



**LAB-AIDS ASSESSMENT BLUEPRINT AND CORRELATION TO
2010 OHIO GRADE LEVEL CONTENT STATEMENTS**

SCIENCE, GRADES 6-8

Presented by

Lab-Aids, Inc.

17 Colt Court, Ronkonkoma, NY 11779

631.737.1133 • 631.737.1286

www.Lab-Aids.com



Thank you for including SEPUP Curriculum Programs in your review process. The recommended scope and sequence aligns 100% to the Ohio Grade Level Indicators for Science, Grades 6 to 8. We are very proud of this program and feel confident that it will exceed the expectations of your students and teachers.

The SEPUP Ohio Model Curriculum (our name for this Grade 6-8 sequence) is a research-based, field-tested, hands-on core program that **builds science content** and process skills in the **context of an *issue***.

Designed with **built-in formative and summative assessments** and developed in collaboration with a national sample of teachers and students with the SEPUP Group at the Lawrence Hall of Science, these programs offer the very best science program and professional development package available.

Like all SEPUP programs, each requires students to gather and evaluate scientific evidence, assess risks and benefits, ask questions and make decisions based on scientific evidence.

All core programs include a Teacher's Guide and a Complete Materials Package for up to 5 classes of 32 students, at **affordable pricing**.

If you have any questions, please don't hesitate to contact us. Please visit our website www.lab-aids.com for your Regional Sales Representative.

Thanks again, for considering SEPUP and Lab-Aids. I look forward to speaking with you soon.

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

Issues and Earth Science, Second Edition (IAES)

Unit Title	Activity Number
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

Issues and Life Science, Second Edition (IALS)

Unit Title	Activity Number
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

Issues and Physical Science, Second Edition (IAPS)

Unit Title	Activity Number
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.

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 NGSF 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 NGSF 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 mission	X			
IALS 48: Design an improved hand-washing procedure		X	X	X

Course activity with description	Students suggest or evaluate a solution	Students engage in the engineering process		
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		

Suggested Scope and Sequence

This scope and sequence shows SEPUP units from LAB-AIDS are used to address the Middle School Science Standards.

Analysis

6th grade Content Statement Alignment—100%

7th grade Content Statement Alignment—100%

8th grade Content Statement Alignment—100%

Overall—100%

Grade 6

Issues & Earth Science (IAES) Unit

- Studying Soils Scientifically (20 Days)
- Rocks and Minerals (25 days)

Issues & Life Science (IALS) Units

- Body Works (30 days)
- Cell Biology and Disease (40 days)
- Genetics (30 days)

Issues & Physical Science (IAPS) Unit

- Studying Materials Scientifically (20 days)

Grade 7

Issues & Physical Science (IAPS) Units

- Chemistry of Materials (35 days)
- Energy (40 days)

Issues & Earth Science (IAES) Unit

- Weather and Atmosphere (30 days)
- Earth in Space (25 days)

Issues & Life Science (IALS) Unit

- Ecology (40 days)

Grade 8

Issues & Physical Science (IAPS) Unit

- Force and Motion (30 days)

Issues & Earth Science (IAES) Units

- Erosion and Deposition (25 days)
- Plate Tectonics (25 days)
- Exploring the Solar System (25 days)

Issues & Life Science (IALS) Units

- Evolution (20 days)
- Bioengineering (STEM Unit) (20 days)

Ohio Achievement Test

Issues & Physical Science (IAPS) Unit

- Water (25 days) 9th grade content

Key to Alignment Document		
Ohio Content Statements	Unit Title-Activity Number(s)	Ohio Assessment Blueprint
		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
<p>Grade 6 Theme: Order and Organization <i>This theme focuses on helping students use scientific inquiry to discover patterns, trends, structures and relationships that may be described by simple principles. These principles are related to the properties or interactions within and between systems.</i></p> <p>Strand Connections: <i>All matter is made of small particles called atoms. The properties of matter are based on the order and organization of atoms and molecules. Cells, minerals, rocks and soil are all examples of matter.</i></p>		
<p><i>Rocks, Minerals and Soil</i></p> <p>This topic focuses on the study of rocks, minerals and soil which make up the lithosphere. By classifying and identifying different types of rocks, minerals and soil, the past environment in which they formed can be decoded.</p>		
<p>1. Minerals have specific, quantifiable properties.</p> <p>Minerals are naturally occurring, inorganic solids that have a defined chemical composition. Minerals have properties that can be observed and measured. Minerals form in specific environments.</p> <p>Note: Specific information regarding the properties that can be used to identify minerals will be found in the model curriculum</p>	<p>IAES Rocks and Minerals (RM) 14-18, 23</p>	<p>RM 14 AQ5 RE 15 AQ 1,3-5 16 AQ 1-2, 3RE + Ext 17 AQ 1-4 18 AQ 1-4 23 AQ 1, AQ3 ET [IB] B2-3, 7-9, 10</p> <p>14 AQ5 RE 15 AQ 1,3-5 + Ext 2 16 AQ 1-2, 3RE + Ext 17 AQ 1-4 18 AQ 1-4 23 AQ 1-2, AQ3 ET [IB] B1-3, 7-9, 10</p>
<p>2. Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification.</p> <p>Most rocks are composed of one or more minerals, but there are a few types of sedimentary rocks that contain organic material, such as coal. The composition of the rock, types of mineral present, mineral arrangement, and/or mineral shape and size can be used to identify the rock and to interpret its history of formation, breakdown (weathering) and transport (erosion)</p>	<p>IAES Rocks and Minerals (RM) 17-20, 22</p>	<p>RM 17 AQ 1-2, 4 19 AQ 3-4 20 AQ 1-4 + Ext 22 AQ1-6 [IB] B 4, 6, 11</p> <p>17 AQ 1-2 18 AQ 1-4 19 AQ 2-4 20 AQ 1-4 + Ext 22 AQ7 UC [IB] B 4, 6, 11</p>
<p>3. Igneous, metamorphic and sedimentary</p>	<p>IAES</p>	<p>RM</p>

