



LAB-AIDS CORRELATIONS FOR THE PENNSYLVANIA STATE CONTENT ASSESSMENT ANCHORS

GRADES 6-8

As well as the *SEPUP Pennsylvania Model Curriculum*

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Key to SEPUP Core Science Programs:

SEPUP programs are available as full year courses, or separately, as units, each taking 3-9 weeks to complete, as listed below.

MIDDLE SCHOOL

IAES = Issues and Earth Science, Second Edition

- Studying Soil Scientifically, 1-11
- Rocks and Minerals, 12-23
- Erosion and Deposition, 24-35
- Plate Tectonics, 36-49
- Weather and Atmosphere, 50-70
- The Earth in Space, 71-84
- Exploring Space, 85-98

IALS = Issues and Life Science, Second Edition

- Experimental Design: Studying People Scientifically, 1-10
- Body Works, 11-29
- Cell Biology and Disease, 30-53
- Genetics, 54-71
- Ecology, 72 – 88
- Evolution, 89-101
- Bioengineering, 102-109

IAPS = Issues and Physical Science, Second Edition

- Studying Materials Scientifically, 1-11
- The Chemistry of Materials, 12-29
- Water, 30 – 52
- Energy, 53-72
- Force and Motion, 73-88
- Waves, 89 - 99

Each of the full year programs begins with a “starter” unit sequence on the scientific method in the context of each particular discipline. For example, the Issues and Life Science (IALS) course contains a ten- activity unit called “Experimental Design: Studying People Scientifically,” which uses the science behind clinical trials on human subjects, to frame the study of the life sciences. These are listed first in each course.

<i>SEPUP Course/Activity Numbers</i>	<i>Main Unit Issue or Problem</i>
IAES Issues and Earth Science	
Studying Soils Scientifically, 1-11	Why don't plants grow in the school garden?
Rocks and Minerals, 12-23	How do diamonds made in a lab compare to diamonds mined from the earth?
Erosion and Deposition, 24-35	Where should Boomtown construct the new buildings?
Plate Tectonics, 36-49	Which site would you recommend for storing nuclear waste?
Weather and Atmosphere, 50-70	Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?
The Earth in Space, 71-84	Why are there many different calendars?
Earth and the Solar System, 85-98	What kinds of future space missions should we conduct?
IALS Issues and Life Science	
Studying People Scientifically, 1-10	Which proposals have an experimental design worth funding?
Body Works, 11-29	How can you convince people to make choices that reduce their level of heart disease risk?
Cell Biology and Disease, 30-53	How is an emerging disease spread? What can you do to stop it?
Genetics, 54-71	What are the ethical issues involved in using genetic information?
Ecology, 72-88	What are the trade-offs of introducing a species into a new environment?
Evolution, 89-101	What are the trade-offs in deciding whether to save an endangered species or to re-create an extinct one?
Bioengineering, 102-108	How are new solutions to problems in life science developed?
IAPS Issues and Physical Science	
Studying Materials Scientifically, 1-11	How should unidentified materials be handled?
The Chemistry of Materials, 12-29	When you buy a new product, do you think about what materials it is made of? What will happen to it when you no longer have a use for it?
Water, 30 - 52	What does your community do to make its water safe to drink? Whose responsibility is it?
Energy, 53-72	Can you help a family decide what energy improvements they should invest in?
Force and Motion, 73-88	Should noncommercial vehicles be more alike?
Waves, 89-99	Are there situations in which some waves are harmful to your health?

Key to SEPUP Assessment System:

SEPUP materials include research-based assessment system developed by SEPUP and the Berkeley Evaluation and Assessment Research Group (BEAR) in the University of California Graduate School of Education. Forming the core of the SEPUP Assessment System are the **assessment variables** (content and process skills to be assessed), **assessment questions or tasks** used to gather evidence and **scoring guides** for interpreting students’ responses (correspond to assessment variables).

The seven assessment variables are:

- Designing Investigations (DI)
- Organizing Data (OD)
- Analyzing Data (AD)
- Understanding Concepts (UC)
- Evidence and Trade-offs (ET)
- Communication Skills (CS)
- Group Interaction (GI)

Types of assessment:

Quick Checks (✓) present opportunities for informal formative assessment and may be used prior to instruction to find out what students know or think. They may also be used to help teachers track students’ knowledge of key information or progress in understanding a concept.

Some embedded questions and tasks and all item bank questions are all suitable for summative assessment. Analysis questions are included at the end of each activity.

Citations included in the correlation document are as follows:

IAES 40, 41, 42	40 Q1, 3, 4
IALS 2, 3, 37	41 Q3 UC; [IB] D2
IAPS 1, 2, 3	42 [IB] D4, 6, 8-10, 16

IAES 40, 41, 42 **40 Q1, 3, 4**
41 Q3 UC; [IB] D2
42 [IB] D4, 6, 8-10, 16

means that the standard or benchmark may be assessed using Issues and Earth Science Activity 40 Analysis Question 1, 3 and 4, IAES Activity 43 Analysis Question 3 using Understanding Concepts scoring guide and Item Bank Question D2 from Unit D Plate Tectonics.

For more information on program assessment and using SEPUP rubrics, consult the Teacher’s Guide, TR part III Assessment section.

SEPUP Support for Engineering Design

The Next Generation Science Frameworks (NGSF) notes that science and engineering are somewhat parallel practices and have many similar elements. Scientists ask questions, make observations, and collect and analyze data, in an attempt to make sense of the natural world. Similarly, engineers create, test, and redesign as they respond with solutions to human needs. And just as we use scaffolds in teaching of scientific inquiry to improve student learning and practice, so do we use scaffolds in teaching about engineering for our students. The NSGF emphasizes three major phases of the engineering design process.

