LAB-AIDS CORRELATIONS FOR THE 2016 INDIANA ACADEMIC SCIENCE STANDARDS

GRADES 6-8

As well as the ***SEPUP Indiana 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.

Recommended Scope and Sequence Indiana Academic Science Standards 2016

Grade 6

SEPUP Course/Activity Numbers	***Main Unit Issue***
IALS *Issues and Life Science*:	
Experimental Design: Studying People Scientifically 1-10	Which proposals have an experimental design worth funding?
Ecology 72-88	What are the trade-offs of introducing a species into a new environment?
IAES *Issues and Earth Science*:	
Earth in Space 71-84	Why are there many different calendars?
Exploring Space 85-98	What kinds of future space missions should we conduct?
IAPS *Issues and Physical Science*:	
Energy 53-72	Can you help a family decide what energy improvements they should invest in?
Waves 89-99	Are there situations in which some waves are harmful to your health?

Grade 7

SEPUP Course/Activity Numbers	***Main Unit Issue***
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?
Plate Tectonics 36-49	Which site would you recommend for storing nuclear waste?
IALS *Issues and Life Science*:	
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?
Bioengineering 102-108	How are new solutions to problems in life science developed?
IAPS *Issues and Physical Science*:	
Force and Motion 73-88	Should noncommercial vehicles be more alike?

Grade 8

SEPUP Course/Activity Numbers	***Main Unit Issue***
IAPS *Issues and Physical Science*:	
Studying Materials Scientifically 1-11	How should unidentified materials be handled?
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?
IALS *Issues and Life Science*:	
Genetics 54-71	What are the ethical issues involved in using genetic information?
Evolution 89-101	What are the trade-offs in deciding whether to save an endangered species or to re-create an extinct one?
IAES *Issues and Earth Science*:	
Weather and Atmosphere	Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?

Key to SEPUP Assessment System:

SEPUP materials include a 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 nine assessment variables are:

Designing Investigations (DI)
Organizing Data (OD)
Analyzing Data (AD)
Understanding Concepts (UC)
Recognizing Evidence (RE)
Evidence and Trade-offs (ET)
Communication Skills (CS)
Organizing Scientific Ideas (SI)
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 41 Analysis Question 3 using Understanding Concepts scoring guide and Item Bank Questions 2, 4, 6, 8-10, and 16 from Unit D Plate Tectonics. For more information on program assessment and using SEPUP rubrics, consult the Teacher's Guide, Teacher Resource part III Assessment section.

SEPUP Support for Engineering Design

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 mission	X			
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		

Sixth Grade Science Standards

Science and Engineering Process Standards (SEPS)	
SEPS.1 Posing questions (for science) and defining problems (for engineering)	A practice of science is posing and refining questions that lead to descriptions and explanations of how the natural and designed world(s) work and these questions can be scientifically tested. Engineering questions clarify problems to determine criteria for possible solutions and identify constraints to solve problems about the designed world.
SEPS.2 Developing and using models and tools	A practice of both science and engineering is to use and construct conceptual models that illustrate ideas and explanations. Models are used to develop questions, predictions and explanations; analyze and identify flaws in systems; build and revise scientific explanations and proposed engineered systems; and communicate ideas. Measurements and observations are used to revise and improve models and designs. Models include, but are not limited to: diagrams, drawings, physical replicas, mathematical representations, analogies, and other technological models. Another practice of both science and engineering is to identify and correctly use tools to construct, obtain, and evaluate questions and problems. Utilize appropriate tools while identifying their limitations. Tools include, but are not limited to: pencil and paper, models, ruler, a protractor, a calculator, laboratory equipment, safety gear, a spreadsheet, experiment data collection software, and other technological tools.
SEPS.3 Constructing and performing investigations	Scientists and engineers are constructing and performing investigations in the field or laboratory, working collaboratively as well as individually. Researching analogous problems in order to gain insight into possible solutions allows them to make conjectures about the form and meaning of the solution. A plan to a solution pathway is developed prior to constructing and performing investigations. Constructing investigations systematically encompasses identified variables and parameters generating quality data. While performing, scientists and engineers monitor and record progress. After performing, they evaluate to make changes to modify and repeat the investigation if necessary.
SEPS.4 Analyzing and interpreting data	Investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists and engineers use a range of tools to identify the significant features in the data. They identify sources of error in the investigations and calculate the degree of certainty in the results. Advances in science and engineering makes analysis of proposed solutions more efficient and effective. They analyze their results by continually asking themselves questions; possible questions may be, but are not limited to: "Does this make sense?" "Could my results be duplicated?" and/or "Does the design solve the problem with the given constraints?"

SEPS.5 Using mathematics and computational thinking	In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Scientists and engineers understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)	Scientists and engineers use their results from the investigation in constructing descriptions and explanations, citing the interpretation of data, connecting the investigation to how the natural and designed world(s) work. They construct or design logical coherent explanations or solutions of phenomena that incorporate their understanding of science and/or engineering or a model that represents it, and are consistent with the available evidence.
SEPS.7 Engaging in argument from evidence	Scientists and engineers use reasoning and argument based on evidence to identify the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation, the process by which evidence-based conclusions and solutions are reached, to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.
SEPS.8 Obtaining, evaluating, and communicating information	Scientists and engineers need to be communicating clearly and articulating the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as, orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.

LEARNING OUTCOMES		
	LST.1: LEARNING OUTCOME FOR LITERACY IN SCIENCE/TECHNICAL SUBJECTS **Read and comprehend science and technical texts independently and proficiently and write effectively for a variety of discipline-specific tasks, purposes, and audiences**	
	GRADES 6-8	
	6-8.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 6-8 independently and proficiently by the end of grade 8.	**Throughout**

	6-8.LST.1.2: Write routinely over a variety of time frames for a range of discipline-specific tasks, purposes, and audiences.	**Throughout**