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<p>rocks form in different ways.</p> <p>Magma or lava cools and crystallizes to form igneous rocks. Heat and pressure applied to existing rock forms metamorphic rocks. Sedimentary rock forms as existing rock weathers chemically and/or physically and the weathered material is compressed and then lithifies. Each rock type can provide information about the environment in which it was formed.</p>	<p>Rocks and Minerals (RM) 19-20, 22</p>	<p>[IB] B 4-6, 11 UC 19 AQ1, 3-4 20 1-2 22 AQ 1-6, 7 UC</p> <p>[IB] B 4-6, 11 UC 19 AQ1, 3-4 20 AQ1-2 22 AQ 1-6, 7 UC</p>
<p>4. Soil is unconsolidated material that contains nutrient matter and weathered rock.</p> <p>Soil formation occurs at different rates and is based on environmental conditions, type of existing bedrock and rates of weathering. Soil forms in layers known as horizons. Soil horizons can be distinguished from one another based on properties that can be measured.</p> <p>Note: The introduction to soil is found in grade 3.</p>	<p>IAES Studying Soil Scientifically (SSS) 5-7, 9</p>	<p>SSS 5 STT 1,3-4 AQ 1-4, 5 UC 6 AQ1 7 AQ 1-3 9 AQ 1-3</p> <p>5 AQ 3-4</p>
<p>5. Rocks, minerals and soils have common and practical uses.</p> <p>Nearly all manufactured material requires some kind of geologic resource. Most geologic resources are considered nonrenewable. Rocks, minerals and soil are examples of geologic resources that are nonrenewable.</p> <p>Note: Nonrenewable energy sources should be included (such as fossil fuels).</p>	<p>IAES Studying Soil Scientifically (SSS) 8-9 Rocks and Minerals (RM) 14, 16, 19, 23</p>	<p>SSS 8 AQ4 9 AQ 1-2</p> <p>RM 14 AQ 5-6 16 AQ 4 19 AQ 2 23 AQ 1-2, 3 ET</p> <p>19 AQ 2 23 AQ 1-2, 3 ET</p>
<p>Topic: Cellular to Multicellular <i>This topic focuses on the study of the basics of Modern Cell Theory. All organisms are composed of cells, which are the fundamental</i></p>		

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<i>unit of life. Cells carry on the many processes that sustain life. All cells come from pre-existing cells.</i>		
<p>1. Cells are the fundamental unit of life.</p> <p>All living things are composed of cells. Different body tissues and organs are made of different kinds of cells. The ways cells function are similar in all living organisms.</p> <p>Note 1: Specific information about the organelles that need to be addressed at this grade level will be found in the model curriculum.</p> <p>Note 2: Emphasis should be placed on the function and coordination of these components, as well as on their roles in overall cell function.</p>	<p>IALS Cell Biology and Disease (CB) 35, 37-42</p>	<p>CB 37 Procedure 38 AQ 1-6 39 AQ 2AD 42 AQ 1-5 + Ext [IB] C7, 13, 23</p> <p>38 AQ 1-6 41 AQ 4 42 STT 1b, 2; AQ 1-5 + Ext 43 AQ 1-4, 5UC 44 AQ3 45 STT 1a-b; AQ 1-2, 4, 7UC + Ext 46 AQ 3-4 [IB] C7, 13, 29</p>
<p>2. All cells come from pre-existing cells.</p> <p>Cells repeatedly divide resulting in more cells and growth and repair in multicellular organisms.</p> <p>Note: This is not a detailed discussion of the phases of mitosis or meiosis. The focus should be on reproduction as a means of transmitting genetic information from one generation to the next, cellular growth and repair.</p>	<p>IALS Cell Biology and Disease (CB) 37, 42</p> <p>Genetics (G) 57, 63</p>	<p>CB 37 AQ 1 42 “Cell Biology” call out questions</p> <p>G 57 STT 1, 3, AQ 1d 63 Reading + Ext</p>
<p>3. Cells carry on specific functions that sustain life.</p> <p>Many basic functions of organisms occur in cells.</p> <p>Cells take in nutrients and energy to perform work, like making various molecules required by that cell or an organism.</p> <p>Every cell is covered by a membrane that controls what can enter and leave the cell.</p> <p>Within the cell are specialized parts for the</p>	<p>IALS Cell Biology and Disease (CB) 39-42, 45</p>	<p>CB 39 AQ 2 AD 41 AQ 3-4 [IB] C 6 40 AQ1, 3AD, 4-5 + Ext [IB] C 15, 18 42 AQ 3-6 45 AQ2, 7 UC [IB] C19, 20</p> <p>39 AQ 2AD 41 AQ 3-4 [IB] C6</p>

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
<p>transport of materials, energy capture and release, protein building, waste disposal, information feedback and movement.</p> <p>Note 1: Emphasis should be placed on the function and coordination of cell components, as well as on their roles in overall cell function.</p> <p>Note 2: Additional information will be found in the model curriculum.</p>		<p>40 AQ1, 3AD, 4-5 + Ext [IB] C 15, 18</p> <p>42 AQ 3-6 45 AQ2, 7 UC [IB] C19, 20</p>
<p>4. Living systems at all levels of organization demonstrate the complementary nature of structure and function.</p> <p>Level of organization within organisms includes cells, tissues, organs, organ systems and whole organisms.</p> <p>Whether the organism is single-celled or multicellular, all of its parts function as a whole to perform the tasks necessary for the survival of the organism.</p> <p>Organisms have diverse body plans, symmetry and internal structures that contribute to their being able to survive in their environments.</p>	<p>IALS Body Works (BW) 12, 16, 21</p> <p>Cell Biology and Disease (CB) 38, 42-46</p> <p>Ecology (Eco) 74-76</p>	<p>BW 12 AQ 5 16 AQ 4 21 AQ 2-3 [IB] B13, 22</p> <p>CB 38 AQ 1-2, 5-6 42 AQ 1-7 43 AQ 1-4, 5 UC 44 AQ 1 45 AQ 7UC + Ext 46 AQ 3 [IB] C6, 17, 19</p> <p>BW 12 AQ 5 + Ext 16 AQ 7 [IB] B13, [IB] C16</p> <p>CB 38 AQ 1-2, 5-6 42 AQ 1-7 43 AQ 1-4, 5 UC 44 AQ 1 45 AQ 7 UC + Ext 46 AQ3 [IB] C6, 19</p> <p>Eco 74 AQ 3 75 AQ 1-3 76 AQ 1-2</p>
<p>Physical Sciences Topic: Matter and Motion <i>This topic focuses on the study of foundational concepts of the particulate</i></p>		

