); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-159	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.WC.2** **Grade level:** E (9th-12th) **CCRS:** —	Analyze geoscience data and the results from global climate models to make an evidence- based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.	Science 630, Environmental Issues Science 621, Weather and Climate *Not yet covered: climate-model data and forecasts*	**Science 630** Knowing causes of global warming (frames 6 – 11); Understanding humans' impact on their ecosystems (frames 1–2) **Science 621** Understanding climate (frames 71 – 84); Understanding weather (frames 43 – 70; 43 – 71)
PA-SCI-160	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HS.1** **Grade level:** E (9th-12th) **CCRS:** —	Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	Science 640, Earth's Natural Resources Science 630, Environmental Issues	**Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding non-renewable resources (frames 4–6) **Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-161	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HS.2** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	Science 640, Earth's Natural Resources *Not yet covered: cost-benefit comparison of energy and mineral resources*	**Science 640** Defining nuclear energy (frames 56 – 62); Understanding sustainable development (frames 7 – 15)

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PA-SCI-162	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HS.3** **Grade level:** E (9th-12th) **CCRS:** —	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	Science 640, Earth's Natural Resources Science 531, Habitats *Not yet covered: simulating resource management and sustainability*	**Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding sustainable development (frames 7 – 15) **Science 531** Defining population density (frames 9 – 14); Identifying density-independent factors (frames 21 – 29)
PA-SCI-163	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HS.4** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate or refine a technological solution that reduces the impact of human activities on natural systems.	Science 630, Environmental Issues Science 151, Science in Personal and Social Perspectives, Part 2 *Not yet covered: refining a technology that reduces human impact*	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55) **Science 151** Understanding air pollution (frames 11 – 27); Understanding how air pollution threatens the ozone layer 23 – 27
PA-SCI-164	**Integrated Science: Earth and Space Science**	**SCI.9-12.ESS.HS.5** **Grade level:** E (9th-12th) **CCRS:** —	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity	Science 630, Environmental Issues *Not yet covered: computational models of human-modified Earth systems*	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55)

Integrated Science: Engineering, Technology, and Applications of Science (8 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-85	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.6-8.ETS.ED.1** **Grade level:** D (6th-8th) **CCRS:** —	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	Science 211, Investigations and Experiments Life Skills 13, Solving Problems *Not yet covered: defining design criteria and constraints*	**Science 211** Knowing the definition of the scientific method (frames 1–3; 4–5); Understanding operationally defined variables (frames 29 – 35) **Life Skills 13** Defining problem and related terms; The nature of problems (lesson objectives; answer key not machine-readable)
PA-SCI-86	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.6-8.ETS.ED.2** **Grade level:** D (6th-8th) **CCRS:** —	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Life Skills 12, Making Decisions Lessons in Things 150, Peanut Butter Plus Two *Not yet covered: evaluating competing design solutions*	**Life Skills 12** The steps in the decision-making process; Defining decision (lesson objectives; answer key not machine-readable) **Lessons in Things 150** Constraints generate creativity; What constraints reveal
PA-SCI-87	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.6-8.ETS.ED.3** **Grade level:** D (6th-8th) **CCRS:** —	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	Science 211, Investigations and Experiments *Not yet covered: combining the best features of tested designs*	**Science 211** Knowing how to gather data (frames 48 – 66); Knowing how to make predictions (frames 21 – 29)

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PA-SCI-88	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.6-8.ETS.ED.4** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	Lessons in Things 210, The Five-Knot Toolkit *Not yet covered: iterative testing and modeling of a design*	**Lessons in Things 210** Tension increases friction; Knot efficiency: applied calculation
PA-SCI-165	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.9-12.ETS.ED.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	Science 630, Environmental Issues Life Skills 13, Solving Problems *Not yet covered: criteria and constraints for global challenges*	**Science 630** Knowing causes of global warming (frames 6 – 11); Understanding the meaning of environmental mottos (frames 42 – 55) **Life Skills 13** Defining problem and related terms; The nature of problems (lesson objectives; answer key not machine-readable)
PA-SCI-166	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.9-12.ETS.ED.2** **Grade level:** E (9th-12th) **CCRS:** —	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	Life Skills 13, Solving Problems Life Skills 17, Systems Thinking *Not yet covered: engineering a complex solution*	**Life Skills 13** The steps in the problem-solving process; Defining problem and related terms (lesson objectives; answer key not machine-readable) **Life Skills 17** Designing a hypothetical system; Defining system and related terms (lesson objectives; answer key not machine-readable)
PA-SCI-167	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.9-12.ETS.ED.3** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade- offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.	Life Skills 12, Making Decisions Science 650, Cutting Edge Science *Not yet covered: trade-offs among cost, safety and reliability*	**Life Skills 12** Defining decision; The nature of decisions (lesson objectives; answer key not machine-readable) **Science 650** Understanding science and technology (frames 65 – 68); Understanding environmental ethics (frames 16 – 20; 25 – 30; 37 – 41; 44 – 47; 47 – 48)
PA-SCI-168	**Integrated Science: Engineering, Technology, and Applications of Science**	**SCI.9-12.ETS.ED.4** **Grade level:** E (9th-12th) **CCRS:** —	Use a computer simulation to model the impact of proposed solutions to a complex real- world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	Life Skills 17, Systems Thinking *Not yet covered: computer simulation of solutions*	**Life Skills 17** Defining system and related terms; Practical examples of systems (lesson objectives; answer key not machine-readable)

Integrated Science: Environmental Literacy and Sustainability (18 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-89	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.AS.1** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe how agricultural and food systems function, including the sustainable use of natural resources and the production, processing, and management of food, fiber, and energy.	Science 150, Science in Personal and Social Perspectives, Part 1 Science 640, Earth's Natural Resources *Not yet covered: agricultural and food systems*	**Science 150** Understanding agricultural improvements (frames 12 – 29); Understanding how medical science has improved our (frames 44 – 63) **Science 640** Understanding sustainable development (frames 7 – 15); Understanding distribution of natural resources (frames 15 – 19)
PA-SCI-90	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.ESOC.1** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data about how different societies (economic and social systems) and cultures use and manage natural resources differently.	Science 640, Earth's Natural Resources Social Studies 610, Economic Systems	**Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding sustainable development (frames 7 – 15) **Social Studies 610** Knowing how many basic economic (frames 1 – 47); Understanding a command system (frames 48 – 128)

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PA-SCI-91	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.WW.1** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe how watersheds and wetlands function as systems, including the roles and functions they serve.	Science 620, Water Cycles and the Ocean *Not yet covered: watersheds and wetlands*	**Science 620** Understanding the water cycle (frames 4 – 16); Defining estuary (frames 48 – 49)
PA-SCI-92	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.IEI.1** **Grade level:** D (6th-8th) **CCRS:** —	Gather, read, and synthesize information from multiple sources to investigate how Pennsylvania environmental issues affect Pennsylvania's human and natural systems.	Science 630, Environmental Issues *Not yet covered: Pennsylvania environmental issues*	**Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67)
PA-SCI-93	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.EEXP.1** **Grade level:** D (6th-8th) **CCRS:** —	Collect, analyze, and interpret environmental data to describe a local environment.	Science 211, Investigations and Experiments Lessons in Things 160, The Architecture of Disturbance *Not yet covered: collecting local environmental data*	**Science 211** Knowing how to gather data (frames 48 – 66); Knowing how to make predictions (frames 21 – 29) **Lessons in Things 160** Pioneer species; Broken ground as prerequisite
PA-SCI-94	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.EVSOL.1** **Grade level:** D (6th-8th) **CCRS:** —	Obtain and communicate information on how integrated pest management could improve indoor and outdoor environments.	Science 151, Science in Personal and Social Perspectives, Part 2 *Not yet covered: integrated pest management*	**Science 151** Knowing what the environment is (frames 1–4); Understanding contamination (frames 28 – 46)
PA-SCI-95	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.ESUS.1** **Grade level:** D (6th-8th) **CCRS:** —	Obtain and communicate information to describe how best management practices and environmental laws are designed to achieve environmental sustainability.	Science 640, Earth's Natural Resources Science 630, Environmental Issues *Not yet covered: best management practices and environmental laws*	**Science 640** Understanding sustainable development (frames 7 – 15); Understanding the necessity of sustainable development (frames 7 – 15) **Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67)
PA-SCI-96	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.ESTW.1** **Grade level:** D (6th-8th) **CCRS:** —	Design a solution to an environmental issue in which individuals and societies can engage as stewards of the environment.	Science 630, Environmental Issues Lessons in Things 215, Bees *Not yet covered: designing a stewardship solution*	**Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67) **Lessons in Things 215** Keystone species; Colony Collapse Disorder
PA-SCI-97	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.6-8.ELS.EJUS.1** **Grade level:** D (6th-8th) **CCRS:** —	Construct an explanation that describes regional environmental conditions and their implications on environmental justice and social equity.	*Prescription in Development* *Not yet covered: environmental justice and social equity*	
PA-SCI-169	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.AS.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze and interpret how issues, trends, technologies, and policies impact agricultural, food, and environmental systems and resources.	Science 150, Science in Personal and Social Perspectives, Part 1 Science 640, Earth's Natural Resources Lessons in Things 215, Bees *Not yet covered: agricultural policy and technology*	**Science 150** Understanding agricultural improvements (frames 12 – 29); Understanding how medical science has improved our (frames 44 – 63) **Science 640** Understanding sustainable development (frames 7 – 15); Understanding non-renewable resources (frames 4–6) **Lessons in Things 215** Keystone species; Colony Collapse Disorder