KEY IDEAS AND TEXTUAL SUPPORT	**LST.2: KEY IDEAS AND TEXTUAL SUPPORT (READING)** **Extract and construct meaning from science and technical texts using a variety of comprehension skills**	
	GRADES 6-8	
	6-8.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts.	**Stopping to Think questions:** *IAES* – 5, 19, 29, 33, 38, 45, 58, 60, 66, 74, 78, 87, 92, 96 *IALS* – 4, 6, 7, 15, 23, 25, 28, 42, 45, 57, 63, 79, 85, 97, 103 *IAPS* – 13, 16, 21, 23, 31, 34, 41, 50, 57, 64, 71, 80
	6-8.LST.2.2: Determine the central ideas or conclusions of a text; provide an accurate, objective summary of the text.	**Anticipation Guide:** *IAES* - 18, 44, 55, 62, 63, 74, 85, 96 *IALS* – 1, 2, 4, 5, 7, 8, 16, 17, 30, 32, 33, 45, 46, 49, 51, 52, 77, 79, 84, 85, 87, 97, *IAPS* – 53, 55, 56, 63, 67, 71 **Three-Level Reading Guide:** *IAES* – 15, 29, 78, 87 *IALS* – 11, 25, 57, 83, 89, 101 *IAPS* – 21, 23, 50, 57, 64, 84 **Listen, Stop, Write:** *IAES* - 33, 38, 60, 66, 92 *IALS* - 4, 34 *IAPS* - 53
	6-8.LST.2.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	**All "Laboratory" type activities** *IAES* – 3, 4, 6, 10, 13, 16, 17, 20, 46, 59, 61, 63, 67, 93 *IALS* – 5, 8, 14, 16, 17, 19, 22, 27, 35, 36, 38, 39, 43, 47, 55, 62, 64, 70, 78, 80-83, 90, 106 *IAPS* - 5-9, 14, 18, 19, 24-28, 35, 37, 38, 42, 43, 45, 46, 48, 51, 54, 59-61, 63, 65, 67-69, 74, 76-77, 79, 82

STRUCTURAL ELEMENTS AND ORGANIZATION	**LST.3: STRUCTURAL ELEMENTS AND ORGANIZATION (READING)** **Build understanding of science and technical texts, using knowledge of structural organization and author's purpose and message**	
	GRADES 6-8	
	6-8.LST.3.1: 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 relevant to grades 6-8 texts and topics.	**Categorization activities** *IAES* – 6, 12, 17, 19, 30, 38, 51, 60 *IALS* – 15, 23, 45, 56, 80 *IAPS* – 35, 58
	6-8.LST.3.2: 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.	**Writing Frame** *IAES* 11, 16, 36, 41, 55, 83 *IALS* 10, 11, 14, 29, 32, 34, 48, 49, 53, 64, 67, 70, 71, 72, 81, 83, 87, 88, 89, 101, 105 *IAPS* 33, 72, 88 **Writing Review** *IAES* 84, 98 *IALS* 10, 15, 32, 67, 89
	6-8.LST.3.3: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	**Three-Level Reading Guides** *IAES* 15, 29, 78, 87 *IALS* 11, 25, 57, 83, 89, 101 *IAPS* 21, 23, 50, 57, 64, 84

SYNTHESIS AND CONNECTION OF IDEAS	LST.4: SYNTHESIS AND CONNECTION OF IDEAS (READING) **Build understanding of science and technical texts by synthesizing and connecting ideas and evaluating specific claims**	
	GRADES 6-8	
	6-8.LST.4.1: 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*).	**Concept Maps:** *IAES* – 5, 6, 9, 15, 19, 29, 33, 60, 84 *IALS* – 86 *IAPS* – 34, 38, 83 **Venn Diagrams:** *IAES* – 3, 5, 42, 77 *IALS* – 23, 38, 43, 45, 57, 82, *IAPS* – 2, 47, 66 **Talking Drawings:** *IAES* – 19, 38, 73, 90, 91 *IALS* – 15, 55, 62, 64, 79 *IAPS* – 39, 55, 84 **Makes/interprets graphs:** *IAES* – 27, 51, 52, 55, 70, 75, 93, 95 *IALS* – 3, 14, 17, 19, 30, 51, 54, 72, 77, 79, 84, 85 *IAPS* – 12, 22, 30, 75, 78, 83
	6-8.LST.4.2: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	**Contrast evidence vs. opinion** *IAES* 2, 36, 40, 41, 49, 57, 70, 77, 89, 98 *IALS* 10, 20, 29, 32, 43, 47, 48, 53, 60, 67, 68, 70, 71, 75, 87, 88, 99, 100 *IAPS* 6, 7, 11, 18, 24, 26, 29, 31, 33, 52, 62, 70
	6-8.LST.4.3: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	**Talking it Over literacy strategy** *IAES* 2, 18, 23, 24, 36, 41, 50, 70, 71, 83, 98 *IALS* 10, 34, 52, 72, 87, 89, 101, 108 *IAPS* 11, 29, 33, 44, 47, 52, 73, 87 **Computer simulations/multimedia "View & Reflect" type activities** *IAES* 47, 48, 51, 64, 68, 76, 81 *IALS* 2, 33, 50, 56 *IAPS* 1 In addition to the above citations, there are over 100 web links to support each SEPUP course online at www.sepuplhs.org.

WRITING GENRES	LST.5: WRITING GENRES (WRITING) Write for different purposes and to specific audiences or people	
	GRADES 6-8	
	6-8.LST.5.1: Write arguments focused on discipline-specific content.	*IAES* 11, 16, 23, 36, 49, 55, 67, 70, 72, 83, 89, 98 *IALS* 5, 8, 9, 10, 14, 20, 29, 32, 34, 48, 49, 53, 64, 67, 71, 89, 101, 104, 105, 107, 108, 109 *IAPS* 3, 10, 11, 12, 27, 28, 29, 54, 64, 65, 66, 68, 72, 74, 77, 88
	6-8.LST.5.2: Write informative texts, including scientific procedures/experiments or technical processes that include precise descriptions and conclusions drawn from data and research.	*IAES* 16, 55, 67, 72 *IALS* 5, 8, 14, 48, 64, 81, 83, 104, 105, 109 *IAPS* 3, 10, 54, 65, 66, 68, 74, 77

THE WRITING PROCESS	LST.6: THE WRITING PROCESS (WRITING) Produce coherent and legible documents by planning, drafting, revising, editing, and collaborating with others	
	GRADES 6-8	
	6-8.LST.6.1: Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.	**Addressed through use of science notebook throughout all units**
	6-8.LST.6.2: Use technology to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	**Addressed through use of science notebook throughout all units**

THE RESEARCH PROCESS	**LST.7: THE RESEARCH PROCESS (WRITING)** **Build knowledge about the research process and the topic under study by conducting short or more sustained research**	
	GRADES 6-8	
	6-8.LST.7.1: Conduct short research assignments and tasks to answer a question (including a self- generated question), or test a hypothesis, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	*IAES* 52 *IALS* 29, 31, 71, 73
	6-8.LST.7.2: Gather relevant information from multiple sources, using search terms effectively; annotate sources; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation (e.g., *APA or CSE*).	*IAES* 52, 89 *IALS* 2, 3, 9, 10, 29, 31, 71, 73
	6-8.LST.7.3: Draw evidence from informational texts to support analysis, reflection, and research.	*IAES* 2, 11, 16, 23, 36, 49, 70, 83, 89, 98 *IALS* 2, 3, 9, 10, 20, 29, 32, 34, 49, 53, 67, 70, 71, 72, 87, 88, 89, 101, 106, 107, 108 *IAPS* 11, 12, 13, 27, 28, 29, 64, 72, 82, 88