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
<i>nature of matter, linear motion, and kinetic and potential energy.</i>		
<p>1. All matter is made up of small particles called atoms.</p> <p>Each atom takes up space, has mass and is in constant motion. Mass is the amount of matter in an object.</p> <p>Elements are a class of substances composed of a single kind of atom.</p> <p>Molecules are the combination of two or more atoms that are joined together chemically.</p> <p>Compounds are composed of two or more different elements. Each element and compound has properties, which are independent of the amount of the sample</p>	<p>Chemistry of Materials (CM) 14-17, 20-21</p> <p>IAPS Studying Materials Scientifically (SMS) 9-10</p>	<p>CM 14 AQ 2-4 15 AQ 1, 3-5 16 AQ all 17 AQ all 20 AQ 3-5 21 AQ 2-3 [IB] B9-11</p> <p>SMS 9 AQ3 10 AQ1</p> <p>CM 15 AQ 1, 3-5 16 STT 1-3, 6; AQ 3-4 17 AQ 1 [IB] B9-10</p> <p>16 STT 5-6; AQ 1-4 17 AQ 2-7 20 AQ 3-5 21 AQ 2-3</p> <p>14 AQ 2-4 16 STT 1, 5-6; AQ 1-3 [IB] B11</p>
<p>2. Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion.</p> <p>Atoms and molecules are not changed in structure when a substance undergoes a change of state; the amount of motion of the atoms and molecules is changed. Thermal energy is a measure of the motion of the atoms and molecules in a substance.</p> <p>Mass is conserved when substances undergo</p>	<p>IAPS Water (W) 35</p> <p>Energy (E) 56, 58</p> <p><i>58A (supplemental activity available separately)</i></p>	<p>W 35 AQ 6</p> <p>E 56 Intro 58 AQ 1-5 58A AQ 1-5</p>

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
changes of state. Note: Thermal energy can be connected to kinetic energy at this grade level.		58 AQ 3-5 <i>58A AQ 1-5</i>
3. There are two categories of energy: kinetic and potential. Objects and substances in motion have kinetic energy. Objects and substances can store energy as a result of its position (potential energy). Note: Kinetic and potential energy should be introduced at the macroscopic level for this grade. Chemical and elastic potential energy should not be included at this grade; this is found in PS Grade 8	IAPS Energy (E) 54-58	E 54 AQ 2, 5 55 AQ 1, 3 56 AQ 4 57 AQ 1, 3 58 AQ 1-2 [IB] D1 54 AQ 2, 5 55 AQ 1-3 56 AQ 4 58 AQ 1-2 54 AQ 2, 5 55 AQ 1, 3 56 AQ 4 57 AQ 1, 3 58 AQ 1-2
4. An object's motion can be described by its speed and the direction in which it is moving. An object's position and speed can be measured and graphed as a function of time. Note 1: This begins to quantify student observations using appropriate mathematical skills. Note 2: Velocity and acceleration rates should not be included at this grade level; these terms are introduced in high school.	IAPS Force and Motion (FM) 74, 75	FM 74 AQ 1, 3, 5 75 AQ 1-4 + Ext [IB] E2, 14 75 AQ 1-4 [IB] E1, 5, 14
Science Inquiry and Application <i>During the years of grades 5-8 all students must use the following scientific processes to construct their knowledge and understanding in all science content areas:</i>		
This group of expectations map to all Units in the 6 th grade sequence.		
1. Identify questions that can be answered through scientific investigations	IAES Studying Soil	

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
	Scientifically (SSS) 1-4, 6-7, 9 Rocks and Minerals (RM) 12,13, 16, 17, 18, 20, 23 IAPS Studying Materials Scientifically (SMS) 3, 5 IALS Studying People Scientifically (SPS) 1-3, 5, 9-10 Body Works (BW) 14, 16-17, 19, 24, 26-27 Cell Biology and Disease (CB) 30, 32, 35-36, 38-41, 43, 47-48, 50-51, 53	
2. <i>Design and conduct a scientific investigation</i>	IAES Studying Soil Scientifically (SSS) 1-2, 10 Rocks and Minerals (RM) 12-14, 16-17 IAPS Studying Materials Scientifically (SMS) 3, 5, 10 IALS Body Works (BW) 14, 24 Cell Biology and Disease (CB) 36, 47-48	SMS 3 Proc DI 10 Proc DI RM 16 Proc DI BW 14 Proc DI CB 48 Proc DI
3. <i>Use appropriate mathematics, tools and techniques to gather data and information</i>	IAES Studying Soil	

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	Scientifically (SSS) 3-4, 6, 10 Rocks and Minerals (RM) 12-13, 16-17, 20 IAPS Studying Materials Scientifically (SMS) 6-10 IALS Body Works (BW) 14, 16-17, 19, 21-24, 26-27 Cell Biology and Disease (CB) 30-32, 35-36, 38-41, 43, 46-48, 51, 53	
4. <i>Analyze and interpret data</i>	IAPS Studying Materials Scientifically (SMS) 6-7, 10 IALS Body Works (BW) 14, 19, 22 Cell Biology and Disease (CB) 30, 39-40, 47, 51	SMS 6 AQ1 AD 7 AQ1 AD 10 AQ1 AD BW 14 AQ4 AD 19 AQ3b AD 22 AQ2-3 AD CB 30 AQ1a AD 39 AQ2 AD 40 AQ3 AD 47 AQ2 AD 51 AQ1 AD
5. <i>Develop descriptions, models, explanations and predictions</i>	IAES Studying Soil Scientifically (SSS) 1-4, 6-7, 10 Rocks and Minerals (RM) 12-14, 16-17, 20-22	