- DESIGN: Creates design, prototype or plan, noting constraints of proposed use
- TEST: Tests design, prototype or plan, collecting qualitative or quantitative data
- REDESIGN: Evaluates prototype, design or plan, suggests further changes as needed

In addition, the NSGF emphasizes the role of design in solving human problems, and of designers in developing criteria for solutions, evaluating solutions, and determining the tradeoffs involved in a design or solution.

The table below shows SEPUP activities that support major elements of engineering design. Some support the initial stages of design, criteria development, and evaluation that precede the full design cycle by suggesting or evaluating scientific or technological solutions to real-world problems. Others involve students in one or all steps of the design cycle as they build, test, and/or redesign prototypes.

Engineering and Design Practices in SEPUP

Course activity with description	Students suggest or evaluate a solution	Students engage in the engineering process		
		Design	Test	Re-design
IAES11: Recommend a soil improvement plan	X			
IAES 32: Design a coastal breakwater		X	X	X
IAES 35: Recommend a site plan for housing development		X		
IAES 49: Evaluate sites for nuclear waste disposal	X			
IAES 67: Design/build wind vane/anemometer		X	X	X
IAES 98: Recommend a space	X			

mission				
IALS 48: Design an improved hand-washing procedure		X	X	X
IALS 88: Suggest a plan for preventing zebra mussel spread	X			
IALS 104: Design artificial heart valve		X		
IALS 105: Design an artificial bone		X	X	X
IALS 107: Design an energy bar		X	X	X
IALS 108: Design a prosthetic limb		X	X	X
IAPS 12: Recommend a material for a drink container	X			
IAPS 13: Construct a product life cycle for a drink container	X			
IAPS 29: Evaluate options to recommend a "green" computer	X			
IAPS 60: Design an ice preservation chamber		X	X	X
IAPS 63: Improve a calorimeter design			X	X
IAPS 69: Design a better solar collector		X	X	X
IAPS 70: Design a warm & cool home		X		
IAPS 72: Recommend an energy-improvement plan for a home	X	X	X	X
IAPS 73: Evaluate vehicle safety features		X		
IAPS 85: Design a crash test dummy		X		

GRADE 8 ASSESSMENT ANCHOR	SEPUP Core Curriculum	
	LOCATION	ASSESSMENT
ASSESSMENT ANCHOR		
S8.A.1 Reasoning and Analysis		
S8.A.1.1 Explain, interpret, and apply scientific, environmental, or technological knowledge presented in a variety of formats (e.g., visuals, scenarios, graphs). Reference: 3.2.7.A, 3.2.7.B		
S8.A.1.1.1 Distinguish between a scientific theory and an opinion, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices.	IAPS 6, 7, 11... IAES 36, 40, 41... IALS 39, 40, 41...	6 AQ1 AD [IB] A3, A4 7 AQ 1 AD, AQ1 UC, [IB] A5, A7, A8 11 AQ1 ET, [IB] A17 36 AQ2 ET 41 AQ3 UC; [IB] D2 39 AQ2 DCI, [IB] C6 40 AQ3 DCI, [IB] C15, C18
S8.A.1.1.2 Explain how certain questions can be answered through scientific inquiry and/or technological design.	IAPS 38, 41-42, 46... IAES 16, 20, 32... IALS 5, 8, 14, 17...	38 AQ 1-3 AD [IB] C2 41 AQ2 AD 16 AQ3 RE; [IB] B7-10 20 Proc GI; [IB] B6 32 Proc GI; [IB] C11, C12 5 [IB] A11-14 8 [IB] A11-16 14 [IB] B16 17 [IB] B1, B8, B21

GRADE 8 ASSESSMENT ANCHOR	SEPUP Core Curriculum	
	LOCATION	ASSESSMENT
S8.A.1.1.3 Use evidence, such as observations or experimental results, to support inferences about a relationship.	IAPS 40, 45-46... IAES 24, 26, 28... IALS 26, 27, 32...	40 AQ1 ET; [IB] C5-7, C19 45 [IB] C8, C20 46 Proc OD, GI; [IB] C9 26 [IB] C4-6 28 Proc GI; [IB] C2, C7 26 AQ 4 UC, [IB] B30-31 27 [IB] B32 32 AQ4 ET, [IB] C9
S8.A.1.1.4 Develop descriptions, explanations, predictions, and models using evidence.	IAPS 17, 19, 20, 26... IAES 21, 22, 25... IALS 12, 14, 18...	17 AQ6 UC 19 [IB] B12-14 22 AQ7 UC; [IB] B4-6, B11 25 [IB] C4-6 12 [IB] B12, B15 14 [IB] B16 18 [IB] B9, B17-18, B29
S8.A.1.2 Identify and explain the impacts of applying scientific, environmental, or technological knowledge to address solutions to practical problems. <i>Reference: 3.2.7.C, 3.8.7.A, 3.8.7.B, 4.3.7.A</i>		
S8.A.1.2.1 Describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments (e.g., air/space travel, genetic engineering, nuclear fission/fusion, artificial intelligence, lasers, organ transplants).	IAES 97 IALS 69-71, 72-73, 108 IAPS 36, 49	97 AQ1 RE 69 [IB] D19 70 AQ2 DCI [IB] D19 71 AQ1 GI, AQ2 ET