Sixth Grade Science Standards

Physical Science (PS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
6.PS.1 Distinguish between the terms position, distance, and displacement, as well as, the terms speed and velocity.	Covered in Grade 7: **IAPS:** Force and Motion 74, 75, 76, 80, 82, 83	Covered in Grade 7 **IAPS:** 74 AQ 1-3, 5, Extension 2 75 AQ 1, 2 (UC), 4, Extension 76 AQ 2 80 STT 1 82 2, 3 (RE) 83 AQ 4, 5b, 6 (AD)
6.PS.2 Describe the motion of an object graphically showing the relationship between time and position.	Covered in Grade 7: **IAPS:** Force and Motion 75	Covered in Grade 7: **IAPS:** 75 Procedure, AQ 1, 3-5, Extension
6.PS.3 Describe how potential and kinetic energy can be transferred from one form to another.	**IAPS:** Energy 54, 55, 56, 57, 58, 65	**IAPS:** 54 AQ 1-5 56 AQ 3-4 57 AQ 1-5 58 Procedure, AQ 1-2 65 Procedure, AQ 2, 3, 4, 5 IB 1
6.PS.4 Investigate the properties of light, sound, and other energy waves and how they are reflected, absorbed, and transmitted through materials and space.	**IAPS:** Waves 93, 95, 96, 97, 98	**IAPS:** 93 AQ 1, 2, 3 (UC), 4 95 AQ 1-3 97 AQ 1, 2, 4 (AD), 5-7 98 Procedure (DI), AQ 1-2

Earth and Space Science (ESS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
6.ESS.1 Describe the role of gravity and inertia in maintaining the regular and predictable motion of celestial bodies.	**IAES:** Earth in Space 84 Exploring the Solar System 95, 96	**IAES** 84 AQ 1 IB 3 95 AQ 1-3, 4 (AD) 96 AQ 2-3 IB 12

6.ESS.2 Design models to describe how Earth's rotation, revolution, tilt, and interaction with the sun and moon cause seasons, tides, changes in daylight hours, eclipses, and phases of the moon.	**IAES:** Earth in Space 72, 73, 74, 75, 76, 77, 78, 80, 81, 82, 84	**IAES:** 72 Procedure (DI), AQ 1-7 73 AQ 1 (UC), 2-3 74 AQ 1-3, 5-6 75 Procedure, AQ 4-7 76 Procedure AQ 1-3, 4 (AD), 5-7, Extension 77 Procedure, AQ 1-6 78 AQ 1, 2 (UC), Extension 80 AQ 1-5 81 AQ 1-2, 5 (UC) 82 AQ 1-2, 3 (AD) 84 Procedure (UC), AQ 1 IB 1-3, 6-16
6.ESS.3 Compare and contrast the Earth, its moon, and other planets in the solar system, including comets and asteroids. (Comparisons should be made in regard to size, surface features, atmospheric characteristics, and the ability to support life.)	**IAES:** Exploring the Solar System 88, 89, 90, 91, 94	**IAES:** 88 Procedure 89 Procedure, AQ 1 90 Procedure 91 Procedure, Extension 94 Procedure, AQ 2 IB 6, 14, 18

Life Science (LS)	**Unit Title – Activity Number (s)**	**Indiana Assessment Blueprint**
6.LS.1 Investigate and describe how homeostasis is maintained as living things seek out their basic needs of food, water, shelter, space, and air.	**Not currently covered**	
6.LS.2 Describe the role of photosynthesis in the flow of energy in food chains, energy pyramids, and food webs. Create diagrams to show how the energy in animals' food used for bodily processes was once energy from the sun.	**IALS:** Ecology 79, 80, 81, 82	**IALS:** 79 AQ 2 (SI) 80 AQ 3 81 Procedure Part B (DI) AQ 4, AQ 5 (UC), 6 82 AQ3a, 3c, 5 IB 10, 15, 28
6.LS.3 Describe specific relationships (predator/prey, consumer/producer, parasite/host) and symbiotic relationships between organisms. Construct an explanation that predicts why patterns of interactions develop between organisms in an ecosystem.	**IALS:** Ecology 72, 73, 78-82, 84-88	**IALS:** 80 AQ 1-2 84 AQ 3 (OD, AD), 4-6, Extension 85 AQ 1 (AD, UC) 87 AQ 1 88 Procedure IB 9, 11, 33

6.LS.4 Investigate and use data to explain how changes in biotic and abiotic components in a given habitat can be beneficial or detrimental to native plants and animals.	**IALS:** Ecology 85, 87, 88	**IALS:** 85 AQ 1c (UC) 87 AQ 1, 2 (ET) 88 AQ 2 (AD), 3 (ET) Procedure (CS, UC, SI) IB 23, 24, 27, 29-32, 35, 37, 40, 45
6.LS.5 Research invasive species and discuss their impact on ecosystems.	**IALS:** Ecology 73, 88	**IALS:** 73 Procedure 88 Procedure (CS, UC, SI), AQ 1, 2 (AD), 3 (ET)

Engineering (E)	
6-8.E.1 Identify the criteria and constraints of a design 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.3 Analyze data from investigations 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.	*IAES* 72 *IALS* 104, 105, 107, 109 *IAPS* 65, 85

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SEPS.5 Using mathematics and computational thinking	In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Scientists and engineers understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)	Scientists and engineers use their results from the investigation in constructing descriptions and explanations, citing the interpretation of data, connecting the investigation to how the natural and designed world(s) work. They construct or design logical coherent explanations or solutions of phenomena that incorporate their understanding of science and/or engineering or a model that represents it, and are consistent with the available evidence.
SEPS.7 Engaging in argument from evidence	Scientists and engineers use reasoning and argument based on evidence to identify the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation, the process by which evidence-based conclusions and solutions are reached, to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.
SEPS.8 Obtaining, evaluating, and communicating information	Scientists and engineers need to be communicating clearly and articulating the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as, orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.