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PA-SCI-170	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.ESOC.1** **Grade level:** E (9th-12th) **CCRS:** —	Apply research and analytical skills to evaluate the conditions and motivations that lead to conflict, cooperation, and change among individuals, groups, and nations.	Science 630, Environmental Issues Social Studies 362, Africa after World War II and Global Issues *Not yet covered: conflict and cooperation over the environment*	**Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67) **Social Studies 362** Knowing what global warming is (frames 39 – 93); Knowing what desertification is (frames 1 – 38)
PA-SCI-171	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.WW.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze and interpret how issues, trends, technologies, and policies impact watersheds and water resources.	Science 620, Water Cycles and the Ocean Science 630, Environmental Issues *Not yet covered: watersheds and water-resource policy*	**Science 620** Understanding the water cycle (frames 4 – 16); Knowing properties of ocean water (frames 17 – 21) **Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Understanding water conservation (frames 28 – 31)
PA-SCI-172	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.IEI.1** **Grade level:** E (9th-12th) **CCRS:** —	Apply research and analytical skills to systematically investigate environmental issues ranging from local issues to those that are regional or global in scope.	Science 630, Environmental Issues Reading 470, Research and Research Projects	**Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing causes of global warming (frames 6 – 11) **Reading 470** Knowing resources for research (frames 21 – 39); Understanding the difference among direct quotes,
PA-SCI-173	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.EEXP.1** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation utilizing environmental data about a local environmental issue.	Science 211, Investigations and Experiments Science 630, Environmental Issues *Not yet covered: investigating a local environmental issue*	**Science 211** Knowing how to gather data (frames 48 – 66); Knowing how to make predictions (frames 21 – 29) **Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67)
PA-SCI-174	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.EVSOL.1** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate and communicate the effect of integrated pest management practices on indoor and outdoor environments.	Science 151, Science in Personal and Social Perspectives, Part 2 *Not yet covered: integrated pest management*	**Science 151** Knowing what the environment is (frames 1–4); Understanding contamination (frames 28 – 46)
PA-SCI-175	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.ESUS.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze and evaluate how best management practices and environmental laws achieve sustainability of natural resources.	Science 640, Earth's Natural Resources Science 650, Cutting Edge Science *Not yet covered: environmental laws and best management practices*	**Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding sustainable development (frames 7 – 15) **Science 650** Understanding environmental ethics (frames 16 – 20; 25 – 30; 37 – 41; 44 – 47; 47 – 48); Understanding science and nature (frames 77 – 80)
PA-SCI-176	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.ESTW.1** **Grade level:** E (9th-12th) **CCRS:** —	Design and evaluate solutions in which individuals and societies can promote stewardship in environmental quality and community well-being.	Science 630, Environmental Issues Science 640, Earth's Natural Resources *Not yet covered: designing stewardship solutions*	**Science 630** Understanding the meaning of environmental mottos (frames 42 – 55); Knowing ways to help the environment (frames 43 – 67) **Science 640** Understanding sustainable development (frames 7 – 15); Understanding the necessity of sustainable development (frames 7 – 15)
PA-SCI-177	**Integrated Science: Environmental Literacy and Sustainability**	**SCI.9-12.ELS.EJUS.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze and interpret data on a regional environmental condition and its implications on environmental justice and social equity.	*Prescription in Development* *Not yet covered: environmental justice and social equity*	

Integrated Science: Life Science (45 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-34	**Integrated Science: Life Science**	**SCI.6-8.LS.SFIP.1** **Grade level:** D (6th-8th) **CCRS:** —	Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.	Science 501, The Cell and Life Science 500, Introduction to Biology	**Science 501** Identifying different types of membranes (frames 30 – 39); Understanding the difference between sex cells and (frames 74 – 87) **Science 500** Understanding the characteristics of living things (frames 1–3; 1–4; 2–3; 4–6; 5–7; 9); Understanding the differences between living and non-living 5 – 7
PA-SCI-35	**Integrated Science: Life Science**	**SCI.6-8.LS.MEOE.3** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Science 530, Ecosystems Science 531, Habitats Lessons in Things 160, The Architecture of Disturbance Lessons in Things 215, Bees	**Science 530** Knowing what an ecosystem is (frames 21 – 24); Knowing what a population is (frames 7 – 11) **Science 531** Defining population density (frames 9 – 14); Identifying density-independent factors (frames 21 – 29) **Lessons in Things 160** Pioneer species; Broken ground as prerequisite **Lessons in Things 215** Colony Collapse Disorder; Keystone species
PA-SCI-36	**Integrated Science: Life Science**	**SCI.6-8.LS.GDRO.4** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	Science 521, Plants, Animals, and Viruses Science 510, Heredity	**Science 521** Understanding the replication of viruses (frames 120 – 123); Defining viruses (frames 116 – 118) **Science 510** Understanding dominance (frames 27 – 42); Understanding alleles (frames 20 – 28)
PA-SCI-37	**Integrated Science: Life Science**	**SCI.6-8.LS.NSA.1** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	Science 610, History of Earth Science 511, The Theory of Biological Evolution	**Science 610** Understanding the formation of Earth (frames 1 – 12); Understanding the fossil record (frames 41 – 77) **Science 511** Understanding the process of natural selection (frames 32 – 35); Understanding the types of life cycles (frames 68 – 72)
PA-SCI-57	**Integrated Science: Life Science**	**SCI.6-8.LS.SFIP.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe the function of a cell as a whole and the ways that parts of cells contribute to the function.	Science 501, The Cell and Life	**Science 501** Understanding the difference between sex cells and (frames 74 – 87); Defining organelles (frames 1)
PA-SCI-58	**Integrated Science: Life Science**	**SCI.6-8.LS.SFIP.3** **Grade level:** D (6th-8th) **CCRS:** —	Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	Science 540, The Human Body	**Science 540** Understanding the excretory system (frames 72 – 77); Understanding the nervous system (frames 79 – 88)
PA-SCI-59	**Integrated Science: Life Science**	**SCI.6-8.LS.SFIP.4** **Grade level:** D (6th-8th) **CCRS:** —	Gather and synthesize information about how sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	Science 540, The Human Body Lessons in Things 330, The 4-7-8 Breathing Method and the Trojan Seme	**Science 540** Understanding the nervous system (frames 79 – 88); Understanding the endocrine system (frames 89 – 92) **Lessons in Things 330** Trojan Seme definition; Trojan Seme recognition
PA-SCI-60	**Integrated Science: Life Science**	**SCI.6-8.LS.MEOE.1** **Grade level:** D (6th-8th) **CCRS:** —	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	Science 501, The Cell and Life Science 532, Life Systems	**Science 501** Understanding the role of the nucleus (frames 11 – 12); Understanding the role of the endoplasmic reticulum (frames 20 – 21) **Science 532** Knowing what producers are (frames 2–4); Knowing what a food chain is (frames 11 – 13)