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
	IALS Body Works (BW) 14, 16-17, 19-22, 26-27, 29 Cell Biology and Disease (CB) 32, 34, 36, 38-41, 43-44	
<i>6. Think critically and logically to connect evidence and explanations</i>	IAES Studying Soil Scientifically (SSS) 2, 4, 7-8, 11 Rocks and Minerals (RM) 13-14, 16-17, 20, 22 IALS Body Works (BW) 14, 17, 19, 21-22, 26-27 Cell Biology and Disease (CB) 30, 32, 36, 38-41, 43, 46-51, 53	
<i>7. Recognize and analyze alternative explanations and predictions</i>	IAES Studying Soil Scientifically (SSS) 11 Rocks and Minerals (RM) 12, 16-18, 20 IAPS Studying Materials Scientifically (SMS) 2, 8 IALS Body Works (BW) 14, 17, 21, 24, 27 Cell Biology (CB) 30, 32, 36, 38-41, 43-44, 46-48, 53	
Above and beyond standards for STEM Applications and 21st Century Skill Development		
A. Design and build a product or create a	IALS	

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		Analysis Question (AQ) Act. No.-AQ No. Or Item Bank [IB]
solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects).	Body Works (BW) 24 Cell Biology and Disease (CB) 48	BW 24 AQ1-4(Evaluating a circulation model) CB 48 Procedure; AQ5, 6; AQ 3 UC, (Design a hand washing procedure) [IB] C25

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<p>Grade 7 Theme: Order and Organization</p> <p><i>This theme focuses on helping students use scientific inquiry to discover patterns, trends, structures and relationships that may be described by simple principles. These principles are related to the properties or interactions within and between systems.</i></p> <p>Strand Connections: <i>Systems can exchange energy and/or matter when interactions occur within systems and between systems. Systems cycle matter and energy in observable and predictable patterns.</i></p>		
<p>Earth and Space Science Topic: Cycles and Patterns of Earth and the Moon</p> <p><i>This topic focuses on Earth's hydrologic cycle, patterns that exist in atmospheric and oceanic currents, the relationship between thermal energy and the currents, and the relative position and movement of the Earth, sun and moon.</i></p>		
<p>1. The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere and atmosphere.</p> <p>Thermal energy is transferred as water changes state throughout the cycle. The cycling of water in the atmosphere is an important part of weather patterns on Earth. The rate at which water flows through soil and rock is dependent upon the porosity and permeability of the soil or rock.</p> <p>Note: Contamination can occur within any step of the hydrologic cycle. Ground water is easily contaminated as pollution present in the soil or spilled on the ground surface moves into ground water and can impact numerous water sources.</p>	<p>IAES Weather and Atmosphere (WA) 60-62</p> <p>IAPS Water (W) 34, 39</p>	<p>WA 60 AQ 1-2 61 AQ 1-3 62 AQ 1-23 4 SI [IB] E 3, 4, 6, 11, 15</p> <p>W 34 AQ1 UC, 2 39 AQ 1-6, 7 SI [IB] C 4</p> <p>WA 60 AQ 1-2 61 AQ 1-3 62 AQ 1-23 4 SI [IB] E 3, 4, 6, 11, 15</p> <p>W 34 AQ1 UC, 2 39 AQ 1-6, 7 SI 41 AQ 2 + Ext [IB] C 4</p>
<p>2. Thermal energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.</p> <p>The sun is the major source of energy for wind, air and ocean currents and the hydrologic cycle. As thermal energy transfers occur in the atmosphere and ocean,</p>	<p>IAES Weather and Atmosphere (WA) 55-58</p>	<p>WA 56 AQ1 57 AQ 1, 3-4 58 STT 2-3, AQ 1-3 [IB] E 7, 10</p>

Key to Alignment Document		
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<p>currents form. Large bodies of water can influence weather and climate. The jet stream is an example of an atmospheric current and the Gulf Stream is an example of an oceanic current. Ocean currents are influenced by factors other than thermal energy, such as water density, mineral content (such as salinity), ocean floor topography and Earth's rotation. All of these factors delineate global climate patterns on Earth.</p> <p>Note: This content statement is related to LS grade 7</p>	<p>IALS Ecology (Biomes)</p>	<p>55 AQ3 56 AQ 1-4 57 AQ 1, 3-4 58 STT 2-3, AQ 1-3 [IB] E7, 10</p>
<p>3. The atmosphere has different properties at different elevations and contains a mixture of gases that cycle through the lithosphere, biosphere, hydrosphere and atmosphere.</p> <p>The atmosphere is held to the Earth by the force of gravity. There are defined layers of the atmosphere that have specific properties, such as temperature, chemical composition and physical characteristics. Gases in the atmosphere include nitrogen, oxygen, water vapor, carbon dioxide and other trace gases. Biogeochemical cycles illustrate the movement of specific elements or molecules (such as carbon or nitrogen) through the lithosphere, biosphere, hydrosphere and atmosphere.</p> <p>Note: The emphasis is on why the atmosphere has defined layers, not on naming the layers.</p>	<p>IAES Weather and Atmosphere (WA) 63-66</p>	<p>WA 63 AQ 3, 4 UC 64 AQ 1-4 65 AQ 1-3 66 AQ 1, 2 UC [IB] E 4, 5</p> <p>63 AQ 3, 4 UC 64 AQ 1-4 65 AQ 1-3 66 AQ 1, 2 UC [IB] E 4, 5</p>
<p>4. The relative patterns of motion and positions of the Earth, moon and sun cause solar and lunar eclipses, tides and phases of the moon.</p> <p>The moon's orbit and its change of position relative to the Earth and sun result in different parts of the moon being visible from Earth (phases of the moon). A solar eclipse is when Earth moves into the shadow of the moon</p>	<p>IAES Earth in Space (ES) 79-84</p>	<p>ES 79 AQ 1-5 80 AQ 1-5 81 AQ 1-3, 5 UC, 6 + Ext 82 AQ 1-2, 3 AD + Ext 83 AQ 2 84 AQ1, Procedure [IB] F 3-9</p> <p>79 AQ 1-5 80 AQ 1-5 81 AQ 1-3, 5 UC, 6 + Ext</p>