LEARNING OUTCOMES	LST.1: LEARNING OUTCOME FOR LITERACY IN SCIENCE/TECHNICAL SUBJECTS **Read and comprehend science and technical texts independently and proficiently and write effectively for a variety of discipline-specific tasks, purposes, and audiences**	
	GRADES 6-8	
	6-8.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 6-8 independently and proficiently by the end of grade 8.	**Throughout**
	6-8.LST.1.2: Write routinely over a variety of time frames for a range of discipline-specific tasks, purposes, and audiences.	**Throughout**

KEY IDEAS AND TEXTUAL SUPPORT	LST.2: KEY IDEAS AND TEXTUAL SUPPORT (READING) **Extract and construct meaning from science and technical texts using a variety of comprehension skills**	
	GRADES 6-8	
	6-8.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts.	**Stopping to Think questions:** *IAES* – 5, 19, 29, 33, 38, 45, 58, 60, 66, 74, 78, 87, 92, 96 *IALS* – 4, 6, 7, 15, 23, 25, 28, 42, 45, 57, 63, 79, 85, 97, 103 *IAPS* – 13, 16, 21, 23, 31, 34, 41, 50, 57, 64, 71, 80
	6-8.LST.2.2: Determine the central ideas or conclusions of a text; provide an accurate, objective summary of the text.	**Anticipation Guide:** *IAES* - 18, 44, 55, 62, 63, 74, 85, 96 *IALS* – 1, 2, 4, 5, 7, 8, 16, 17, 30, 32, 33, 45, 46, 49, 51, 52, 77, 79, 84, 85, 87, 97, *IAPS* – 53, 55, 56, 63, 67, 71 **Three-Level Reading Guide:** *IAES* – 15, 29, 78, 87 *IALS* – 11, 25, 57, 83, 89, 101 *IAPS* – 21, 23, 50, 57, 64, 84 **Listen, Stop, Write:** *IAES* - 33, 38, 60, 66, 92 *IALS* - 4, 34 *IAPS* - 53

	6-8.LST.2.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	**All "Laboratory" type activities** *IAES* – 3, 4, 6, 10, 13, 16, 17, 20, 46, 59, 61, 63, 67, 93 *IALS* – 5, 8, 14, 16, 17, 19, 22, 27, 35, 36, 38, 39, 43, 47, 55, 62, 64, 70, 78, 80-83, 90, 106 *IAPS* - 5-9, 14, 18, 19, 24-28, 35, 37, 38, 42, 43, 45, 46, 48, 51, 54, 59-61, 63, 65, 67-69, 74, 76-77, 79, 82

STRUCTURAL ELEMENTS AND ORGANIZATION	**LST.3: STRUCTURAL ELEMENTS AND ORGANIZATION (READING)** **Build understanding of science and technical texts, using knowledge of structural organization and author's purpose and message**	
	GRADES 6-8	
	6-8.LST.3.1: 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 relevant to grades 6-8 texts and topics.	**Categorization activities** *IAES* – 6, 12, 17, 19, 30, 38, 51, 60 *IALS* – 15, 23, 45, 56, 80 *IAPS* – 35, 58
	6-8.LST.3.2: 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.	**Writing Frame** *IAES* 11, 16, 36, 41, 55, 83 *IALS* 10, 11, 14, 29, 32, 34, 48, 49, 53, 64, 67, 70, 71, 72, 81, 83, 87, 88, 89, 101, 105 *IAPS* 33, 72, 88 **Writing Review** *IAES* 84, 98 *IALS* 10, 15, 32, 67, 89
	6-8.LST.3.3: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	**Three-Level Reading Guides** *IAES* 15, 29, 78, 87 *IALS* 11, 25, 57, 83, 89, 101 *IAPS* 21, 23, 50, 57, 64, 84

SYNTHESIS AND CONNECTION OF IDEAS	LST.4: SYNTHESIS AND CONNECTION OF IDEAS (READING) **Build understanding of science and technical texts by synthesizing and connecting ideas and evaluating specific claims**	
	GRADES 6-8	
	6-8.LST.4.1: 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*).	**Concept Maps:** *IAES* – 5, 6, 9, 15, 19, 29, 33, 60, 84 *IALS* – 86 *IAPS* – 34, 38, 83 **Venn Diagrams:** *IAES* – 3, 5, 42, 77 *IALS* – 23, 38, 43, 45, 57, 82, *IAPS* – 2, 47, 66 **Talking Drawings:** *IAES* – 19, 38, 73, 90, 91 *IALS* – 15, 55, 62, 64, 79 *IAPS* – 39, 55, 84 **Makes/interprets graphs:** *IAES* – 27, 51, 52, 55, 70, 75, 93, 95 *IALS* – 3, 14, 17, 19, 30, 51, 54, 72, 77, 79, 84, 85 *IAPS* – 12, 22, 30, 75, 78, 83
	6-8.LST.4.2: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	**Contrast evidence vs. opinion** *IAES* 2, 36, 40, 41, 49, 57, 70, 77, 89, 98 *IALS* 10, 20, 29, 32, 43, 47, 48, 53, 60, 67, 68, 70, 71, 75, 87, 88, 99, 100 *IAPS* 6, 7, 11, 18, 24, 26, 29, 31, 33, 52, 62, 70

	6-8.LST.4.3: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	**Talking it Over literacy strategy** *IAES* 2, 18, 23, 24, 36, 41, 50, 70, 71, 83, 98 *IALS* 10, 34, 52, 72, 87, 89, 101, 108 *IAPS* 11, 29, 33, 44, 47, 52, 73, 87 **Computer simulations/multimedia "View & Reflect" type activities** *IAES* 47, 48, 51, 64, 68, 76, 81 *IALS* 2, 33, 50, 56 *IAPS* 1 In addition to the above citations, there are over 100 web links to support each SEPUP course online at www.sepuplhs.org.

WRITING GENRES	**LST.5: WRITING GENRES (WRITING)** **Write for different purposes and to specific audiences or people**	
	GRADES 6-8	
	6-8.LST.5.1: Write arguments focused on discipline-specific content.	*IAES* 11, 16, 23, 36, 49, 55, 67, 70, 72, 83, 89, 98 *IALS* 5, 8, 9, 10, 14, 20, 29, 32, 34, 48, 49, 53, 64, 67, 71, 89, 101, 104, 105, 107, 108, 109 *IAPS* 3, 10, 11, 12, 27, 28, 29, 54, 64, 65, 66, 68, 72, 74, 77, 88
	6-8.LST.5.2: Write informative texts, including scientific procedures/experiments or technical processes that include precise descriptions and conclusions drawn from data and research.	*IAES* 16, 55, 67, 72 *IALS* 5, 8, 14, 48, 64, 81, 83, 104, 105, 109 *IAPS* 3, 10, 54, 65, 66, 68, 74, 77

THE WRITING PROCESS	LST.6: THE WRITING PROCESS (WRITING) **Produce coherent and legible documents by planning, drafting, revising, editing, and collaborating with others**	
	GRADES 6-8	
	6-8.LST.6.1: Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.	**Addressed through use of science notebook throughout all units**
	6-8.LST.6.2: Use technology to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	**Addressed through use of science notebook throughout all units**

THE RESEARCH PROCESS	LST.7: THE RESEARCH PROCESS (WRITING) **Build knowledge about the research process and the topic under study by conducting short or more sustained research**	
	GRADES 6-8	
	6-8.LST.7.1: Conduct short research assignments and tasks to answer a question (including a self- generated question), or test a hypothesis, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	*IAES* 52 *IALS* 29, 31, 71, 73
	6-8.LST.7.2: Gather relevant information from multiple sources, using search terms effectively; annotate sources; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation (e.g., *APA or CSE*).	*IAES* 52, 89 *IALS* 2, 3, 9, 10, 29, 31, 71, 73
	6-8.LST.7.3: Draw evidence from informational texts to support analysis, reflection, and research.	*IAES* 2, 11, 16, 23, 36, 49, 70, 83, 89, 98 *IALS* 2, 3, 9, 10, 20, 29, 32, 34, 49, 53, 67, 70, 71, 72, 87, 88, 89, 101, 106, 107, 108 *IAPS* 11, 12, 13, 27, 28, 29, 64, 72, 82, 88