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	LOCATION	ASSESSMENT
		72 AQ5 UC, [IB] E2, 3, E5, E13-14 73 [IB] E1, E12, E24 36 AQ8 UC 49 [IB] C14-18, C21
S8.A.1.2.2 Identify environmental issues and explain their potential long-term health effects (e.g., pollution, pest controls, vaccinations).	IALS 72-73 IAES 36, 49 IAPS 22, 29, 39, 51	72 AQ5 UC, [IB] E2, 3, E5, E13-14 73 [IB] E1, E12, E24 36 AQ2 ET 49 AQ2 ET 22 Proc OD 29 AQ1 ET; [IB] B22-23 39 AQ7 SI; [IB] C3-4 51 AQ4 DI, DI; AQ5 ET, [IB] C24
S8.A.1.2.3 Describe fundamental scientific or technological concepts that could solve practical problems (e.g., Newton’s laws of motion, Mendelian genetics).	IAPS 13, 23, 29, 64, 73, 82, 84 IAES 9-10, 23 IALS 46, 60, 102-109	3 Proc DI; [IB] A16 29 AQ1 ET; [IB] B22-23 64 AQ3 ET, AQ4 AD, [IB] D7 82 AQ3 RE; [IB] E3, 9, 12 84 [IB] E16 9 [IB] A6 10 Proc GI 23 AQ3 ET 46 AQ1 UC, [IB] C27, C36

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	LOCATION	ASSESSMENT
		60 AQ1 DCI [IB] D2
S8.A.1.2.4 Explain society’s standard of living in terms of technological advancements and how these advancements impact on agriculture (e.g., transportation, processing, production, storage).	IALS 55, 60, 62	55 AQ2 UC 60 AQ1 DCI [IB] D2 62 AQ4a UC
S8.A.1.3 Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems. Reference: 3.1.7.E, 4.7.7.C, 4.8.7.C		
S8.A.1.3.1 Use ratio to describe change (e.g., percents, parts per million, grams per cubic centimeter, mechanical advantage).	IAPS 9, 10, 40, 67, 69, 78	9 AQ3 UC, [IB] A10-12 10 AQ1 AD, Proc DI; [IB] A10-12 40 AQ1 ET; [IB] C5-7, C19 67 AQ5 AD, [IB] D-14 69 [IB] D11, D15, D18 78 [IB] E2, 3, 8
S8.A.1.3.2 Use evidence, observations, or explanations to make inferences about change in systems over time (e.g., carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the variables affecting these changes.	IALS 72, 77, 93 IAES 40-42 IAPS 25, 27, 49	72 AQ5 UC, [IB] E2, 3, E5, E13-14 77 AQ4 DCI, AQ7 DCI 93 AQ4 UC, [IB] F8-11 41 AQ3 UC; [IB] D2 42 [IB] D4, 6, 8-10, 16
S8.A.1.3.3 Examine systems changing over time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this	IALS 72, 77, 93 IAES 40-42	72 AQ5 UC, [IB] E2, 3, E5, E13-14 77 AQ4 DCI, AQ7 DCI

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change.	IAPS 25, 27, 49	93 AQ4 UC, [IB] F8-11 41 AQ3 UC; [IB] D2 42 [IB] D4, 6, 8-10, 16 27 AQ2 CS, AQ3 ET 49 [IB] C14-18, C21
S8.A.1.3.4 Given a scenario, explain how a dynamically changing environment provides for the sustainability of living systems.	IALS 96	96 AQ2 DCI
ASSESSMENT ANCHOR S8.A.2 Processes, Procedures, and Tools of Scientific Investigations		
S8.A.2.1 Apply knowledge of scientific investigation or technological design in different contexts to make inferences to solve problems. Reference: 3.2.7.B, 3.2.7.D, 3.1.7.C, 3.1.7.D		
S8.A.2.1.1 Use evidence, observations, or a variety of scales (e.g., mass, distance, volume, temperature) to describe relationships.	IAPS 24, 40 IAES 21, 27, 38, 75, 93 IALS 3, 8, 14, 17, 19...	24 [IB] B14-16 40 AQ1 ET; [IB] C5-7, C19 27 Proc OD; [IB] C8 38 AQ5 UC; [IB] D1, D15 93 [IB] G5 3 AQ1 ET, AQ4 UC, [IB] A3, A7, A17 8 [IB] A11-16

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		14 [IB] B16 17 [IB] B1, B8, B21 19 [IB] B14
S8.A.2.1.2 Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.	IAPS 2, 8, 25, 32... IAES 2, 6, 13, 16... IALS 21, 27, 41, 44	2 AQ2 UC 8 AQ6 UC; [IB] A9 32 Proc GI 2 AQ3 RE 6 AQ3 AD, [IB] A8-9 16 AQ3 RE; [IB] B7-10 21 [IB] B19 27 [IB] B32 44 Act GI, [IB] C2, C35
S8.A.2.1.3 Design a controlled experiment by specifying how the independent variables will be manipulated, how the dependent variable will be measured, and which variables will be held constant.	IAPS 3, 10, 18, 27... IAES 16, 20, 32... IALS 5, 8, 14, 17...	3 Proc DI; [IB] A16 10 AQ1 AD, Proc DI; [IB] A10-12 18 AQ3 AD, [IB] B19-21 27 AQ2 CS, AQ3 ET 16 AQ3 RE; [IB] B7-10 20 Proc GI; [IB] B6 32 Proc GI; [IB] C11, C12 5 [IB] A11-14 8 [IB] A11-16 14 [IB] B16 17 [IB] B1, B8, B21