Key to Alignment Document		
Ohio Content Statements	Unit Title-Activity Number(s)	Ohio Assessment Blueprint Analysis Question (AQ) Act. No.-AQ No.Or Item Bank [IB]
		82 AQ1, 3 AD 84 AQ 1 [IB] F 4-6, 8, 9
Life Science Topic: Cycles of Matter and Flow of Energy <i>This topic focuses on the impact of matter and energy transfer within the biotic component of ecosystems.</i>		
<p>1. Matter is transferred continuously between one organism to another and between organisms and their physical environments.</p> <p>Plants use the energy in light to make sugars out of carbon dioxide and water (photosynthesis).</p> <p>These materials can be used immediately or stored for later use. Organisms that eat plants break down plant structures to produce the materials and energy they need to survive. Then they are consumed by other organisms.</p> <p>Energy can transform from one form to another in living things. Animals get energy from oxidizing their food, releasing some of its energy as heat. The total amount of matter and energy remains constant, even though its form and location change.</p> <p>Note 1: Chemical reactions are presented as the rearrangement of atoms in molecules.</p> <p>Note 2: Chemical reactions in terms of subatomic structures of atoms are not appropriate.</p>	<p>IALS Ecology (Eco) 78-81</p> <p><i>81A (supplemental activity available separately)</i></p>	<p>Eco 78 AQ 1-3 79 STT 2, 4 AQ 2 80 AQ 1-4 81 AQ 2, 4-5 81A AQ 1-3</p> <p>81 AQ 2, 4-5 <i>81A AQ 1-3</i></p> <p>78 AQ 1-3 79 STT 2, 4 80 AQ 1-4 <i>81A AQ 1-3</i></p> <p>78 AQ 1-3 79 STT 2, 4 AQ 2 80 AQ 1, 3</p>
<p>2. In any particular biome, the number, growth and survival of organisms and populations depend on biotic and abiotic factors.</p> <p>Biomes are regional ecosystems characterized by distinct</p>	<p>IALS Ecology (Eco) 72-73, 77, 79, 81, 83-85</p>	<p>Eco 72 AQ1-7 73 AQ 3 77 AQ 1-8 79 AQ3-4 81 AQ 6 83 AQ 2-7 +Ext. 84 AQ 1-6 85 AQ 1-4</p> <p>83 AQ 4-7 +Ext.</p>

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Ohio Content Statements	Unit Title-Activity Number(s)	Ohio Assessment Blueprint Analysis Question (AQ) Act. No.-AQ No.Or Item Bank [IB]
<p>types of organisms that have developed under specific soil and climatic conditions.</p> <p>The variety of physical (abiotic) conditions that exists on Earth gives rise to diverse environments (biomes) and allows for the existence of a wide variety of organisms (biodiversity).</p> <p>Ecosystems are dynamic in nature; the number and types of species fluctuate over time. Disruptions, deliberate or inadvertent, to the physical (abiotic) or biological (biotic) components of an ecosystem impact the composition of an ecosystem.</p> <p>Note: Predator-prey and producer-consumer relations are addressed in grade 5.</p>		<p>83 AQ2,5</p> <p>72 AQ1-7 73 AQ 3 77 AQ 1-8 79 AQ3-4 81 AQ 6 84 AQ 1-6 85 AQ 1-4</p>
<p>Physical Science Topic: Conservation of Mass and Energy</p> <p><i>This topic focuses on the empirical evidence for the arrangements of atoms on the Periodic Table of Elements, conservation of mass and energy, transformation and transfer of energy.</i></p>		
<p>1. The properties of matter are determined by the arrangement of atoms.</p> <p>Elements can be organized into families of elements with similar properties, such as highly reactive metals, less-reactive metals highly reactive nonmetals and some almost-completely nonreactive gases. Substances are classified according to their properties, such as metals and acids.</p> <p>When substances are combined in a mixture, the new product may have different properties, but the amount of mass does not change.</p> <p>Note 1: This is the conceptual introduction of the Periodic Table of Elements.</p> <p>Note 2: Acids and bases are included in this topic; further detail will be provided in the Model Curriculum.</p>	<p>IAPS Chemistry of Materials (CM) 15-17, 19-21, 25</p>	<p>CM 15 AQ 1, 3 16 STT 5; AQ 1-2, 4 17 AQ 1-5, 6UC 19 AQ 1-2 20 AQ 1-4 21 AQ 2-3 [IB] B 8, 19, 20</p> <p>15 AQ 1, 3-4, 5UC 16 STT 3-4 [IB] B8</p> <p>25 AQ 2-3 28 AQ 1 extension</p>

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<p>Note 3: It is important to emphasize that most changes in the properties of matter have some combination of chemical and physical change (at different levels).</p>		
<p>2. Energy can be transformed from one form to another or can be transferred from one location to another, but is never lost.</p> <p>When energy is transferred from one system to another, the quantity of energy before transfer equals the quantity of energy after transfer. When energy is transformed from one form to another, the total amount of energy remains the same.</p> <p>Note: Further discussion of energy transformation is addressed at the high school level.</p>	<p>IAPS Energy (E) 57-58, 62-63, 67</p>	<p>E 57 AQ 1-2, 3UC 58 AQ 2UC 62 AQ 1-5 63 AQ 3-4, 6AD 67 AQ 2-4, 5AD [IB] D2</p> <p>57 AQ 1-2, 3UC 58 AQ 2UC 62 AQ 1-5 63 AQ 3-4, 6AD 67 AQ 2-4, 5AD [IB] D2</p>
<p>3. Energy can be transferred through a variety of ways.</p> <p>Thermal energy can be transferred through radiation, convection and conduction. Mechanical energy can be transferred when objects push or pull on each other over a distance. Electromagnetic waves transfer energy when they interact with matter. Electrical energy transfers when an electrical source is connected in a complete electrical circuit to an electrical device.</p> <p>Note 1: Energy transfers should be experiential and observable. This builds upon PS grade 4 and is directly connected to ESS grade 7 (thermal energy transfers in the hydrologic cycle).</p>	<p>IAPS Energy (E) 54-70 Waves (WV) 89-99</p>	<p>E 54 AQ 1-5 55 AQ 1, 3-4 56 AQ 3-4 57 AQ 1 58 AQ 1, 2UC 59 AQ 3-4 60 AQ 3 61 AQ 5-6 + Ext 62 AQ 3, 5 63 AQ 2, 6AD + Ext 64 AQ 1 65 Ext 66 AQ 1-4 69 AQ 1 + Ext [IB] D2, 4-5, 8-9, 11, 19</p> <p>54 AQ 1-5 55 AQ 1, 3-4 56 AQ 3-4 57 AQ 1</p>