Seventh Grade Science Standards

Physical Science (PS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
7.PS.1 Draw, construct models, or use animations to differentiate between atoms, elements, molecules, and compounds.	Covered in Grade 8: **IAPS:** Chemistry of Materials 16, 17, 19	Covered in Grade 8: **IAPS:** 16 AQ 1, 2, 4 17 Procedure, AQ 5, 6 (UC)
7.PS.2 Describe the properties of solids, liquids, and gases. Develop models that predict and describe changes in particle motion, density, temperature, and state of a pure substance when thermal energy is added or removed.	Spirals from Grade 6: Energy 58A	Spirals from Grade 6: 58A AQ 1-5
7.PS.3 Investigate the Law of Conservation of Mass by measuring and comparing the mass of a substance before and after a change of state.	Covered in Grade 8: **IAPS:** Chemistry of Materials 25, 26, 29	Covered in Grade 8: **IAPS:** 25: AQ 2, 3
7.PS.4 Investigate Newton's first law of motion (Law of Inertia) and how different forces (gravity, friction, push and pull) affect the velocity of an object.	**IAPS:** Force and Motion 79, 80, 82, 83, 84, 86, 87	**IAPS:** 79 AQ 3 80 STT 1, 2, 5, AQ 1, 2 (UC), 5 83 AQ 7 84 AQ 1 87 AQ 1a
7.PS.5 Investigate Newton's second law of motion to show the relationship among force, mass and acceleration.	**IAPS:** Force and Motion 78, 80, 84	**IAPS:** 78 Procedure, AQ 1-5 80 STT 4, AQ 3
7.PS.6 Investigate Newton's third law of motion to show the relationship between action and reaction forces.	**IAPS:** Force and Motion 80, 81,	**IAPS:** 80 STT 3, 5, AQ 4 81 AQ 1-5

7.PS.7 Construct a device that uses one or more of Newton's laws of motion. Explain how motion, acceleration, force, and mass are affecting the device.	**IAPS:** *The prerequisite knowledge and skills for this standard are developed in the Force and Motion unit, Activities 74, 76, 77, 78, 82, 83 and explored more fully in Activity 85, "Designing Crash Test Dummies."*	
7.PS.8 Investigate a process in which energy is transferred from one form to another and provide evidence that the total amount of energy does not change during the transfer when the system is closed. (Law of conservation of energy)	Spirals from Grade 6: **IAPS:** Energy 57, 58	Spirals from Grade 6: **IAPS:** 57 AQ 1, 2, 3 (UC)
7.PS.9 Compare and contrast the three types of heat transfer: radiation, convection, and conduction.	**IAES:** Plate Tectonics 46, 46A Spirals from Grade 6: **IAPS:** Energy 58, 59, 67, 69	**IAES:** 46 AQ 1b, 2a, 2b, 3 46A AQ 1-3 Spirals from Grade 6: **IAPS:** 58 AQ 1-2 59 AQ 2-5

Earth and Space Science (ESS)	**Unit Title – Activity Number (s)**	**Indiana Assessment Blueprint**
7.ESS.1 Identify and investigate the properties of minerals. Identify and classify a variety of rocks based on physical characteristics from their origin, and explain how they are related using the rock cycle. (i.e. Sedimentary, igneous, and metamorphic rocks)	**IAES:** Rocks and Minerals 15, 16, 17, 18, 19, 20, 22 Plate Tectonics 45	**IAES:** 15 AQ 1-4 16 AQ 1-2, 3 (RE), 4 17 AQ 1-4 18 AQ 1-4 19 AQ 1-4 20 AQ 1-3 22 AQ 1-6, 7 (UC) IB 5, 6, 11 45 AQ 4

	7.ESS.2 Construct a model or scale drawing (digitally or on paper), based on evidence from rock strata and fossil records, for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history.	**IAES:** Plate Tectonics 39 <u>Covered in Grade 8:</u> Evolution 92	**IAES:** 39 AQ 2-3 IB 13
	7.ESS.3 Using simulations or demonstrations, explain continental drift theory and how lithospheric (tectonic) plates have been and still are in constant motion resulting in the creation of landforms on the Earth's surface over time.	**IAES:** Plate Tectonics 45, 46, 47, 48	**IAES:** 45 Procedure, AQ 1 46 AQ 3, 4 47 AQ 2-4 48 AQ 1-3, 4 (UC) IB 3, 6, 8, 10, 11, 12, 16
	7.ESS.4 Construct an explanation, based on evidence found in and around Indiana, for how large scale physical processes, such as Karst topography and glaciation, have shaped the land.	**IAES:** Plate Tectonics 41A	**IAES:** 41A AQ 1-3
	7.ESS.5 Construct a model, diagram, or scale drawing of the interior layers of the Earth. Identify and compare the compositional (chemical) layers to the mechanical (physical) layers of the Earth's interior including magnetic properties.	**IAES:** Studying Soils Scientifically 5 Plate Tectonics 38, 41C *The terms compositional and mechanical are not introduced but the concepts implied in their use are covered.*	**IAES:** 5 AQ 1-5 IB (SSS) 3, 7-8 38 AQ 1-3, 5 (UC) 41C AQ 1-4
	7.ESS.6 Research common synthetic materials (i.e. plastics, composites, polyester, and alloys) to gain an understanding that synthetic materials do come from natural resources and have an impact on society.	**IAES:** Rocks and Minerals 13, 14, 18 <u>Covered in Grade 8</u> **IAPS:** Chemistry of Materials 18, 19, 20, 21	**IAPS:** 18 Procedure 21 AQ 1

7.ESS.7 Describe the positive and negative environmental impacts of obtaining and utilizing various renewable and nonrenewable energy resources in Indiana. Determine which energy resources are the most beneficial and efficient.	Spirals from Grade 6: **IAPS:** Energy 64	Spirals from Grade 6: **IAPS:** 64 Procedure, AQ 1-2