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PA-SCI-61	**Integrated Science: Life Science**	**SCI.6-8.LS.MEOE.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	Science 501, The Cell and Life Science 540, The Human Body	**Science 501** Knowing the role of ATP molecule in the body (frames 101 – 103); Defining organelles (frames 1) **Science 540** Defining enzymes (frames 14 – 15); Understanding the excretory system (frames 72 – 77)
PA-SCI-62	**Integrated Science: Life Science**	**SCI.6-8.LS.MEOE.4** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	Science 532, Life Systems Science 530, Ecosystems	**Science 532** Understanding ecosystems (frames 1–2); Knowing how ecosystems become stable (frames 63 – 66) **Science 530** Knowing what an ecosystem is (frames 21 – 24); Knowing the relationship between climate and life in a 24 – 33
PA-SCI-63	**Integrated Science: Life Science**	**SCI.6-8.LS.MEOE.5** **Grade level:** D (6th-8th) **CCRS:** —	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	Science 531, Habitats Lessons in Things 160, The Architecture of Disturbance	**Science 531** Defining population density (frames 9 – 14); Understanding the ecosystem balance (frames 25 – 32, 38) **Lessons in Things 160** Pioneer species; Broken ground as prerequisite
PA-SCI-64	**Integrated Science: Life Science**	**SCI.6-8.LS.IRE.1** **Grade level:** D (6th-8th) **CCRS:** —	Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	Science 531, Habitats Science 532, Life Systems Lessons in Things 215, Bees Lessons in Things 220, Mycology of the Forest Floor	**Science 531** Understanding the ecosystem balance (frames 25 – 32, 38); Defining an ecosystem (frames 1–6) **Science 532** Understanding ecosystems (frames 1–2); Knowing how ecosystems become stable (frames 63 – 66) **Lessons in Things 215** Keystone species; Colony Collapse Disorder **Lessons in Things 220** Mycorrhizal exchange: tree provides carbohydrates; Documented transfers: evidence and limits
PA-SCI-65	**Integrated Science: Life Science**	**SCI.6-8.LS.IRE.2** **Grade level:** D (6th-8th) **CCRS:** —	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Science 630, Environmental Issues Lessons in Things 215, Bees *Not yet covered: comparing solutions that maintain biodiversity*	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55) **Lessons in Things 215** Keystone species; Colony Collapse Disorder
PA-SCI-66	**Integrated Science: Life Science**	**SCI.6-8.LS.GDRO.1** **Grade level:** D (6th-8th) **CCRS:** —	Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively.	Science 521, Plants, Animals, and Viruses Lessons in Things 215, Bees	**Science 521** Knowing the characteristics of plants (frames 1–3); Identifying the characteristics of mollusks (frames 73 – 80) **Lessons in Things 215** Keystone species; Colony Collapse Disorder
PA-SCI-67	**Integrated Science: Life Science**	**SCI.6-8.LS.GDRO.2** **Grade level:** D (6th-8th) **CCRS:** —	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Science 510, Heredity Science 531, Habitats	**Science 510** Understanding heritable traits (frames 8 – 13); Understanding phenotypes and genotypes (frames 32 – 45) **Science 531** Identifying density-independent factors (frames 21 – 29); Identifying abiotic factors (frames 42 – 50)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-68	**Integrated Science: Life Science**	**SCI.6-8.LS.GDRO.3** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	Science 510, Heredity Science 511, The Theory of Biological Evolution *Not yet covered: mutations changing proteins*	**Science 510** Understanding alleles (frames 20 – 28); Understanding probability with alleles (frames 20 -28; 20 – 28) **Science 511** Identifying a mutation (frames 45 – 48); Defining the gene pool (frames 24 – 29)
PA-SCI-69	**Integrated Science: Life Science**	**SCI.6-8.LS.GDRO.5** **Grade level:** D (6th-8th) **CCRS:** —	Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	Science 650, Cutting Edge Science Science 531, Habitats	**Science 650** Understanding science and technology (frames 65 – 68); Understanding science and nature (frames 77 – 80) **Science 531** Defining biotic potential (frames 51 – 56); Defining diversity (frames 66 – 70)
PA-SCI-70	**Integrated Science: Life Science**	**SCI.6-8.LS.NSA.2** **Grade level:** D (6th-8th) **CCRS:** —	Apply scientific ideas to construct an explanation for anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	Science 511, The Theory of Biological Evolution Science 520, Classification	**Science 511** Understanding the types of life cycles (frames 68 – 72); Knowing the influence of Darwin's work (frames 3–4) **Science 520** Understanding scientific names (frames 41 – 51); Understanding the diversity of life (frames 1 – 12)
PA-SCI-71	**Integrated Science: Life Science**	**SCI.6-8.LS.NSA.3** **Grade level:** D (6th-8th) **CCRS:** —	Analyze displays of pictorial data to compare patterns of similarities in anatomical structures across multiple species to identify relationships not evident in the fully formed anatomy.	Science 511, The Theory of Biological Evolution *Not yet covered: comparing embryo development across species*	**Science 511** Understanding the types of life cycles (frames 68 – 72); Knowing the influence of Darwin's work (frames 3–4)
PA-SCI-72	**Integrated Science: Life Science**	**SCI.6-8.LS.NSA.4** **Grade level:** D (6th-8th) **CCRS:** —	Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	Science 511, The Theory of Biological Evolution	**Science 511** Defining variation (frames 12 – 14); Understanding the types of life cycles (frames 68 – 72)
PA-SCI-73	**Integrated Science: Life Science**	**SCI.6-8.LS.NSA.5** **Grade level:** D (6th-8th) **CCRS:** —	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	Science 511, The Theory of Biological Evolution *Not yet covered: mathematical models of trait change in populations*	**Science 511** Understanding the process of natural selection (frames 32 – 35); Understanding the types of life cycles (frames 68 – 72)
PA-SCI-122	**Integrated Science: Life Science**	**SCI.9-12.LS.SF.1** **Grade level:** E (9th-12th) **CCRS:** —	Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.	Science 501, The Cell and Life Science 510, Heredity	**Science 501** Understanding the difference between sex cells and (frames 74 – 87); Defining organelles (frames 1) **Science 510** Understanding dominance (frames 27 – 42); Understanding alleles (frames 20 – 28)
PA-SCI-123	**Integrated Science: Life Science**	**SCI.9-12.LS.SF.2** **Grade level:** E (9th-12th) **CCRS:** —	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Science 540, The Human Body Science 500, Introduction to Biology	**Science 540** Understanding the excretory system (frames 72 – 77); Understanding the nervous system (frames 79 – 88) **Science 500** Understanding the influences on the biological system (frames 17 – 20); Understanding the definition of a biological system (frames 28 – 30)