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<p>Note 2: Electricity can be measured through current, voltage and resistance. In addition, renewable energy systems should be included (such as wind, geothermal, water or solar).</p> <p>Note 3: The types of waves used within this topic include seismic, oceanic, sound and light. Seismic waves also are found in ESS grade 8.</p>		58 AQ 1, 2UC 59 AQ 3-4 60 AQ 3 61 AQ 5-6 62 AQ 3, 5 63 AQ 2, 6AD 64 AQ 1 66 AQ 1-4 69 AQ 1 [IB] D4-5, 7-9, 11, 18-19 WV 90: AQ1 94: AQ 4, 6 95: AQ 1-3 96: AQ 1-5 97: AQ 5-6
<p>Science Inquiry and Application</p> <p><i>During the years of grades 5-8 all students must use the following scientific processes to construct their knowledge and understanding in all science content areas:</i></p>		
<p>This group of expectations map to all SEPUP Units at this grade level.</p>		
<p>1. <i>Identify questions that can be answered through scientific investigations</i></p>	<p>IAES Weather and Atmosphere (WA) 52, 54-55, 59, 61, 63-64, 67-70</p> <p>IAPS Chemistry of Materials (CM) 14, 18, 22 Energy (E) 56, 66, 68, 70</p> <p>IALS Ecology (Eco) 74-78, 80-84, 86</p>	
<p>2. <i>Design and conduct a scientific investigation</i></p>	<p>IAES Weather and</p>	<p>WA</p>

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Ohio Content Statements	Unit Title- Activity Number(s)	Ohio Assessment Blueprint Analysis Question (AQ) Act. No.-AQ No.Or Item Bank [IB]
	Atmosphere (WA) 52, 55, 67 IAPS Energy (E) 54, 59- 61, 65-66, 68, 70 IALS Ecology (Eco) 81, 83, 86	55 Proc DI 67 Proc DI E 54 Proc DI 65 Proc DI 66 Proc DI 68 Proc DI Eco 81 Proc DI 83 Proc DI; AQ3 DI
3. Use appropriate mathematics, tools and techniques to gather data and information	IAES Weather and Atmosphere (WA) 51-52, 55, 63, 67, 69 IAPS Chemistry of Materials (CM) 14, 18 Energy (E) 61-63, 65-68, 70 IALS Ecology (Eco) 73- 74, 77-78, 80-83, 86	
4. Analyze and interpret data	IAPS Chemistry of Materials (CM) 18 Energy (E) 63-64, 67 IALS Ecology (Eco) 77, 84-85, 88	CM 18 AQ3 AD E 63 AQ6 AD 64 AQ4 AD 67 AQ5 AD Eco 77 AQ4 AD; AQ6 AD 84AQ 1b AD; AQ 3b AD

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		85 AQ 1a-b AD 88 AQ2 AD
5. <i>Develop descriptions, models, explanations and predictions</i>	<p>IAES Weather and Atmosphere (WA) 52-57, 59, 61-64, 67-70</p> <p>IAPS Chemistry of Materials (CM) 15, 20</p> <p>Energy (E) 54, 56, 61, 63, 65-68, 70</p> <p>IALS Ecology (Eco) 72, 74-77, 81-88</p>	
6. <i>Think critically and logically to connect evidence and explanations</i>	<p>IAES Weather and Atmosphere (WA) 51-52, 54-55, 57, 61-64, 67-70</p> <p>IAPS Chemistry of Materials (CM) 18</p> <p>Energy (E) 54, 65-66, 68, 70</p> <p>IALS Ecology (Eco) 74-77, 81, 83-88</p>	
7. <i>Recognize and analyze alternative explanations and predictions</i>	<p>IAES Weather and Atmosphere (WA) 69-70</p> <p>IAPS Chemistry of Materials (CM) 13,</p>	

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	23, 24, 26, 27-29 Energy (E) 59, 65, 70 IALS Ecology (Eco) 72, 74-78, 81, 83-84, 86, 88	
8. <i>Communicate scientific procedures and explanations</i>	IAES Weather and Atmosphere (WA) 50, 54-55, 67, 69 IAPS Chemistry of Materials (CM) 18, 27 Energy (E) 54, 56, 59, 61, 65-66, 68, 70 IALS Ecology (Eco) 73-75, 77, 79, 81, 83, 86	
Above and beyond standards for STEM Applications and 21 st Century Skill Development		
A. Design and build a product or create a solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects).	IAPS Chemistry of Materials (CM) 13, 22, 29 Energy (E) 64, 67,	CM 13 Proc RE, GI; [IB] B2-3 (Construct a product life cycle diagram for their drink container) 22 Proc OD (Recommend alternate materials for circuit boards) 29 AQ1 ET; [IB] B22-23 (Choose a 'green' computer) 29 Procedure; AQ2-3; AQ1 ET

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Ohio Content Statements	Unit Title- Activity Number(s)	Ohio Assessment Blueprint Analysis Question (AQ) Act. No.-AQ No.Or Item Bank [IB]
	71-72 IAES Earth in Space (ES) 75, 83	[IB] B22-23 E 64 AQ3-4 (Evaluate electricity generation sources) 67 AQ5 (Evaluate light bulb efficiency) 71 AQ1-3 + Ext 72 AQ1-4 + Exts (Design an energy efficient home) ES 75 (Sun Stick problem) 83 ET (Recommend calendar)