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S8.A.2.1.4 Interpret data/observations; develop relationships among variables based on data/observations to design models as solutions.	IAPS 6-10... IAES 2, 6, 7, 10... IALS 3, 14, 17...	6 AQ1 AD [IB] A3, A4 7 AQ 1 AD, AQ1 UC, [IB] A5, A7, A8 8 AQ6 UC; [IB] A9 9 AQ3 UC, [IB] A10-12 10 AQ1 AD, Proc DI; [IB] A10-12 2 AQ3 RE 6 AQ3 AD, [IB] A8-9 7 [IB] A9 10 Proc GI 3 AQ1 ET, AQ4 UC, [IB] A3, A7, A17 14 [IB] B16 17 [IB] B1, B8, B21
S8.A.2.1.5 Use evidence from investigations to clearly communicate and support conclusions.	IAPS 6-10... IAES 5, 7, 10, 11... IALS 12, 14, 15...	6 AQ1 AD [IB] A3, A4 7 AQ 1 AD, AQ1 UC, [IB] A5, A7, A8 8 AQ6 UC; [IB] A9 9 AQ3 UC, [IB] A10-12 10 AQ1 AD, Proc DI; [IB] A10-12 5 AQ5 UC; [IB] A3-4 7 [IB] A9 10 Proc GI 11 AQ2 RE, ET; [IB] A11-

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	LOCATION	ASSESSMENT
		<p>14</p> <p>12 [IB] B12, B15</p> <p>14 [IB] B16</p> <p>15 AQ3 UC, [IB] B2, B5, B25-28</p>
S8.A.2.1.6 Identify a design flaw in a simple technological system and devise possible working solutions.	IALS 104-106	Assessed in student book AQ
<p>S8.A.2.2 Apply appropriate instruments for a specific purpose and describe the information the instrument can provide.</p> <p><i>Reference: 3.3.7.A, 3.7.7.B, 3.1.7.D</i></p>		
S8.A.2.2.1 Describe the appropriate use of instruments and scales to accurately and safely measure time, mass, distance, volume, or temperature under a variety of conditions.	<p>IAPS 8-10...</p> <p>IAES 12, 13, 21...</p> <p>IALS 14, 16, 17...</p>	<p>8 AQ6 UC; [IB] A9</p> <p>9 AQ3 UC, [IB] A10-12</p> <p>10 AQ1 AD, Proc DI; [IB] A10-12</p> <p>14 [IB] B16</p> <p>16 AQ4 UC, [IB] B6</p> <p>17 [IB] B1, B8, B21</p>
S8.A.2.2.2 Apply appropriate measurement systems (e.g., time, mass, distance, volume, temperature) to record and interpret observations under varying conditions.	<p>IAPS 8-10...</p> <p>IAES 12, 13, 21...</p> <p>IALS 14, 16, 17...</p>	<p>8 AQ6 UC; [IB] A9</p> <p>9 AQ3 UC, [IB] A10-12</p> <p>10 AQ1 AD, Proc DI; [IB] A10-12</p> <p>14 [IB] B16</p> <p>16 AQ4 UC, [IB] B6</p> <p>17 [IB] B1, B8, B21</p>
S8.A.2.2.3 Describe ways technology (e.g., microscope, telescope, micrometer,	IALS 35, 37...	35 [IB] C10, C33, C34

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hydraulics, barometer) extends and enhances human abilities for specific purposes.	IAES 67, 85-87... IAPS 41, 51, 85...	37 Act UC, [IB] C14 67 Proc DI 85 [IB] G1 87 [IB] G8, G15 41 AQ2 AD 51 AQ4 DI, DI; AQ5 ET, [IB] C24 85 Proc CS; [IB] E16
ASSESSMENT ANCHOR S8.A.3 Systems, Models, and Patterns		
S8.A.3.1 Explain the parts of a simple system, their roles, and their relationships to the system as a whole. Reference: 3.1.7.A, 3.4.7.B, 4.3.7.C, 4.2.7.D, 4.6.7.A		
S8.A.3.1.1 Describe a system (e.g., watershed, circulatory system, heating system, agricultural system) as a group of related parts with specific roles that work together to achieve an observed result.	IALS 12, 18, 42... IAES 38, 62, 69 IAPS 65, 66	12 [IB] B12, B15 18 [IB] B9, B17-18, B29 42 [IB] D3, D7, D16-10, C23 38 AQ5 UC; [IB] D1, D15 62 AQ4 SI; [IB] E3, 9, 11, 15 69 Proc CS; [IB] E14 65 Proc DI; D13 66 Proc DI; [IB] D16
S8.A.3.1.2 Explain the concept of order in a system [e.g., (first to last: manufacturing steps, trophic levels); (simple to complex:	IALS 12, 18, 42...	12 [IB] B12, B15