Life Science (LS)	**Unit Title – Activity Number (s)**	**Indiana Assessment Blueprint**
7.LS.1 Investigate and observe cells in living organisms and collect evidence showing that living things are made of cells. Compare and provide examples of prokaryotic and eukaryotic organisms. Identify the characteristics of living things.	**IALS:** Cell Biology and Disease 37, 38, 38B, 39, 40, 41, 42	**IALS:** 37 Procedure 38 Procedure, AQ 3 39 AQ 2 (AD) 40 AQ 4, 5 42 Procedure, AQ 3-5 IB 6, 7, 13, 15
7.LS.2 Create a model to show how the cells in multicellular organisms repeatedly divide to make more cells for growth and repair as a result of mitosis. Explain how mitosis is related to cancer.	**IALS:** Cell Biology and Disease 38A, 38B, 42 *No relation to cancer except on page G-36.*	**IALS:** 38A AQ 1-6 38B AQ 1-3 42 AQ 1-2
7.LS.3 Explain how cells develop through differentiation into specialized tissues and organs in multicellular organisms.	**IALS:** Cell Biology and Disease 38A, 38B Covered in Grade 8: Genetics 57	**IALS:** 38A AQ 1-6 38B AQ 1-3 Covered in Grade 8: 57 AQ 1d
7.LS.4 Research and describe the functions and relationships between various cell types, tissues, and organs in the immune system, circulatory system and digestive system of the human body.	**IALS:** Body Works 12, 13, 15, 17, 18, 23 Cell Biology and Disease 46	**IALS:** 12 AQ 5 13 AQ 1 15 AQ 1-2, 3 (UC), 5 17 Student Sheet 17.1 18 Procedure, AQ 6 23 AQ 1, 3, 8 IB 3, 6, 9, 18, 20, 21, 32, 33, 43

7.LS.5 Compare and contrast the form and function of the organelles found in plant and animal cells.	**IALS:** Cell Biology and Disease 38, 42, 45 <u>Spirals from Grade 6:</u> Ecology 82	**IALS:** 38 Procedure, AQ 1-2, 5-6 42 Procedure, AQ 3-5 45 Procedure, AQ 2 <u>Spirals from Grade 6:</u> 82 AQ 3-4

Engineering (E)	
6-8.E.1 Identify the criteria and constraints of a design 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.3 Analyze data from investigations 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.	*IAES* 72 *IALS* 104, 105, 107, 109 *IAPS* 65, 85

Eighth Grade Science Standards

Science and Engineering Process Standards (SEPS)	
SEPS.1 Posing questions (for science) and defining problems (for engineering)	A practice of science is posing and refining questions that lead to descriptions and explanations of how the natural and designed world(s) work and these questions can be scientifically tested. Engineering questions clarify problems to determine criteria for possible solutions and identify constraints to solve problems about the designed world.
SEPS.2 Developing and using models and tools	A practice of both science and engineering is to use and construct conceptual models that illustrate ideas and explanations. Models are used to develop questions, predictions and explanations; analyze and identify flaws in systems; build and revise scientific explanations and proposed engineered systems; and communicate ideas. Measurements and observations are used to revise and improve models and designs. Models include, but are not limited to: diagrams, drawings, physical replicas, mathematical representations, analogies, and other technological models. Another practice of both science and engineering is to identify and correctly use tools to construct, obtain, and evaluate questions and problems. Utilize appropriate tools while identifying their limitations. Tools include, but are not limited to: pencil and paper, models, ruler, a protractor, a calculator, laboratory equipment, safety gear, a spreadsheet, experiment data collection software, and other technological tools.
SEPS.3 Constructing and performing investigations	Scientists and engineers are constructing and performing investigations in the field or laboratory, working collaboratively as well as individually. Researching analogous problems in order to gain insight into possible solutions allows them to make conjectures about the form and meaning of the solution. A plan to a solution pathway is developed prior to constructing and performing investigations. Constructing investigations systematically encompasses identified variables and parameters generating quality data. While performing, scientists and engineers monitor and record progress. After performing, they evaluate to make changes to modify and repeat the investigation if necessary.
SEPS.4 Analyzing and interpreting data	Investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists and engineers use a range of tools to identify the significant features in the data. They identify sources of error in the investigations and calculate the degree of certainty in the results. Advances in science and engineering makes analysis of proposed solutions more efficient and effective. They analyze their results by continually asking themselves questions; possible questions may be, but are not limited to: "Does this make sense?" "Could my results be duplicated?" and/or "Does the design solve the problem with the given constraints?"

SEPS.5 Using mathematics and computational thinking	In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Scientists and engineers understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
SEPS.6 Constructing explanations (for science) and designing solutions (for engineering)	Scientists and engineers use their results from the investigation in constructing descriptions and explanations, citing the interpretation of data, connecting the investigation to how the natural and designed world(s) work. They construct or design logical coherent explanations or solutions of phenomena that incorporate their understanding of science and/or engineering or a model that represents it, and are consistent with the available evidence.
SEPS.7 Engaging in argument from evidence	Scientists and engineers use reasoning and argument based on evidence to identify the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation, the process by which evidence-based conclusions and solutions are reached, to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims.
SEPS.8 Obtaining, evaluating, and communicating information	Scientists and engineers need to be communicating clearly and articulating the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as, orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs.

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	GRADES 6-8	
	6-8.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 6-8 independently and proficiently by the end of grade 8.	**Throughout**
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	GRADES 6-8	
	6-8.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts.	**Stopping to Think questions:** *IAES* – 5, 19, 29, 33, 38, 45, 58, 60, 66, 74, 78, 87, 92, 96 *IALS* – 4, 6, 7, 15, 23, 25, 28, 42, 45, 57, 63, 79, 85, 97, 103 *IAPS* – 13, 16, 21, 23, 31, 34, 41, 50, 57, 64, 71, 80
	6-8.LST.2.2: Determine the central ideas or conclusions of a text; provide an accurate, objective summary of the text.	**Anticipation Guide:** *IAES* - 18, 44, 55, 62, 63, 74, 85, 96 *IALS* – 1, 2, 4, 5, 7, 8, 16, 17, 30, 32, 33, 45, 46, 49, 51, 52, 77, 79, 84, 85, 87, 97, *IAPS* – 53, 55, 56, 63, 67, 71 **Three-Level Reading Guide:** *IAES* – 15, 29, 78, 87 *IALS* – 11, 25, 57, 83, 89, 101 *IAPS* – 21, 23, 50, 57, 64, 84 **Listen, Stop, Write:** *IAES* - 33, 38, 60, 66, 92 *IALS* - 4, 34 *IAPS* - 53

	6-8.LST.2.3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	**All "Laboratory" type activities** *IAES* – 3, 4, 6, 10, 13, 16, 17, 20, 46, 59, 61, 63, 67, 93 *IALS* – 5, 8, 14, 16, 17, 19, 22, 27, 35, 36, 38, 39, 43, 47, 55, 62, 64, 70, 78, 80-83, 90, 106 *IAPS* - 5-9, 14, 18, 19, 24-28, 35, 37, 38, 42, 43, 45, 46, 48, 51, 54, 59-61, 63, 65, 67-69, 74, 76-77, 79, 82