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PA-SCI-124	**Integrated Science: Life Science**	**SCI.9-12.LS.SF.3** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Science 501, The Cell and Life Lessons in Things 330, The 4-7-8 Breathing Method and the Trojan Seme	**Science 501** Defining homeostasis (frames 94 – 96); Defining organelles (frames 1) **Lessons in Things 330** Trojan Seme definition; Trojan Seme recognition
PA-SCI-125	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.1** **Grade level:** E (9th-12th) **CCRS:** —	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	Science 501, The Cell and Life	**Science 501** Understanding the conversion of sunlight to glucose (frames 53 – 56); Defining organelles (frames 1)
PA-SCI-126	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.2** **Grade level:** E (9th-12th) **CCRS:** —	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	Science 331, Organic Chemistry Science 501, The Cell and Life	**Science 331** Knowing the properties of carbon (frames 1–3); Understanding nucleic acids (frames 53 – 59) **Science 501** Knowing the role of ATP molecule in the body (frames 101 – 103); Defining organelles (frames 1)
PA-SCI-127	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.3** **Grade level:** E (9th-12th) **CCRS:** —	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	Science 501, The Cell and Life	**Science 501** Understanding the process of cellular respiration (frames 49 – 52); Knowing the role of ATP molecule in the body (frames 101 – 103)
PA-SCI-128	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.4** **Grade level:** E (9th-12th) **CCRS:** —	Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	Science 501, The Cell and Life Science 532, Life Systems	**Science 501** Understanding the process of cellular respiration (frames 49 – 52); Understanding the conversion of sunlight to glucose (frames 53 – 56) **Science 532** Identifying trophic levels (frames 20 – 36); Understanding food webs (frames 19 – 20)
PA-SCI-129	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.5** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	Science 532, Life Systems *Not yet covered: quantifying energy flow between trophic levels*	**Science 532** Identifying trophic levels (frames 20 – 36); Understanding ecosystems (frames 1–2)
PA-SCI-130	**Integrated Science: Life Science**	**SCI.9-12.LS.MEOE.6** **Grade level:** E (9th-12th) **CCRS:** —	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Science 501, The Cell and Life Science 532, Life Systems *Not yet covered: the carbon cycle across Earth's spheres*	**Science 501** Understanding the process of cellular respiration (frames 49 – 52); Understanding the role of the nucleus (frames 11 – 12) **Science 532** Identifying trophic levels (frames 20 – 36); Knowing what producers are (frames 2–4)
PA-SCI-131	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.1** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Science 531, Habitats	**Science 531** Defining carrying capacity (frames 53 – 56); Identifying density-independent factors (frames 21 – 29)
PA-SCI-132	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.2** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	Science 531, Habitats Science 532, Life Systems	**Science 531** Defining population density (frames 9 – 14); Identifying density-independent factors (frames 21 – 29) **Science 532** Understanding the necessity of biodiversity (frames 37 – 41; 37 – 43); Knowing what biodiversity is (frames 37 – 41)

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PA-SCI-133	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.3** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	Science 531, Habitats Lessons in Things 160, The Architecture of Disturbance	**Science 531** Understanding the ecosystem balance (frames 25 – 32, 38); Defining an ecosystem (frames 1–6) **Lessons in Things 160** Pioneer species; Broken ground as prerequisite
PA-SCI-134	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.4** **Grade level:** E (9th-12th) **CCRS:** —	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	Science 630, Environmental Issues *Not yet covered: designing a solution that reduces human impact*	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-135	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.5** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Lessons in Things 215, Bees Lessons in Things 100, How to Recruit a Murder of Crows	**Lessons in Things 215** Keystone species; Colony Collapse Disorder **Lessons in Things 100** Crows share assessments; Social proof
PA-SCI-136	**Integrated Science: Life Science**	**SCI.9-12.LS.IRE.6** **Grade level:** E (9th-12th) **CCRS:** —	Create or revise a simulation to test a solution to mitigate the adverse impacts of human activity on biodiversity.	Science 630, Environmental Issues *Not yet covered: simulating solutions for biodiversity*	**Science 630** Understanding humans' impact on their ecosystems (frames 1–2); Understanding the meaning of environmental mottos (frames 42 – 55)
PA-SCI-137	**Integrated Science: Life Science**	**SCI.9-12.LS.IVT.1** **Grade level:** E (9th-12th) **CCRS:** —	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Science 501, The Cell and Life	**Science 501** Understanding the difference between plant and (frames 4–9); Understanding the process of cellular respiration (frames 49 – 52)
PA-SCI-138	**Integrated Science: Life Science**	**SCI.9-12.LS.IVT.2** **Grade level:** E (9th-12th) **CCRS:** —	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	Science 510, Heredity Science 501, The Cell and Life	**Science 510** Understanding recessive traits (frames 27 – 41); Understanding heritable traits (frames 8 – 13) **Science 501** Understanding the role of the nucleus (frames 11 – 12); Understanding the role of the endoplasmic reticulum (frames 20 – 21)
PA-SCI-139	**Integrated Science: Life Science**	**SCI.9-12.LS.IVT.3** **Grade level:** E (9th-12th) **CCRS:** —	Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	Science 510, Heredity Science 511, The Theory of Biological Evolution	**Science 510** Understanding alleles (frames 20 – 28); Understanding probability with alleles (frames 20 -28; 20 – 28) **Science 511** Identifying a mutation (frames 45 – 48); Defining variation (frames 12 – 14)
PA-SCI-140	**Integrated Science: Life Science**	**SCI.9-12.LS.IVT.4** **Grade level:** E (9th-12th) **CCRS:** —	Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	Science 510, Heredity Basic Math 420, Probability I Basic Math 440, Statistics	**Science 510** Understanding recessive traits (frames 27 – 41); Understanding probability with alleles (frames 20 -28; 20 – 28) **Basic Math 420** computing simple probabilities in real- world word problems (frames 20 - 46) **Basic Math 440** finding the mean (frames 13 - 21); finding the range (frames 2 - 12)
PA-SCI-141	**Integrated Science: Life Science**	**SCI.9-12.LS.NSE.1** **Grade level:** E (9th-12th) **CCRS:** —	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Science 511, The Theory of Biological Evolution Science 610, History of Earth	**Science 511** Understanding the principles of Evolution (frames 3–7); Identifying the principles of evolution (frames 21 – 23) **Science 610** Understanding the origin of life (frames 13 – 34); Understanding the formation of Earth (frames 1 – 12)

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PA-SCI-142	**Integrated Science: Life Science**	**SCI.9-12.LS.NSE.2** **Grade level:** E (9th-12th) **CCRS:** —	Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	Science 511, The Theory of Biological Evolution	**Science 511** Identifying a mutation (frames 45 – 48); Understanding the process of natural selection (frames 32 – 35)
PA-SCI-143	**Integrated Science: Life Science**	**SCI.9-12.LS.NSE.3** **Grade level:** E (9th-12th) **CCRS:** —	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	Science 511, The Theory of Biological Evolution *Not yet covered: statistics of trait frequency in populations*	**Science 511** Understanding the types of life cycles (frames 68 – 72); Knowing the influence of Darwin's work (frames 3–4)
PA-SCI-144	**Integrated Science: Life Science**	**SCI.9-12.LS.NSE.4** **Grade level:** E (9th-12th) **CCRS:** —	Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	Science 511, The Theory of Biological Evolution	**Science 511** Understanding the process of natural selection (frames 32 – 35); Knowing the types of adaptations (frames 58; 58 – 67; 65 – 67)
PA-SCI-145	**Integrated Science: Life Science**	**SCI.9-12.LS.NSE.5** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	Science 511, The Theory of Biological Evolution Science 531, Habitats	**Science 511** Understanding the types of life cycles (frames 68 – 72); Knowing the influence of Darwin's work (frames 3–4) **Science 531** Understanding environmental resistance (frames 42 – 50); Defining population density (frames 9 – 14)

Integrated Science: Physical Science (43 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-30	**Integrated Science: Physical Science**	**SCI.6-8.PS.SPM.1** **Grade level:** D (6th-8th) **CCRS:** —	Develop models to describe the atomic composition of simple molecules and extended structures.	Science 300, Matter Science 330, Compounds	**Science 300** Understanding kinetic molecular theory (frames 64 – 65); Defining molecules (frames 6 – 10) **Science 330** Understanding the relation of atomic mass (frames 73 – 82); Understanding moles (frames 60 – 66)
PA-SCI-31	**Integrated Science: Physical Science**	**SCI.6-8.PS.CR.1** **Grade level:** D (6th-8th) **CCRS:** —	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	Science 300, Matter Science 340, Chemical Reactions Lessons in Things 140, Process Engineering	**Science 300** Understanding physical properties of matter (frames 15 – 23); Understanding density (frames 52 – 56) **Science 340** Understanding chemical reactions & the real-world (frames 81 – 86); Understanding chemical formulas (frames 1 – 10) **Lessons in Things 140** Self-sustaining combustion; Fire defined