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cell, tissue, organ, organ system)].	IAES 38, 62, 69 IAPS 65, 66	18 [IB] B9, B17-18, B29 42 [IB] D3, D7, D16-10, C23 38 AQ5 UC; [IB] D1, D15 62 AQ4 SI; [IB] E3, 9, 11, 15 69 Proc CS; [IB] E14 65 Proc DI; D13 66 Proc DI; [IB] D16
S8.A.3.1.3 Distinguish among system inputs, system processes, system outputs, and feedback (e.g., physical, ecological, biological, informational).	IALS 12, 18, 42... IAES 38, 62, 69 IAPS 65, 66	12 [IB] B12, B15 18 [IB] B9, B17-18, B29 42 [IB] D3, D7, D16-10, C23 38 AQ5 UC; [IB] D1, D15 62 AQ4 SI; [IB] E3, 9, 11, 15 69 Proc CS; [IB] E14 65 Proc DI; D13 66 Proc DI; [IB] D16
S8.A.3.1.4 Distinguish between open loop (e.g., energy flow, food web) and closed loop (e.g., materials in the nitrogen and carbon cycles, closed-switch) systems.	IALS 79, 80... IAES 62 IAPS 25	79 AQ1 UC, [IB] E2-3, E7-11, E16, E35 80 [IB] E2-3, E7-10, E15, E16, E25 62 AQ4 SI; [IB] E3, 9, 11, 15
S8.A.3.1.5 Explain how components of natural and human-made systems play different roles in a working system.	IALS 12, 18, 42... IAES 38, 62, 69	12 [IB] B12, B15 18 [IB] B9, B17-18, B29

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	LOCATION	ASSESSMENT
	IAPS 65, 66	42 [IB] D3, D7, D16-10, C23 38 AQ5 UC; [IB] D1, D15 62 AQ4 SI; [IB] E3, 9, 11, 15 69 Proc CS; [IB] E14 65 Proc DI; D13 66 Proc DI; [IB] D16
S8.A.3.2 Apply knowledge of models to make predictions, draw inferences, or explain technological concepts. <i>Reference: 3.1.7.B, 3.2.7.B, 4.1.7.B</i>		
S8.A.3.2.1 Describe how scientists use models to explore relationships in natural systems (e.g., an ecosystem, river system, the solar system).	IAPS 17, 19, 20... IAES 21, 22, 25... IALS 12, 14, 18...	17 AQ6 UC 19 [IB] B12-14 22 AQ7 UC; [IB] B4-6, B11 25 [IB] C4-6 12 [IB] B12, B15 14 [IB] B16 18 [IB] B9, B17-18, B29
S8.A.3.2.2 Describe how engineers use models to develop new and improved technologies to solve problems.	IALS 104-106, 109	Assessed in student book AQ
S8.A.3.2.3 Given a model showing simple cause- and-effect relationships in a natural system, predict results that can be used to test the assumptions in the model (e.g., photosynthesis, water cycle, diffusion, infiltration).	IAES 62 IAPS 39 IALS 40, 80	62 AQ4 SI; [IB] E3, 9, 11, 15 39 AQ7 SI; [IB] C3-4 40 AQ3 DCI, [IB] C15, C18

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	LOCATION	ASSESSMENT
		80 [IB] E2-3, E7-10, E15, E16, E25
<p>S8.A.3.3 Describe repeated processes or recurring elements in natural, scientific, and technological patterns.</p> <p><i>Reference: 3.1.7.C, 3.2.7.B</i></p>		
<p>S8.A.3.3.1 Identify and describe patterns as repeated processes or recurring elements in human-made systems (e.g., trusses, hub-and-spoke system in communications and transportation systems, feedback controls in regulated systems).</p>	<p>IALS 18, 24...</p> <p>IAES 22, 62...</p> <p>IAPS 16, 66</p>	<p>18 [IB] B9, B17-18, B29</p> <p>24 AQ 2 UC, [IB] B22, B24</p> <p>22 AQ7 UC; [IB] B4-6, B11</p> <p>62 AQ4 SI; [IB] E3, 9, 11, 15</p> <p>16 [IB] B7-11</p> <p>66 Proc D1; [IB] D16</p>
<p>S8.A.3.3.2 Describe repeating structure patterns in nature (e.g., veins in a leaf, tree rings, crystals, water waves) or periodic patterns (e.g., daily, monthly, annually).</p>	<p>IAES 22, 73-75, 79, 83</p> <p>IALS 12, 42, 69,</p> <p>IAPS 15-16, 17, 20...</p>	<p>22 AQ7 UC; [IB] B4-6, B11</p> <p>73 AQ1 UC</p> <p>74 [IB] F1-2</p> <p>79 [IB] F10-12, F14-16</p> <p>83 AQ5 ET</p> <p>12 [IB] B12, B15</p> <p>42 [IB] D3, D7, D16-10, C23</p> <p>69 [IB] D19</p> <p>15 AQ5 UC [IB] B7-11</p> <p>16 [IB] B7-11</p>

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	LOCATION	ASSESSMENT
ASSESSMENT ANCHOR S8.B.1 Structure and Function of Organisms		
S8.B.1.1 Describe and compare structural and functional similarities and differences that characterize diverse living things. Reference: 3.3.7.A, 3.3.7.B, 4.6.7.A, 4.7.7.B		
S8.B.1.1.1 Describe the structures of living things that help them function effectively in specific ways (e.g., adaptations, characteristics).	IALS 74, 75, 76, 95, 96	74 AQ3 CM, [IB] E6, E18 75 [IB] E4, E36 76 AQ 1-2 95 [IB] F18-21 96 AQ2 DCI
S8.B.1.1.2 Compare similarities and differences in internal structures of organisms (e.g., invertebrate/vertebrate, vascular/nonvascular, single-celled/multi-celled) and external structures (e.g., appendages, body segments, type of covering, size, shape).	IALS 75, 76 See also web extensions for ___ at www.sepuplhs.org	75 [IB] E4, E36 76 AQ 1-2
S8.B.1.1.3 Apply knowledge of characteristic structures to identify or categorize organisms (i.e., plants, animals, fungi, bacteria, and protista).	IALS 44, 75, 76	44 Act GI, [IB] C2, C35 75 [IB] E4, E36 76 AQ 1-2
S8.B.1.1.4 Identify the levels of organization from cell to organism and describe how specific structures (parts), which underlie larger systems, enable the system to function as a whole.	IALS 42	42 [IB] D3, D7, D16-10, C23
S8.B.2.1 Explain the basic concepts of natural selection.		