STRUCTURAL ELEMENTS AND ORGANIZATION	**LST.3: STRUCTURAL ELEMENTS AND ORGANIZATION (READING)** **Build understanding of science and technical texts, using knowledge of structural organization and author's purpose and message**	
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	6-8.LST.3.2: 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.	**Writing Frame** *IAES* 11, 16, 36, 41, 55, 83 *IALS* 10, 11, 14, 29, 32, 34, 48, 49, 53, 64, 67, 70, 71, 72, 81, 83, 87, 88, 89, 101, 105 *IAPS* 33, 72, 88 **Writing Review** *IAES* 84, 98 *IALS* 10, 15, 32, 67, 89
	6-8.LST.3.3: Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	**Three-Level Reading Guides** *IAES* 15, 29, 78, 87 *IALS* 11, 25, 57, 83, 89, 101 *IAPS* 21, 23, 50, 57, 64, 84

SYNTHESIS AND CONNECTION OF IDEAS	LST.4: SYNTHESIS AND CONNECTION OF IDEAS (READING) **Build understanding of science and technical texts by synthesizing and connecting ideas and evaluating specific claims**	
	GRADES 6-8	
	6-8.LST.4.1: 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*).	**Concept Maps:** *IAES* – 5, 6, 9, 15, 19, 29, 33, 60, 84 *IALS* – 86 *IAPS* – 34, 38, 83 **Venn Diagrams:** *IAES* – 3, 5, 42, 77 *IALS* – 23, 38, 43, 45, 57, 82, *IAPS* – 2, 47, 66 **Talking Drawings:** *IAES* – 19, 38, 73, 90, 91 *IALS* – 15, 55, 62, 64, 79 *IAPS* – 39, 55, 84 **Makes/interprets graphs:** *IAES* – 27, 51, 52, 55, 70, 75, 93, 95 *IALS* – 3, 14, 17, 19, 30, 51, 54, 72, 77, 79, 84, 85 *IAPS* – 12, 22, 30, 75, 78, 83
	6-8.LST.4.2: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	**Contrast evidence vs. opinion** *IAES* 2, 36, 40, 41, 49, 57, 70, 77, 89, 98 *IALS* 10, 20, 29, 32, 43, 47, 48, 53, 60, 67, 68, 70, 71, 75, 87, 88, 99, 100 *IAPS* 6, 7, 11, 18, 24, 26, 29, 31, 33, 52, 62, 70

	6-8.LST.4.3: Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	**Talking it Over literacy strategy** *IAES* 2, 18, 23, 24, 36, 41, 50, 70, 71, 83, 98 *IALS* 10, 34, 52, 72, 87, 89, 101, 108 *IAPS* 11, 29, 33, 44, 47, 52, 73, 87 **Computer simulations/multimedia "View & Reflect" type activities** *IAES* 47, 48, 51, 64, 68, 76, 81 *IALS* 2, 33, 50, 56 *IAPS* 1 In addition to the above citations, there are over 100 web links to support each SEPUP course online at www.sepuplhs.org.

WRITING GENRES	**LST.5: WRITING GENRES (WRITING)** **Write for different purposes and to specific audiences or people**	
	GRADES 6-8	
	6-8.LST.5.1: Write arguments focused on discipline-specific content.	*IAES* 11, 16, 23, 36, 49, 55, 67, 70, 72, 83, 89, 98 *IALS* 5, 8, 9, 10, 14, 20, 29, 32, 34, 48, 49, 53, 64, 67, 71, 89, 101, 104, 105, 107, 108, 109 *IAPS* 3, 10, 11, 12, 27, 28, 29, 54, 64, 65, 66, 68, 72, 74, 77, 88
	6-8.LST.5.2: Write informative texts, including scientific procedures/experiments or technical processes that include precise descriptions and conclusions drawn from data and research.	*IAES* 16, 55, 67, 72 *IALS* 5, 8, 14, 48, 64, 81, 83, 104, 105, 109 *IAPS* 3, 10, 54, 65, 66, 68, 74, 77

THE WRITING PROCESS	LST.6: THE WRITING PROCESS (WRITING) **Produce coherent and legible documents by planning, drafting, revising, editing, and collaborating with others**	
	GRADES 6-8	
	6-8.LST.6.1: Plan and develop; draft; revise using appropriate reference materials; rewrite; try a new approach; and edit to produce and strengthen writing that is clear and coherent, with some guidance and support from peers and adults.	**Addressed through use of science notebook throughout all units**
	6-8.LST.6.2: Use technology to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	**Addressed through use of science notebook throughout all units**

THE RESEARCH PROCESS	LST.7: THE RESEARCH PROCESS (WRITING) **Build knowledge about the research process and the topic under study by conducting short or more sustained research**	
	GRADES 6-8	
	6-8.LST.7.1: Conduct short research assignments and tasks to answer a question (including a self- generated question), or test a hypothesis, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	*IAES* 52 *IALS* 29, 31, 71, 73
	6-8.LST.7.2: Gather relevant information from multiple sources, using search terms effectively; annotate sources; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation (e.g., *APA or CSE*).	*IAES* 52, 89 *IALS* 2, 3, 9, 10, 29, 31, 71, 73
	6-8.LST.7.3: Draw evidence from informational texts to support analysis, reflection, and research.	*IAES* 2, 11, 16, 23, 36, 49, 70, 83, 89, 98 *IALS* 2, 3, 9, 10, 20, 29, 32, 34, 49, 53, 67, 70, 71, 72, 87, 88, 89, 101, 106, 107, 108 *IAPS* 11, 12, 13, 27, 28, 29, 64, 72, 82, 88

Physical Science (PS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
8.PS.1 Create models to represent the arrangement and charges of subatomic particles in an atom (protons, neutrons and electrons). Understand the significance that the currently 118 known chemical elements combine to form all the matter in the universe.	**IAPS:** Chemistry of Materials 15, 16, 16A, 17	**IAPS:** 16 AQ 1-2, 4 16A AQ 1-5 17 Procedure
8.PS.2 Illustrate with diagrams (drawings) how atoms are arranged in simple molecules. Distinguish between atoms, elements, molecules, and compounds.	**IAPS:** Chemistry of Materials 16, 17, 21	**IAPS:** 16 AQ 1-4 17 AQ 5, 6 (UC) 21 AQ 2,3 IB 9, 10, 11
8.PS.3 Use basic information provided for an element (atomic mass, atomic number, symbol, and name) to determine its place on the Periodic Table. Use this information to find the number of protons, neutrons, and electrons in an atom.	**IAPS:** Chemistry of Materials 15, 16, 16A	**IAPS:** 15 AQ 3-4, 5 (UC) 16 Stopping to Think 4 16A 1-2
8.PS.4 Identify organizational patterns (radius, atomic number, atomic mass, properties and radioactivity) on the Periodic Table.	**IAPS:** Chemistry of Materials 15, 16 (atomic number, symbol, atomic weight, family, phase at room temperature)	**IAPS:** 15 AQ 1-4, 5 (UC)
8.PS.5 Investigate the property of density and provide evidence that properties, such as density, do not change for a pure substance.	**IAPS:** Studying Materials Scientifically 7, 9, 10 Chemistry of Materials 18	**IAPS:** 7 AQ 1 (AD), 3 9 AQ 1, 3 (UC) 10 Procedure IB 5, 8, 10, 18 AQ 2, 3 (AD), and Extension
8.PS.6 Compare and contrast physical change vs. chemical change. Analyze the properties of substances before and after substances interact to determine if a chemical reaction has occurred.	**IAPS:** Chemistry of Materials 19, 20, 21, 23, 25	**IAPS:** 19 AQ 1,2 20 AQ 2,4 21 AQ 2,3 23 AQ 1 25 AQ 1 IB 12, 13