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PA-SCI-32	**Integrated Science: Physical Science**	**SCI.6-8.PS.FI.2** **Grade level:** D (6th-8th) **CCRS:** —	Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	Science 211, Investigations and Experiments Science 400, Introduction to Physics Lessons in Things 210, The Five-Knot Toolkit	**Science 211** Knowing how to make predictions (frames 21 – 29); Knowing the definition of the scientific method (frames 1–3; 4–5) **Science 400** Understanding the difference between mass and weight (frames 48 – 55); Knowing the definition of mass (frames 48 – 55) **Lessons in Things 210** Tension increases friction; Knot efficiency: applied calculation
PA-SCI-33	**Integrated Science: Physical Science**	**SCI.6-8.PS.E.5** **Grade level:** D (6th-8th) **CCRS:** —	Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Science 410, Work and Power Science 400, Introduction to Physics	**Science 410** Computing Power (frames 37 – 44); Computing Work (frames 8 – 18) **Science 400** Understanding how to compute acceleration (frames 60 – 69; 63; 63 – 65); Knowing how to compute average velocity (frames 23 – 27)
PA-SCI-42	**Integrated Science: Physical Science**	**SCI.6-8.PS.SPM.2** **Grade level:** D (6th-8th) **CCRS:** —	Gather and make sense of information to describe how synthetic materials come from natural resources and impact society.	Science 331, Organic Chemistry Science 640, Earth's Natural Resources *Not yet covered: synthetic materials made from natural resources*	**Science 331** Understanding hydrocarbons (frames 15 – 30); Understanding polymers (frames 6–9) **Science 640** Understanding distribution of natural resources (frames 15 – 19); Understanding non-renewable resources (frames 4–6)
PA-SCI-43	**Integrated Science: Physical Science**	**SCI.6-8.PS.SPM.3** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model that predicts and describes changes in the particle motion, temperature and state of a pure substance when thermal energy is added or removed.	Science 301, Working With Matter Science 440, Heat	**Science 301** Understanding energy and physical changes (frames 41 – 58); Understanding physical changes of water (frames 16 – 25) **Science 440** Knowing the definition of temperature (frames 2–5); Understanding thermal equilibrium (frames 8 – 17)
PA-SCI-44	**Integrated Science: Physical Science**	**SCI.6-8.PS.CR.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	Science 340, Chemical Reactions	**Science 340** Understanding chemical reactions & the real-world (frames 81 – 86); Understanding chemical formulas (frames 1 – 10)
PA-SCI-45	**Integrated Science: Physical Science**	**SCI.6-8.PS.CR.3** **Grade level:** D (6th-8th) **CCRS:** —	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	Science 301, Working With Matter Science 340, Chemical Reactions Lessons in Things 140, Process Engineering *Not yet covered: designing and testing a device that releases or absorbs heat*	**Science 301** Understanding energy and physical changes (frames 41 – 58); Defining chemical change (frames 27 – 32) **Science 340** Understanding chemical formulas (frames 1 – 10); Knowing how to balance chemical equations (frames 17 – 29) **Lessons in Things 140** Fire defined; Self-sustaining combustion
PA-SCI-46	**Integrated Science: Physical Science**	**SCI.6-8.PS.FI.1** **Grade level:** D (6th-8th) **CCRS:** —	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	Science 400, Introduction to Physics *Not yet covered: designing a solution for colliding objects*	**Science 400** Newton's third law (action and reaction) (frames 92 – 98); Knowing Newton's second law (frames 63 – 69)
PA-SCI-47	**Integrated Science: Physical Science**	**SCI.6-8.PS.FI.3** **Grade level:** D (6th-8th) **CCRS:** —	Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Science 420, Electricity and Magnetism	**Science 420** Understanding magnetic fields (frames 63 – 70); Understanding earth's magnetic poles (frames 78 – 84)

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PA-SCI-48	**Integrated Science: Physical Science**	**SCI.6-8.PS.FI.4** **Grade level:** D (6th-8th) **CCRS:** —	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	Science 400, Introduction to Physics Science 602, The Solar System	**Science 400** Understanding the difference between mass and weight (frames 48 – 55); Knowing the definition of physics (frames 100 – 103) **Science 602** Knowing the physical characteristics of Mars (frames 46 – 59); Knowing the physical characteristics of Venus (frames 38 – 45)
PA-SCI-49	**Integrated Science: Physical Science**	**SCI.6-8.PS.FI.5** **Grade level:** D (6th-8th) **CCRS:** —	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	Science 420, Electricity and Magnetism Science 400, Introduction to Physics *Not yet covered: investigating force fields between objects*	**Science 420** Knowing the difference between conductors and insulators 24 – 27; Understanding magnetic fields (frames 63 – 70) **Science 400** Understanding how to compute force (frames 60 – 69); Understanding how to compute net force (frames 88 – 90)
PA-SCI-50	**Integrated Science: Physical Science**	**SCI.6-8.PS.E.1** **Grade level:** D (6th-8th) **CCRS:** —	Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass and speed of an object.	Science 410, Work and Power Advanced Math 503, Descriptive Statistics *Not yet covered: graphing kinetic energy against mass and speed*	**Science 410** Computing Work (frames 8 – 18); Defining work (frames 1–4) **Advanced Math 503** Interpreting data presented in graphs or tables (frames 26-44); Interpreting data presented with a scatter plot; identifying the line of best fit (frames 45-53)
PA-SCI-51	**Integrated Science: Physical Science**	**SCI.6-8.PS.E.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	Science 410, Work and Power	**Science 410** Understanding levers (frames 22 – 29); Understanding the uses of levers (frames 22 – 29)
PA-SCI-52	**Integrated Science: Physical Science**	**SCI.6-8.PS.E.3** **Grade level:** D (6th-8th) **CCRS:** —	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	Science 440, Heat *Not yet covered: designing a device to control heat transfer*	**Science 440** Understanding methods of heat transfer (frames 37 – 58); Understanding specific heat (frames 24 – 26)
PA-SCI-53	**Integrated Science: Physical Science**	**SCI.6-8.PS.E.4** **Grade level:** D (6th-8th) **CCRS:** —	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Science 440, Heat	**Science 440** Understanding kinetic energy (frames 2–3); Understanding methods of heat transfer (frames 37 – 58)
PA-SCI-54	**Integrated Science: Physical Science**	**SCI.6-8.PS.WER.1** **Grade level:** D (6th-8th) **CCRS:** —	Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.	Science 430, Waves and Forces in Fluids Lessons in Things 240, The Sound of Green	**Science 430** Identifying types of transverse waves (frames 6–9); Defining amplitude (frames 10 – 13) **Lessons in Things 240** Wave properties: frequency and amplitude; Wave properties: frequency and amplitude distinguished
PA-SCI-55	**Integrated Science: Physical Science**	**SCI.6-8.PS.WER.2** **Grade level:** D (6th-8th) **CCRS:** —	Develop and use a model to describe how waves are reflected, absorbed, or transmitted through various materials.	Science 430, Waves and Forces in Fluids Lessons in Things 240, The Sound of Green	**Science 430** Identifying types of transverse waves (frames 6–9); Identifying types of compressional waves (frames 29 – 37) **Lessons in Things 240** Wave properties: frequency and amplitude; Wave properties: frequency and amplitude distinguished