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<i>Reference: 3.3.7.D, 4.7.7.A, 4.7.7.B</i>		
S8.B.2.1.1 Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.	IALS 94-96	94 AQ3 UC, [IB] F16, F26 95 [IB] F18-21 96 AQ2 DCI
S8.B.2.1.2 Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.	IALS 94-96	94 AQ3 UC, [IB] F16, F26 95 [IB] F18-21 96 AQ2 DCI
S8.B.2.1.3 Explain that mutations can alter a gene and are the original source of new variations.	IALS 96, 97	96 AQ2 DCI 97 AQ2 CM, [IB] F15, F22-25, F27-28, F30-31
S8.B.2.1.4 Describe how selective breeding or biotechnology can change the genetic makeup of organisms.	IALS 60, 62, 63	60 [IB] E3, E8-9 62 AQ4 SI; [IB] E3, 9, 11, 15 63 AQ4 UC; [IB] E4
S8.B.2.1.5 Explain that adaptations are developed over long periods of time and are passed from one generation to another.	IALS 94-96	94 AQ3 UC, [IB] F16, F26 95 [IB] F18-21 96 AQ2 DCI
S8.B.2.2 Explain how a set of genetic instructions determines inherited traits of organisms.		

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<i>Reference: 3.3.7.C</i>		
S8.B.2.2.1 Identify and explain differences between inherited and acquired traits.	IALS 54-55, 60, 62, 94	54 Act DCI, [IB] D2 55 AQ2 UC 60 AQ1 DCI [IB] D2 62 AQ4a UC 94 AQ3 UC, [IB] F16, F26
S8.B.2.2.2 Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, and that traits are inherited.	IALS 60-65	61 [IB] D5, D12-16 62 AQ4a UC 63 [IB] D1, D2-5, D8-11, D18, D22-24 64 AQ 1 DCI 65 AQ8 UC
ASSESSMENT ANCHOR S8.A.3 Systems, Models, and Patterns		
S8.B.3.1 Explain the relationships among and between organisms in different ecosystems and their abiotic and biotic components. <i>Reference: 4.4.7.B, 4.6.7.A, 4.1.7.C, 4.1.7.D</i>		
S8.B.3.1.1 Explain the flow of energy through an ecosystem (e.g., food chains, food webs).	IALS 79-80	79 AQ1 UC, [IB] E2-3, E7-11, E16, E35 80 [IB] E2-3, E7-10, E15, E16, E25
S8.B.3.1.2 Identify major biomes and describe abiotic and biotic components (e.g.,	NC	

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abiotic: different soil types, air, water sunlight; biotic: soil microbes, decomposers).		
S8.B.3.1.3 Explain relationships among organisms (e.g., producers/consumers, predator/prey) in an ecosystem.	IALS 79-80, 84, 87	79 AQ1 UC, [IB] E2-3, E7-11, E16, E35 80 [IB] E2-3, E7-10, E15, E16, E25 84 [IB] E19-20, E26-27, E34 87 AQ1 ET
S8.B.3.2 Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems. <i>Reference: 3.1.7.C, 4.3.7.B, 4.6.7.C, 4.8.7.D, 3.1.7.E, 4.3.7.C</i>		
S8.B.3.2.1 Use evidence to explain factors that affect changes in populations (e.g., deforestation, disease, land use, natural disaster, invasive species).	IALS 77-78	77 AQ4 DCI, AQ7 DCI 78 [IB] E7-10, E16
S8.B.3.2.2 Use evidence to explain how diversity affects the ecological integrity of natural systems.	IALS 72-73, 77	72 AQ5 UC, [IB] E2, 3, E5, E13-14 73 [IB] E1, E12, E24 77 AQ4 DCI, AQ7 DCI
S8.B.3.2.3 Describe the response of organisms to environmental changes (e.g., changes in climate, hibernation, migration, coloration) and how those changes affect survival.	IALS 95-96	95 [IB] F18-21 96 AQ2 DCI

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<p>S8.B.3.3 Explain how renewable and non-renewable resources provide for human needs or how these needs impact the environment.</p> <p>Reference: 3.6.7.A, 4.4.7.A, 4.4.7.C, 4.5.7.C, 3.8.7.C</p>		
<p>S8.B.3.3.1 Explain how human activities may affect local, regional, and global environments.</p>	<p>IALS 72, 85, 87</p> <p>IAES 8, 36, 49</p> <p>IAPS 22, 29, 51</p>	
<p>S8.B.3.3.2 Explain how renewable and nonrenewable resources provide for human needs (i.e., energy, food, water, clothing, and shelter).</p>	<p>IAES 62</p> <p>IAPS 39, 64, 69-70</p>	<p>62 AQ4 SI; [IB] E3, 9, 11, 15</p> <p>39 AQ7 SI; [IB] C3-4</p> <p>64 AQ3 ET, AQ4 AD, [IB] D7</p> <p>69 [IB] D11, D15, D18</p> <p>70 Proc GI; [IB] D12, D-15</p>
<p>S8.B.3.3.3 Describe how waste management affects the environment (e.g., recycling, composting, landfills, incineration, sewage treatment).</p>	<p>IAPS 4, 13, 22, 29</p> <p>IAES 36</p>	<p>4 [IB] A-15</p> <p>13 Proc RE, GI; [IB] B2-3</p> <p>22 Proc OD</p> <p>29 AQ1 ET; [IB] B22-23</p> <p>36 AQ2 ET</p>
<p>S8.B.3.3.4 Explain the long-term effects of using integrated pest management (e.g., herbicides, natural predators, biogenetics) on the environment.</p>	<p>NC</p>	
<p>ASSESSMENT ANCHOR</p> <p>S8.C.1 Structure, Properties, and Interaction</p>		