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Ohio Content Statement	Unit Title-Activity Number(s)	Ohio Assessment Blueprint by Analysis Question (AQ) Activity No.-AQ No. Or Item Bank [IB]
<p>Grade 8 Theme: Order and Organization</p> <p><i>This theme focuses on helping students use scientific inquiry to discover patterns, trends, structures and relationships that may be described by simple principles. These principles are related to the properties or interactions within and between systems.</i></p> <p>Strand Connections: <i>Systems can be described and understood by analysis of the interaction of their components. Energy, forces and motion combine to change the physical features of the Earth. The changes of the physical Earth and the species that have lived on Earth are found in the rock record. For species to continue, reproduction must be successful.</i></p>		
<p>Earth and Space Science</p> <p>Topic: Physical Earth</p> <p><i>This topic focuses on the physical features of Earth and how they formed. This includes the interior of Earth, the rock record, plate tectonics and landforms.</i></p>		
<p><i>The Universe—This group of expectations map primarily to the “Erosion and Deposition” (ED) and “Plate Tectonics” (PT) SEPUP Units ...context is provided by the issue of determining a location of a nuclear waste storage facility.</i></p>		
<p>1. The composition and properties of Earth’s interior are identified by the behavior of seismic waves.</p> <p>The refraction and reflection of seismic waves as they move through one type of material to another is used to differentiate the layers of Earth’s interior. Earth has an inner and outer core, an upper and lower mantle, and a crust.</p> <p>The formation of the planet generated heat from gravitational energy and the decay of radioactive elements, which is still present today. Heat released from Earth’s core drives convection currents throughout the mantle and the crust.</p> <p>Note: The thicknesses of each layer of Earth can vary and be transitional, rather than uniform and distinct as often depicted in textbooks.</p>	<p>IAES Plate Tectonics (PT) 38, 46-47</p>	<p>PT 38 AQ 1-3, 5 UC [IB] D6-7, 15 46 AQ 1-4 47 AQ 1-4</p> <p>38 AQ 1-4, 5 UC [IB] D6-7, 15</p> <p>46 AQ 1-4 47 AQ 1-4</p>
<p>2. Earth’s crust consists of major and minor tectonic</p>	<p>IAES</p>	

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<p>plates that move relative to each other.</p> <p>Historical data and observations such as fossil distribution, paleomagnetism, continental drift and sea-floor spreading contributed to the theory of plate tectonics. The rigid tectonic plates move with the molten rock and magma beneath them in the upper mantle.</p> <p>Convection currents in the crust and upper mantle cause the movement of the plates. The energy that forms convection currents comes from deep within the Earth.</p> <p>There are three main types of plate boundaries: divergent, convergent and transform. Each type of boundary results in specific motion and causes events (such as earthquakes or volcanic activity) or features (such as mountains or trenches) that are indicative of that type of boundary.</p>	<p>Plate Tectonics (PT) 40, 42, 44-48</p>	<p>PT 40 AQ 2 42 AQ 3 44 AQ3 + Ext 46 AQ 4 47 AQ 4 48 AQ 4 UC [IB] D 3-4, 8-12, 14, 16</p> <p>40 AQ 1-4 42 AQ 1-3 44 AQ 1-5 + Ext 47 AQ 2-3 [IB] D 9</p> <p>46 AQ 3-4 47 AQ 1</p> <p>45 AQ 1-4 47 AQ 4 48 AQ 1-3, 4 UC + Ext [IB]D3, 8, 10-12, 14, 16</p>
<p>3. A combination of constructive and destructive geologic processes formed Earth's surface.</p> <p>Earth's surface is formed from a variety of different geologic processes, including but not limited to plate</p>	<p>IAES Erosion and Deposition (ED) 28-34</p> <p>Plate Tectonics (PT) 37-38, 40-42, 44-45</p>	<p>ED 28 AQ 3-5 29 AQ 1, 3-5, 2 UC + Ext 30 AQ 1-2 31 AQ 3-5 32 AQ 1-5 + Ext 33 AQ 1-3 + Ext [IB] C 1, 7, 10-12</p> <p>PT 37 AQ3 40 AQ 1-4 41 AQ1, 3 UC, SI 42 AQ 1-3 44 AQ 2-3</p>

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<p>tectonics.</p> <p>Note: The introduction of Earth’s surface is found in ESS grade 4.</p>		<p>[IB] D 8, 12, 16</p> <p>37 AQ3 40 AQ 1-4 41 AQ1, 3 UC, SI 42 AQ 1-3 44 AQ 2-3 [IB] D 8, 12, 16</p>
<p>4. Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.</p> <p>Earth is approximately 4.6 billion years old. Earth history is based on observations of the geologic record and the understanding that processes observed at present day are similar to those that occurred in the past (uniformitarianism). There are different methods to determine relative and absolute age of some rock layers in the geologic record. Within a sequence of undisturbed sedimentary rocks, the oldest rocks are at the bottom (superposition). The geologic record can help identify past environmental and climate conditions.</p> <p>Note: Environmental and climate conditions also can be documented through the cryosphere as seen through ice cores.</p>	<p>IAES Plate Tectonics (PT) 39-42, 44</p> <p>IALS Evolution (Evo) 93</p>	<p>PT 39 AQ 2-5 40 AQ 1-4 + Ext 41 AQ 1, 3UC 42 AQ 1, 3 44 AQ 2-3, 5</p> <p>39 AQ 2-5 40 AQ 1-4 + Ext 41 AQ 1, 3 UC 42 AQ 1, 3 44 AQ 2-3, 5 [IB] D 5</p> <p>Evo 93 AQ 5 - 6</p>
<p>Life Science Topic: Species and Reproduction</p> <p><i>This topic focuses on continuation of the species.</i></p>		
<p>This group of expectations maps to the “Evolution” (Evo) SEPUP Unit and “Genetics” (G) at 6th grade ...<i>the issue of saving endangered species provides context for Evolution.</i></p>		
<p>1. Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species.</p>	<p>IALS Evolution (Evo) 89-90, 92, 94-99, 101</p>	<p>Evo 90 Q 2, 3b, 4 92 AQ1</p>