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PA-SCI-56	**Integrated Science: Physical Science**	**SCI.6-8.PS.WER.3** **Grade level:** D (6th-8th) **CCRS:** —	Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	Lessons in Things 130, Basic Electricity and Circuits *Not yet covered: digital versus analog signals*	**Lessons in Things 130** Voltage; Ohm's Law applied
PA-SCI-98	**Integrated Science: Physical Science**	**SCI.9-12.PS.SPM.1** **Grade level:** E (9th-12th) **CCRS:** —	Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	Science 320, Elements Science 321, The Periodic Table	**Science 320** Understanding arrangements of electrons in an atom (frames 14 – 27); Understanding the location of electrons in an atom (frames 14 – 27) **Science 321** Understanding the arrangement of elements in the periodic 11 – 60; Understanding how to read the periodic table (frames 11 – 60)
PA-SCI-99	**Integrated Science: Physical Science**	**SCI.9-12.PS.SPM.2** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	Science 330, Compounds Science 301, Working With Matter *Not yet covered: inferring electrical forces from bulk properties*	**Science 330** Knowing properties of covalent solids (frames 87 – 102); Knowing properties of metals (frames 87 – 102) **Science 301** Understanding energy and physical changes (frames 41 – 58); Knowing the wave-particle duality (frames 60 – 66)
PA-SCI-100	**Integrated Science: Physical Science**	**SCI.9-12.PS.SPM.3** **Grade level:** E (9th-12th) **CCRS:** —	Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	Science 312, Atomic Energy	**Science 312** Understanding radioactive decay (frames 10 – 14); Understanding nuclear fusion (frames 46 – 68; 48 – 68)
PA-SCI-101	**Integrated Science: Physical Science**	**SCI.9-12.PS.SPM.4** **Grade level:** E (9th-12th) **CCRS:** —	Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	Science 331, Organic Chemistry *Not yet covered: molecular structure of designed materials*	**Science 331** Defining isomers (frames 32 – 36); Understanding polymers (frames 6–9)
PA-SCI-102	**Integrated Science: Physical Science**	**SCI.9-12.PS.CR.1** **Grade level:** E (9th-12th) **CCRS:** —	Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	Science 320, Elements Science 321, The Periodic Table Science 340, Chemical Reactions	**Science 320** Understanding arrangements of electrons in an atom (frames 14 – 27); Understanding the location of electrons in an atom (frames 14 – 27) **Science 321** Understanding how to read the periodic table (frames 11 – 60); Knowing where metals are on the periodic table (frames 48 – 60) **Science 340** Understanding chemical reactions & the real-world (frames 81 – 86); Understanding chemical formulas (frames 1 – 10)
PA-SCI-103	**Integrated Science: Physical Science**	**SCI.9-12.PS.CR.2** **Grade level:** E (9th-12th) **CCRS:** —	Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.	Science 340, Chemical Reactions Science 301, Working With Matter Lessons in Things 140, Process Engineering *Not yet covered: total bond energy*	**Science 340** Understanding chemical reactions & the real-world (frames 81 – 86); Understanding chemical formulas (frames 1 – 10) **Science 301** Understanding energy and physical changes (frames 41 – 58); Understanding physical changes of water (frames 16 – 25) **Lessons in Things 140** Fire defined; Self-sustaining combustion

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PA-SCI-104	**Integrated Science: Physical Science**	**SCI.9-12.PS.CR.3** **Grade level:** E (9th-12th) **CCRS:** —	Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	Science 340, Chemical Reactions Science 341, Solutions *Not yet covered: reaction rates: temperature and concentration*	**Science 340** Understanding Le Chatelier's principle (frames 66 – 80); Understanding single replacement reaction (frames 38 – 41) **Science 341** Calculating molarity (frames 26 – 40); Understanding solubility (frames 14 – 22)
PA-SCI-105	**Integrated Science: Physical Science**	**SCI.9-12.PS.CR.4** **Grade level:** E (9th-12th) **CCRS:** —	Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	Science 340, Chemical Reactions *Not yet covered: shifting chemical equilibrium*	**Science 340** Understanding chemical formulas (frames 1 – 10); Knowing how to balance chemical equations (frames 17 – 29)
PA-SCI-106	**Integrated Science: Physical Science**	**SCI.9-12.PS.CR.5** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	Science 340, Chemical Reactions	**Science 340** Understanding chemical reactions & the real-world (frames 81 – 86); Understanding chemical formulas (frames 1 – 10)
PA-SCI-107	**Integrated Science: Physical Science**	**SCI.9-12.PS.FI.1** **Grade level:** E (9th-12th) **CCRS:** —	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	Science 400, Introduction to Physics	**Science 400** Knowing Newton's second law (frames 63 – 69); Understanding how to compute acceleration (frames 60 – 69; 63; 63 – 65)
PA-SCI-108	**Integrated Science: Physical Science**	**SCI.9-12.PS.FI.2** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.	Science 400, Introduction to Physics *Not yet covered: conservation of momentum*	**Science 400** Understanding how to compute force (frames 60 – 69); Understanding how to compute net force (frames 88 – 90)
PA-SCI-109	**Integrated Science: Physical Science**	**SCI.9-12.PS.FI.3** **Grade level:** E (9th-12th) **CCRS:** —	Apply scientific and engineering ideas to design, evaluate and refine a device that minimizes the force on a macroscopic object during a collision.	Science 400, Introduction to Physics *Not yet covered: designing a device that reduces collision force*	**Science 400** Understanding how to compute force (frames 60 – 69); Understanding how to compute net force (frames 88 – 90)
PA-SCI-110	**Integrated Science: Physical Science**	**SCI.9-12.PS.FI.4** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	Science 400, Introduction to Physics Science 420, Electricity and Magnetism *Not yet covered: Newton's law of gravitation and Coulomb's law*	**Science 400** Knowing Newton's second law (frames 63 – 69); Knowing the law of inertia (Newton's first law) (frames 3–8) **Science 420** Knowing the difference between conductors and insulators 24 – 27; Understanding electromagnetic waves (frames 69 – 76)
PA-SCI-111	**Integrated Science: Physical Science**	**SCI.9-12.PS.FI.5** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	Science 420, Electricity and Magnetism Lessons in Things 130, Basic Electricity and Circuits	**Science 420** Understanding magnetic fields (frames 63 – 70); Knowing the difference between conductors and insulators 24 – 27 **Lessons in Things 130** Voltage; Ohm's Law applied
PA-SCI-112	**Integrated Science: Physical Science**	**SCI.9-12.PS.E.1** **Grade level:** E (9th-12th) **CCRS:** —	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	Science 410, Work and Power Science 440, Heat *Not yet covered: computational models of energy in a system*	**Science 410** Computing Power (frames 37 – 44); Computing Work (frames 8 – 18) **Science 440** Understanding kinetic energy (frames 2–3); Understanding conduction (frames 38 – 42)

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PA-SCI-113	**Integrated Science: Physical Science**	**SCI.9-12.PS.E.2** **Grade level:** E (9th-12th) **CCRS:** —	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).	Science 410, Work and Power Science 440, Heat	**Science 410** Computing Work (frames 8 – 18); Defining work (frames 1–4) **Science 440** Understanding kinetic energy (frames 2–3); Understanding conduction (frames 38 – 42)
PA-SCI-114	**Integrated Science: Physical Science**	**SCI.9-12.PS.E.3** **Grade level:** E (9th-12th) **CCRS:** —	Design, build and refine a device that works within given constraints to convert one form of energy into another form of energy.	Science 410, Work and Power Lessons in Things 130, Basic Electricity and Circuits *Not yet covered: designing an energy-conversion device*	**Science 410** Computing Work (frames 8 – 18); Defining work (frames 1–4) **Lessons in Things 130** Voltage; Ohm's Law applied
PA-SCI-115	**Integrated Science: Physical Science**	**SCI.9-12.PS.E.4** **Grade level:** E (9th-12th) **CCRS:** —	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	Science 440, Heat	**Science 440** Knowing the Second Law of Thermodynamics (frames 70 – 71); Understanding conduction (frames 38 – 42)
PA-SCI-116	**Integrated Science: Physical Science**	**SCI.9-12.PS.E.5** **Grade level:** E (9th-12th) **CCRS:** —	Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.	Science 420, Electricity and Magnetism	**Science 420** Understanding magnetic fields (frames 63 – 70); Knowing the difference between conductors and insulators 24 – 27
PA-SCI-117	**Integrated Science: Physical Science**	**SCI.9-12.PS.WER.1** **Grade level:** E (9th-12th) **CCRS:** —	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	Science 430, Waves and Forces in Fluids Lessons in Things 240, The Sound of Green	**Science 430** Identifying types of transverse waves (frames 6–9); Defining wavelengths (frames 10 – 15) **Lessons in Things 240** Wave properties: frequency and amplitude; Wave properties: frequency and amplitude distinguished
PA-SCI-118	**Integrated Science: Physical Science**	**SCI.9-12.PS.WER.2** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate questions about the advantages of using digital transmission and storage of information.	*Prescription in Development* *Not yet covered: digital transmission and storage of information*	
PA-SCI-119	**Integrated Science: Physical Science**	**SCI.9-12.PS.WER.3** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model and that for some situations one model is more useful than the other.	Science 603, Space Exploration Today Science 430, Waves and Forces in Fluids *Not yet covered: wave and particle models of light*	**Science 603** Defining particle accelerator (frames 18 – 22); Knowing about measuring speed of light (frames 12 – 15) **Science 430** Identifying types of transverse waves (frames 6–9); Identifying types of compressional waves (frames 29 – 37)