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of Matter and Energy		
<p>S8.C.1.1 Explain concepts about the structure and properties (physical and chemical) of matter.</p> <p>Reference: 3.4.7.A</p>		
<p>S8.C.1.1.1 Explain the differences among elements, compounds, and mixtures.</p>	IAPS 5, 14, 16	<p>5 Proc GI</p> <p>14 [IB] B4-6</p> <p>16 [IB] B7-11</p>
<p>S8.C.1.1.2 Use characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points, streak test).</p>	IAPS 14, 20	14 [IB] B4-6
<p>S8.C.1.1.3 Identify and describe reactants and products of simple chemical reactions.</p>	IAPS 14, 19, 27	<p>14 [IB] B4-6</p> <p>19 [IB] B12-14</p> <p>27 AQ2 CS, AQ3 ET</p>
<p>ASSESSMENT ANCHOR</p> <p>S8.C.2 Forms, Sources, Conversion, and Transfer of Energy</p>		
<p>S8.C.2.1 Describe energy sources, transfer of energy, or conversion of energy.</p> <p>Reference: 3.4.7.B, 4.2.7.B</p>		
<p>S8.C.2.1.1 Distinguish among forms of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) and sources of energy (i.e., renewable and nonrenewable energy)</p>	IAPS 54, 55, 56, 58, 64	<p>54 Proc DI; [IB] D1</p> <p>55 AQ1 UC [IB] D1</p> <p>58 AQ2 UC, [IB] D4-5, D8</p> <p>64 AQ3 ET, AQ4 AD, [IB] D7</p>

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S8.C.2.1.2 Explain how energy is transferred from one place to another through convection, conduction, or radiation.	IAPS 59 IAES 46	46 [IB] D16
S8.C.2.1.3 Describe how one form of energy (e.g., electrical, mechanical, chemical, light, sound, nuclear) can be converted into a different form of energy.	IAPS 58	58 AQ2 UC, [IB] D4-5, D8
S8.C.2.2 Compare the environmental impact of different energy sources chosen to support human endeavors. <i>Reference: 3.4.7.B, 4.2.7.B</i>	IAPS 64 IAES 36	64 AQ3 ET, AQ4 AD, [IB] D7 36 AQ2 ET
S8.C.2.2.1 Describe the Sun as the major source of energy that impacts the environment.	IAES 92 IALS 80 IAPS 68-70	92 [IB] G2, G11 80 [IB] E2-3, E7-10, E15, E16, E25 68 PROC DI, [IB] D18 69 [IB] D11, D15, D18 70 Proc GI; [IB] D12, D-15
S8.C.2.2.2 Compare the time span of renewability for fossil fuels and the time span of renewability for alternative fuels.	IAPS 64	64 AQ3 ET, AQ4 AD, [IB] D7
S8.C.2.2.3 Describe the waste (i.e., kind and quantity) derived from the use of renewable and nonrenewable resources and their potential impact on the environment.	IAPS 64 IAES 36	64 AQ3 ET, AQ4 AD, [IB] D7 36 AQ2 ET
ASSESSMENT ANCHOR		
S8.C.3 Principles of Motion and Force		
S8.C.3.1 Describe the effect of multiple forces on the movement, speed, or direction of an object.		

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<i>Reference: 3.4.7.C, 3.6.7.C</i>		
S8.C.3.1.1 Describe forces acting on objects (e.g., friction, gravity, balanced versus unbalanced).	IAPS 78, 80, 81 IAES 96	78 [IB] E2, 3, 8 80 AQ2; [IB] E2, 3, 11, 20 81 [IB] E3, 13, 15 96 [IB] G 4, 7, 19
S8.C.3.1.2 Distinguish between kinetic and potential energy.	IAPS 55-56, 58	55 AQ1 UC [IB] D1 58 AQ2 UC, [IB] D4-5, D8
S8.C.3.1.3 Explain that mechanical advantage helps to do work (physics) by either changing a force or changing the direction of the applied force (e.g., simple machines, hydraulic systems).	NC	
ASSESSMENT ANCHOR S8.D.1 Earth Features and Processes that Change Earth and Its Resources		
S8.D.1.1 Describe constructive and destructive natural processes that form different geologic structures and resources. <i>Reference: 3.5.7.A, 4.4.7.B</i>		
S8.D.1.1.1 Explain the rock cycle as changes in the solid earth and rock types (igneous – granite, basalt, obsidian, pumice; sedimentary – limestone, sandstone, shale, coal; and metamorphic – slate, quartzite, marble, gneiss).	IAES 19-22	20 Proc GI; [IB] B6 22 AQ7 UC; [IB] B4-6, B11
S8.D.1.1.2 Describe natural processes that change Earth’s surface (e.g., landslides, volcanic eruptions, earthquakes, mountain building, new land being formed,	IAES 19, 28, 29, 30, 37, 47-48	28 Proc GI; [IB] C2, C7 29 AQ2 UC; [IB] C1, C3