Physical Science (PS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
8.PS.7 Balance chemical equations to show how the total number of atoms for each element does not change in chemical reactions and as a result, mass is always conserved in a closed system. (Law of Conservation of Mass.)	**IAPS:** Chemistry of Materials 25 *We cover chemical formula in Activity 16 but we do not cover balancing equations.*	**IAPS:** 25 Procedure, AQ 2, 3

Earth and Space Science (ESS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
8.ESS.1 Research global temperatures over the past century. Compare and contrast data in relation to the theory of climate change.		
8.ESS.2 Create a diagram or carry out a simulation to describe how water is cycled through the earth's crust, atmosphere and oceans. Explain how the water cycle is driven by energy from the sun and the force of gravity.	**IAES:** Weather and Atmosphere 55, 57, 58, 60, 62	**IAES:** 55 AQ 3 57 AQ 3, 4 58 Stopping to Think 2, AQ 1-3 60 AQ 2 62 Procedure, AQ 1-3, 4 (SI) IB 3, 6, 7, 10, 15
8.ESS.3 Research how human consumption of finite natural resources (i.e. coal, oil, natural gas, and clean water) and human activities have had an impact on the environment (i.e. causes of air, water, soil, light, and noise pollution).	**IAPS:** Chemistry of Materials 23, 24, 26, 27, 28, 29 **IAES:** Weather and Atmosphere 65, 70	**IAPS:** 23 AQ 3 24 AQ 6, Extension 26 AQ 4-5 27 AQ 2 (CS), 3 (ET), Extension 28 AQ 2, 3 (ET) 29 AQ 1 (ET), 2 **IAES:** 65 AQ 1-3 70 AQ 2 (RE), 3

Life Science (LS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
8.LS.1 Compare and contrast the transmission of genetic information in sexual and asexual reproduction. Research organisms that undergo these two types of reproduction.	**IALS:** Genetics 57, 63	**IALS:** 57 Stopping to Think 1-2, AQ 1-2 IB 3, 4, 6, 11, 16, 24
8.LS.2 Demonstrate how genetic information is transmitted from parent to offspring through chromosomes via the process of meiosis. Explain how living things grow and develop.	**IALS:** Genetics 63, 64 *Spirals from Grade 7:* Cell Biology and Disease 38B	**IALS:** 63 informal through discussion 64 AQ 6 38B AQ 1-3
8.LS.3 Create and analyze Punnett squares to calculate the probability of specific traits being passed from parents to offspring using different patterns of inheritance.	**IALS:** Genetics 61, 62, 66, 67	**IALS:** 61 AQ 1, 3-4 62 AQ 5 67 AQ 1b IB 13-15, 26
8.LS.4 Differentiate between and provide examples of acquired and genetically inherited traits.	**IALS:** Genetics 54, 55, 56, 64	**IALS:** 54 AQ 2-3 55 AQ 1-2?? 56 AQ 6 64 AQ 2-3 IB 27
8.LS.5 Explain how factors affecting natural selection (competition, genetic variations, environmental changes, and overproduction) increase or decrease a species' ability to survive and reproduce.	**IALS:** Evolution 94, 95, 96, 97, 98, 99, 101	**IALS:** 94 AQ 3 (UC), 4 95 AQ 4-5 96 AQ 3-6 97 AQ 1, 2 (SI) 98 AQ 2b 99 AQ 2 (UC) 101 AQ 3, 4
8.LS.6 Create models to show how the structures of chromatin, chromosomes, chromatids, genes,	**IALS:** Genetics 63	**IALS:** 63 AQ 1 (UC) IB 9

Life Science (LS)	Unit Title – Activity Number (s)	Indiana Assessment Blueprint
alleles and deoxyribonucleic acid (DNA) molecules are related and differ.	*This is covered in our high school biology, Science and Global Issues: Biology.*	
8.LS.7 Recognize organisms are classified into taxonomic levels according to shared characteristics. Explain how an organism's scientific name correlates to these shared characteristics.	**IALS:** Evolution 99, 100 <u>Spirals from Grade 6</u> Ecology 73, 75, 76	**IALS:** 100 Procedure 75 AQ 2-3 76 AQ 1-2
8.LS.8 Explore and predict the evolutionary relationships between species looking at the anatomical differences among modern organisms and fossil organisms.	**IALS:** Evolution 90, 98, 99 <u>Spirals from Grade 6</u>: Ecology 75, 76 <u>Spirals from Grade 7</u>: Cell Biology and Disease 44, 45	**IALS:** 98 AQ 2a, 3, 6 99 AQ 1-5, Extension 76 AQ 1, 2 44 AQ 1-3
8.LS.9 Examine traits of individuals within a species that may give them an advantage or disadvantage to survive and reproduce in stable or changing environment.	**IALS:** Evolution 95, 96	**IALS:** 95 Procedure, AQ 3 96 Procedure, AQ 4 IB 20, 21, 38
8.LS.10 Gather and synthesize information about how humans alter organisms genetically through a variety of methods.	**IALS:** Genetics 57, 58, 60, 61	**IALS:** 57 Stopping to Think 4
8.LS.11 Investigate how viruses and bacteria affect the human body.	<u>Spirals from Grade 7</u>: Cell Biology and Disease 31, 33, 37, 43, 44, 45, 46, 47, 48, 50, 51, 52	**IALS:** 37 AQ 1 44 AQ 1 45 Stopping to Think 2, AQ 1-3 48 AQ 4 (UC) 51 AQ 1 (AD), 2-3, 4 (UC), 6 52 AQ 1

Engineering (E)	
6-8.E.1 Identify the criteria and constraints of a design 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.3 Analyze data from investigations 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.	*IAES* 32 *IALS* 104, 105, 107 *IAPS* 58, 59, 65, 72, 85, 99
6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.	*IAES* 72 *IALS* 104, 105, 107, 109 *IAPS* 65, 85