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PA-SCI-120	**Integrated Science: Physical Science**	**SCI.9-12.PS.WER.4** **Grade level:** E (9th-12th) **CCRS:** —	Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	Science 430, Waves and Forces in Fluids Science 312, Atomic Energy *Not yet covered: effects of electromagnetic radiation absorbed by matter*	**Science 430** Knowing the measurement unit of frequency (frames 19 – 20); Calculating velocity (frames 17 – 18; 22 – 27) **Science 312** Understanding radioactive decay (frames 10 – 14); Understanding nuclear fusion (frames 46 – 68; 48 – 68)
PA-SCI-121	**Integrated Science: Physical Science**	**SCI.9-12.PS.WER.5** **Grade level:** E (9th-12th) **CCRS:** —	Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	Science 430, Waves and Forces in Fluids Science 603, Space Exploration Today *Not yet covered: how devices use waves to transmit information*	**Science 430** Understanding Pascal's principle (frames 59 – 65); Identifying types of transverse waves (frames 6–9) **Science 603** Knowing about space accidents (frames 99 – 104); Knowing about the Chandra X-Ray Observatory (frames 70 – 75)

Reading in Science and Technical Subjects (22 items)

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PA-SCI-1	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.	Reading 202, Reading Strategies: Unit 2 Reading 223, Main Ideas and Supporting Details: Unit 3 Science 100, Critical Thinking	**Reading 202** Recognizing the best summary of a passage (frames 34 – 54); Selecting the best reading strategy (frames 28 – 33) **Reading 223** Choosing the best title for a passage (frames 3 – 30); Locating supporting details (frames 16 – 33) **Science 100** Understanding verbal and written communications (frames 1–4; 8–9); Knowing points of written communication (frames 13 – 15)
PA-SCI-2	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	Reading 223, Main Ideas and Supporting Details: Unit 3 Reading 202, Reading Strategies: Unit 2	**Reading 223** Choosing the best title for a passage (frames 3 – 30); Locating the main idea found in the thesis (frames 17 – 33) **Reading 202** Recognizing the best summary of a passage (frames 34 – 54); Identifying the most useful addition (frames 10 – 17)
PA-SCI-3	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	Reading 210, Sequence of Events Reading 235, Directions and Instructions Science 211, Investigations and Experiments	**Reading 210** Determining sequence by passage order and (frames 19 – 38); Determining sequence by following the five steps (frames 39 – 52) **Reading 235** Following instructions for doing a household task (frames 1 – 22, 53 – 59); Following directions for getting places (frames 1 – 22, 45 – 52) **Science 211** Understanding why scientists do experiments (frames 1–3); Understanding the end results of experiments (frames 62)
PA-SCI-4	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RI/RL.6.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.	Reading 125, Definitions and Explanations Reading 130, Clue Words and Phrases in General Context Science 110, Scientific Units	**Reading 125** Understanding a definition following signal word is (frames 10 – 33); Understanding a definition following signal word or (frames 45 – 63) **Reading 130** Understanding a comparison following the clue word (frames 66 – 72); Understanding a contrast following the clue word but (frames 46 – 65) **Science 110** Knowing specific scientific units (frames 55 – 64); Knowing specific units of scientific measure (frames 55 – 64)

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PA-SCI-5	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** 7.RI.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	Reading 202, Reading Strategies: Unit 2 Reading 223, Main Ideas and Supporting Details: Unit 3	**Reading 202** Recognizing the best summary of a passage (frames 34 – 54); Knowing how to predict outcome (frames 18 – 27) **Reading 223** Locating supporting details (frames 16 – 33); Identifying supporting details (frames 16 – 33)
PA-SCI-6	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RI.8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	Reading 260, Writer's Purpose	**Reading 260** Knowing that the writer's purpose is to persuade (frames 75 – 88); Knowing that the writer's purpose is to entertain (frames 15 – 25)
PA-SCI-7	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	Reading 445, Tables and Charts Reading 440, Diagrams and Graphs	**Reading 445** Finding information on a mileage chart (frames 24 – 29); Finding information on a phone rate chart (frames 30 – 32) **Reading 440** Reading circle graphs (frames 52 – 55); Reading diagrams (frames 2 – 14)
PA-SCI-8	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RI.8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	Reading 230, Conclusions and Generalizations Reading 252, Fact and Opinion: Unit 2 Science 100, Critical Thinking	**Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading 252** Identifying negative bias in headlines (frames 33 – 35); Identifying neutral statements (frames 17 – 35) **Science 100** Knowing what an inference is (frames 42 – 49); Defining inference (frames 42 – 49)
PA-SCI-9	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	Reading 460, Using Information Sources Science 211, Investigations and Experiments *Not yet covered: comparing experiment/video/multimedia information with a text*	**Reading 460** Understanding how to locate sources with a database (frames 31 – 34); Understanding everyday reference sources (frames 14 – 23) **Science 211** Understanding why scientists do experiments (frames 1–3); Understanding the end results of experiments (frames 62)
PA-SCI-10	**Reading in Science and Technical Subjects**	**Grade level:** D (6th-8th) **CCRS:** RST.6-8.1	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	Reading 202, Reading Strategies: Unit 2 Reading 223, Main Ideas and Supporting Details: Unit 3 Reading Passages 800s	**Reading 202** Selecting the best reading strategy (frames 28 – 33); Recognizing the best summary of a passage (frames 34 – 54) **Reading 223** Choosing the best title for a passage (frames 3 – 30); Locating the main idea found in the thesis (frames 17 – 33) **Reading Passages 800** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-11	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.1	Cite specific textual evidence to support analysis of science and technical texts, attending to precise details of explanations or descriptions.	Reading 223, Main Ideas and Supporting Details: Unit 3 Reading 230, Conclusions and Generalizations Reading Passages 1000s	**Reading 223** Locating supporting details (frames 16 – 33); Identifying supporting details (frames 16 – 33) **Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)

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PA-SCI-12	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.2	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary.	Reading 210, Sequence of Events Reading 223, Main Ideas and Supporting Details: Unit 3 Reading 230, Conclusions and Generalizations Reading Passages 1000s	**Reading 210** Determining sequence by passage order and (frames 19 – 38); Determining sequence by clue words (frames 24 – 38) **Reading 223** Locating the main idea found in the thesis (frames 17 – 33); Locating the implied main idea (frames 2, 17 – 33) **Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-13	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	Reading 235, Directions and Instructions Science 211, Investigations and Experiments Reading Passages 1000s	**Reading 235** Following instructions for doing a household task (frames 1 – 22, 53 – 59); Following directions for getting places (frames 1 – 22, 45 – 52) **Science 211** Understanding why scientists do experiments (frames 1–3); Understanding the end results of experiments (frames 62) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-14	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases in a scientific or technical context.	Reading 125, Definitions and Explanations Reading 130, Clue Words and Phrases in General Context Science 110, Scientific Units Lessons in Things 320, The Indo-European Root Engine Reading Passages 1000s	**Reading 125** Understanding a definition determined by other words (frames 64 – 68); Understanding a definition following signal word is (frames 10 – 33) **Reading 130** Understanding a comparison following the clue word (frames 66 – 72); Understanding a contrast following the clue word but (frames 46 – 65) **Science 110** Knowing specific scientific units (frames 55 – 64); Knowing specific units of scientific measure (frames 55 – 64) **Lessons in Things 320** What a root is and why it has leverage; Decoding unfamiliar words **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-15	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.5	Analyze the structure of the relationships among concepts in a text, including how key terms delve into greater depth.	Reading 201, Reading Strategies: Unit 1 Reading 202, Reading Strategies: Unit 2 Reading Passages 1100s	**Reading 201** Understanding structural analysis (frames 22 – 29); Identifying clue words that show a comparison is (frames 83 – 88) **Reading 202** Recognizing the best summary of a passage (frames 34 – 54); Knowing how to predict outcome (frames 18 – 27) **Reading Passages 1100** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-16	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	Reading 260, Writer's Purpose Science 211, Investigations and Experiments Reading Passages 1100s	**Reading 260** Knowing that the writer's purpose is to persuade (frames 75 – 88); Knowing that the writer's purpose is to entertain (frames 15 – 25) **Science 211** Understanding why scientists do experiments (frames 1–3); Understanding the end results of experiments (frames 62) **Reading Passages 1100** Passage Tests (comprehension items; recommended timed reading speed)