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weathering, erosion, sedimentation, soil formation).		30 [IB] C2, C10 47 [IB] D16 48 AQ4 UC; [IB] D14, D16
S8.D.1.1.3 Identify soil types (i.e., humus, topsoil, subsoil, loam, loess, and parent material) and their characteristics (i.e., particle size, porosity, and permeability) found in different biomes and in Pennsylvania, and explain how they formed.	IAES 3-7 PA not specifically mentioned	3 AQ1 ET, AQ4 UC, [IB] A3, A7, A17 4 AQ 5 UC, [IB] A17 5 [IB] A11-14 7 AQ5 DCI & CM, [IB] A4-6
S8.D.1.1.4 Explain how fossils provide evidence about plants and animals that once lived throughout Pennsylvania’s history (e.g., fossils provide evidence of different environments).	IAES 19, 21, 40, 41 IALS 90-91 *PA not specifically mentioned	41 AQ3 UC; [IB] D2 90 AQ3 CM, [IB] F5 91 AQ4 UC, [IB] F12-14
ASSESSMENT ANCHOR S8.D.1 Earth Features and Processes that Change Earth and Its Resources		
S8.D.1.2 Describe the potential impact of human- made processes on changes to Earth’s resources and how they affect everyday life. <i>Reference: 3.5.7.B, 3.6.7.A, 4.2.7.C</i>		
S8.D.1.2.1 Describe a product’s transformation process from production to consumption (e.g., prospecting, propagating, growing, maintaining, adapting, treating, converting, distributing, disposing) and explain the process’s potential impact on Earth’s resources.	IAPS 13	13 Proc RE, GI; [IB] B2-3
S8.D.1.2.2 Describe potential impacts of	IAES 36	36 AQ2 ET

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human-made processes (e.g., manufacturing, agriculture, transportation, mining) on Earth’s resources, both nonliving (i.e., air, water, or earth materials) and living (i.e., plants and animals).	IAPS 22, 24, 26, 27 IALS 72-73, 87	22 Proc OD 24 [IB] B14-16 27 AQ2 CS, AQ3 ET 72 AQ5 UC, [IB] E2, 3, E5, E13-14 73 [IB] E1, E12, E24
S8.D.1.3 Describe characteristic features of Earth’s water systems or their impact on resources. <i>Reference: 3.5.7.D, 4.3.7.B, 4.1.7.A, 4.1.7.B, 4.1.7.C</i>		
S8.D.1.3.1 Describe the water cycle and the physical processes on which it depends (i.e., evaporation, condensation, precipitation, transpiration, runoff, infiltration, energy inputs, and phase changes).	IAES 61, 62 IAPS 39	62 AQ4 SI; [IB] E3, 9, 11, 15 39 AQ7 SI; [IB] C3-4
S8.D.1.3.2 Compare and contrast characteristics of freshwater and saltwater systems on the basis of their physical characteristics (i.e., composition, density, and electrical conductivity) and their use as natural resources.	NC	
S8.D.1.3.3 Distinguish among different water systems (e.g., wetland systems, ocean systems, river systems, watersheds) and describe their relationships to each other as well as to landforms.	IAES 28, 30, 56	28 Proc GI; [IB] C2, C7 30 [IB] C2, C10 56 Proc GI
S8.D.1.3.4 Identify the physical characteristics of a stream and how these characteristics determine the types of organisms found within the stream environment (e.g., biological diversity, water	IAES 28-29	28 Proc GI; [IB] C2, C7 29 AQ2 UC; [IB] C1, C3

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quality, flow rate, tributaries, surrounding watershed).		
ASSESSMENT ANCHOR S8.D.2 Weather, Climate, and Atmospheric Processes		
S8.D.2.1 Explain how pressure, temperature, moisture, and wind are used to describe atmospheric conditions that affect regional weather or climate. <i>Reference: 3.5.7.C</i>		
S8.D.2.1.1 Explain the impact of water systems on the local weather or the climate of a region (e.g., lake effect snow, land/ocean breezes).	IAES 57, 59, 60, 69	57 [IB] E10 60 [IB] E3, E8-9 69 Proc CS; [IB] E14
S8.D.2.1.2 Identify how global patterns of atmospheric movement influence regional weather and climate.	IAES 63-66	63 AQ4 UC; [IB] E4 64 [IB] E5 66 AQ2 UC; [IB] E12-13
S8.D.2.1.3 Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.	IAES 60	60 [IB] E3, E8-9
ASSESSMENT ANCHOR S8.D.3 Composition and Structure of the Universe		
S8.D.3.1 Explain the relationships between and among the objects of our solar system. <i>Reference: 3.4.7.D</i>		
S8.D.3.1.1 Describe patterns of earth's movements (i.e., rotation and revolution) in relation to the moon and sun (i.e., phases,	IAES 74-75, 77-78, 80, 82	74 [IB] F1-2 77 [IB] F10-12

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eclipses, and tides)		78 AQ2 UC 80 [IB] F4-9 82 AQ5 UC, [IB] F5, F8
S8.D.3.1.2 Describe the role of gravity as the force that governs the movement of the solar system and universe.	IAES 95-96	95 AQ4 AD; [IB] G10, 12 96 [IB] G 4, 7, 19
S8.D.3.1.3 Compare and contrast characteristics of celestial bodies found in the solar system (e.g., moons, asteroids, comets, meteors, inner and outer planets).	IAES 84, 88-90	84 [IB] F13 88 AQ2 UC, [IB] G3, G13, G17 89 Proc RE; [IB] G6, G14 90 [IB] G9, 16, 18