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PA-SCI-17	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.7	Translate quantitative or technical information expressed in words into visual form and translate information expressed visually into words.	Reading 440, Diagrams and Graphs Reading 445, Tables and Charts Basic Math 510, Interpreting Graphs Reading Passages 1000s	**Reading 440** Reading circle graphs (frames 52 – 55); Reading diagrams (frames 2 – 14) **Reading 445** Finding information on a TV listing (frames 48 – 56); Finding information on a utility bill (frames 33 – 39) **Basic Math 510** reading and interpreting line graphs (frames 26 - 39); reading and interpreting circle graphs (pie charts) (frames 40 - 49) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-18	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a problem.	Reading 230, Conclusions and Generalizations Reading 252, Fact and Opinion: Unit 2 Lessons in Things 220, Mycology of the Forest Floor Lessons in Things 250, The Golden Ratio in Nature Reading Passages 1100s	**Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading 252** Identifying negative bias in headlines (frames 33 – 35); Identifying neutral statements (frames 17 – 35) **Lessons in Things 220** Documented transfers: evidence and limits; Mycorrhizal exchange: tree provides carbohydrates **Lessons in Things 250** Apophenia: why golden ratio claims fail measurement; Apophenia: finding what you are primed to find **Reading Passages 1100** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-19	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.9-10.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions and inconsistencies.	Reading 223, Main Ideas and Supporting Details: Unit 3 Reading 230, Conclusions and Generalizations Reading Passages 1000s	**Reading 223** Locating supporting details (frames 16 – 33); Identifying supporting details (frames 16 – 33) **Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-20	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.11-12.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text.	Reading 223, Main Ideas and Supporting Details: Unit 3 Reading 230, Conclusions and Generalizations Reading Passages 1000s	**Reading 223** Locating the main idea found in the thesis (frames 17 – 33); Locating the implied main idea (frames 2, 17 – 33) **Reading 230** Drawing a conclusion from available evidence (frames 1 – 32); Forming a generalization (frames 33 – 52) **Reading Passages 1000** Passage Tests (comprehension items; recommended timed reading speed)
PA-SCI-21	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem.	Reading 440, Diagrams and Graphs Reading 460, Using Information Sources Reading 470, Research and Research Projects Reading Passages 1200s	**Reading 440** Reading circle graphs (frames 52 – 55); Reading diagrams (frames 2 – 14) **Reading 460** Understanding how to evaluate internet sources (frames 39 – 44); Understanding how to locate sources with a database (frames 31 – 34) **Reading 470** Knowing questions to evaluate sources (frames 26 – 49); Understanding the difference among direct quotes, **Reading Passages 1200** Passage Tests (comprehension items; recommended timed reading speed)

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PA-SCI-22	**Reading in Science and Technical Subjects**	**Grade level:** E (9th-12th) **CCRS:** RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying data and corroborating conclusions.	Science 210, Scientific Inquiry Science 211, Investigations and Experiments Lessons in Things 220, Mycology of the Forest Floor Lessons in Things 250, The Golden Ratio in Nature Reading Passages 1100s	**Science 210** Defining hypothesis (frames 6); Knowing how to analyze data (frames 28 – 45; 31 – 41) **Science 211** Knowing how to develop hypotheses (frames 11 – 22); Knowing how to gather data (frames 48 – 66) **Lessons in Things 220** Mycorrhizal exchange: tree provides carbohydrates; Documented transfers: evidence and limits **Lessons in Things 250** Apophenia: finding what you are primed to find; Pattern vs. mechanism **Reading Passages 1100** Passage Tests (comprehension items; recommended timed reading speed)

Writing in Science and Technical Subjects (7 items)

ID	PA Core Domain	Standard ID & CCRS	Descriptor	Pace Prescription	Pace Mastery Check
PA-SCI-23	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.A** **Grade level:** D (6th-8th) **CCRS:** 7.W.1.a	Write arguments focused on discipline-specific content.	Writing 530, Composing Essays Writing 240, Facts, Details, and Examples	**Writing 530** Defining introduction, supporting paragraphs, and conclusion of an essay; Explaining the use of transition words to connect paragraphs in an essay (lesson objectives; answer key not machine-readable) **Writing 240** Distinguishing assertion sentences from supporting sentences; Identifying a supporting sentence in a paragraph (lesson objectives; answer key not machine-readable)
PA-SCI-24	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.B** **Grade level:** D (6th-8th) **CCRS:** 7.W.2.a 6-8.WHST.2.a	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	Writing 530, Composing Essays Writing 240, Facts, Details, and Examples	**Writing 530** Defining introduction, supporting paragraphs, and conclusion of an essay; Explaining the use of transition words to connect paragraphs in an essay (lesson objectives; answer key not machine-readable) **Writing 240** Identifying topic and supporting sentences in a descriptive, narrative, explanatory, and persuasive paragraph; Identifying the topic sentence in a paragraph (lesson objectives; answer key not machine-readable)
PA-SCI-25	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.C** **Grade level:** D (6th-8th) **CCRS:** W.7.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Language 320, Transition Words and Phrases Writing 320, Combining with Conjunctive Adverbs Writing 520, Composing Paragraphs Writing 540, Revising	**Language 320** using consequently to link sentences showing cause and effect (frames 2 - 12); using therefore to link sentences showing cause and effect (frames 2 - 12) **Writing 320** Defining conjunctive adverb; Identifying conjunctive adverbs (lesson objectives; answer key not machine-readable) **Writing 520** Using transition words in a paragraph; Developing complete sentences from a list of supporting details (lesson objectives; answer key not machine-readable) **Writing 540** Explaining revising paragraphs, sentences, and transitions Standard VI – Writing Applications Cluster 1; Explaining revising for content, structure, purpose (lesson objectives; answer key not machine-readable)

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PA-SCI-26	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.D** **Grade level:** D (6th-8th) **CCRS:** WHST.6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	Writing 540, Revising Writing 510, Prewriting	**Writing 540** Explaining revising paragraphs, sentences, and transitions Standard VI – Writing Applications Cluster 1; Explaining revising for content, structure, purpose (lesson objectives; answer key not machine-readable) **Writing 510** Generating an appropriate main idea for a group of supporting details; Generating appropriate supporting details for a stated main idea (lesson objectives; answer key not machine-readable)
PA-SCI-27	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.E** **Grade level:** D (6th-8th) **CCRS:** W.7.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	Reading 465, Using the Internet Writing 500, Introducing the Writing Process	**Reading 465** Understanding the Internet (frames 1–3); Evaluating a website (frames 38 – 56) **Writing 500** Explaining prewriting; Defining composing (lesson objectives; answer key not machine-readable)
PA-SCI-28	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.F** **Grade level:** D (6th-8th) **CCRS:** W.7.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	Reading 470, Research and Research Projects	**Reading 470** Knowing questions to evaluate sources (frames 26 – 49); Knowing resources for research (frames 21 – 39)
PA-SCI-29	**Writing in Science and Technical Subjects**	**CC.8.6.6-8.G** **Grade level:** D (6th-8th) **CCRS:** WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source ...	Reading 470, Research and Research Projects Reading 465, Using the Internet	**Reading 470** Knowing questions to evaluate sources (frames 26 – 49); Understanding the difference among direct quotes, **Reading 465** Understanding library catalog searches (frames 27 – 37); Understanding search engines (frames 3 – 16)