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<p>Fossils provide important evidence of how life and environmental conditions have changed.</p> <p>Changes in environmental conditions can affect how beneficial a trait will be for the survival and reproductive success of an organism or an entire species.</p> <p>Throughout Earth’s history, extinction of a species has occurred when the environment changes and the individual organisms of that species do not have the traits necessary to survive and reproduce in the changed environment. Most species (approximately 99 percent) that have lived on Earth are now extinct.</p> <p>Note: Population genetics and the ability to use statistical mathematics to predict changes in a gene pool are reserved for grade 10.</p>		<p>98 AQ1-5 99 AQ 1b, 3-4 92 AQ3 89 AQ1-2 94 AQ1-4 95 AQ 1-6 96 AQ 1-7 97 AQ 1-3 99 AQ 3,4 101 AQ 1-5</p> <p>90 Q 2, 3b, 4 92 AQ1 98 AQ1-5 99 AQ 1b, 3-4</p> <p>92 AQ3</p> <p>89 AQ1-2 94 AQ1-4 95 AQ 1-6 96 AQ 1-7 97 AQ 1-3 99 AQ 3,4 101 AQ 1-5</p>
<p>2. Reproduction is necessary for the continuation of every species.</p> <p>Every organism alive today comes from a long line of ancestors who reproduced successfully every generation. Reproduction is the transfer of genetic information from one generation to the next. It can occur with mixing of genes from two individuals (sexual reproduction). It can occur with the transfer of genes from one individual to the next generation (asexual reproduction). The ability to</p>	<p>IALS Evolution (Evo) 94, 96-97</p>	<p>Evo 94 AQ 1-4 96 AQ 1-7 97 AQ 3</p> <p>94 AQ 1-4 96 AQ 1-7 97 AQ 3</p>

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reproduce defines living things.		
<p>3. The characteristics of an organism are a result of inherited traits received from parent(s).</p> <p>Expression of all traits is determined by genes and environmental factors to varying degrees. Many genes influence more than one trait, and many traits are influenced by more than one gene.</p> <p>During reproduction, genetic information (DNA) is transmitted between parent and offspring. In asexual reproduction, the lone parent contributes DNA to the offspring. In sexual reproduction, both parents contribute DNA to the offspring.</p> <p>Note 1: The focus should be the link between DNA and traits without being explicit about the mechanisms involved.</p> <p>Note 2: Students are not expected to know any of the ways in which bacteria reproduce.</p> <p>Note 3: The molecular structure of DNA is not appropriate at this grade level.</p>	<p>IALS Genetics (G) 54, 56-61, 63-65</p>	<p>G 54 AQ 1-4 56 AQ3 59 AQ1-7 60 AQ 1,4 64 AQ 1-6 65 AQ 4-8 57 SST 1-4, AQ 1-2 58 AQ 1-2 63 AQ 1</p> <p>54 AQ 1-4 56 AQ3 59 AQ1-7 60 AQ 1,4 64 AQ 1-6 65 AQ 4-8</p> <p>57 SST 1-4, AQ 1-2 58 AQ 1-2 63 AQ 1</p>
<p>Physical Science Topic: Forces and Motion</p> <p><i>This topic focuses on forces and motion within, on and around the Earth and within the universe.</i></p>		
<p>Physical Sciences—This group of expectations map to the “Force and Motion” (FM) and Exploring the Solar System (EX). This content would have been taught and assessed in the 7th grade “Earth in Space” (ES) and the “Energy” (E) SEPUP Units ...<i>the issue of vehicle safety provides context for</i> “Force and Motion” ...manned vs. un-manned space exploration provides context for “Exploring the Solar System.”</p>		

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<p>1. Some forces between objects act when the objects are in direct contact or when they are not touching.</p> <p>Magnetic, electrical and gravitational forces can act at a distance.</p> <p>Note: Direct contact forces were addressed in the elementary grades.</p>	<p>IAES Exploring Space (EX) 95-96</p>	<p>EX 95 AQ 1-3, 4AD 96 STT 2-3, 5; AQ 1-3</p> <p>95 AQ 1-3, 4AD 96 STT 2-3, 5; AQ 1-3</p>
<p>2. Forces have magnitude and direction.</p> <p>The motion of an object is always measured with respect to a reference point.</p> <p>Forces can be added. The net force on an object is the sum of all of the forces acting on the object. The net force acting on an object can change the object's direction and/or speed.</p> <p>When the net force is greater than zero, the object's speed and/or direction will change. When the net force is zero, the object remains at rest or continues to move at a constant speed in a straight line.</p>	<p>IAPS Force and Motion (FM) 75-76, 80-81</p>	<p>FM 75 AQ 1-5 + Ext 76 AQ4 80 STT 3, 5; AQ 2UC 81 AQ 1-5 [IB] E 2, 3, 10, 12, 13, 15, 16</p> <p>75 AQ 1-5 + Ext 76 AQ4</p> <p>80 STT 3, 5; AQ 2UC 81 AQ 1-5 [IB] E3, 12, 13, 15</p> <p>80 STT 3, 5; AQ 2UC 81 AQ 1-5 [IB] E 2, 3, 10, 12, 13, 15, 16</p>
<p>3. There are different types of potential energy.</p> <p>Gravitational potential energy changes in a system as the masses or relative position(s) of objects are changed. Objects can have elastic potential energy due to their compression, or chemical potential energy due to the nature and arrangement of the atoms that make up the object.</p>	<p>IAPS Energy (E) 54-55, 58, 65, 67, 71</p>	<p>E 54 AQ 1-5 55 AQ 1 58 AQ1, 2UC 65 AQ 2-3, 5 [IB] D 1, 4, 13</p> <p>54 AQ 1-5 55 AQ 1 58 AQ1, 2UC 65 AQ 2-3, 5</p>

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		[IB] D 1, 4, 13
Science Inquiry and Application <i>During the years of grades 5-8 all students must use the following scientific processes to construct their knowledge and understanding in all science content areas:</i>		
This group of expectations map to all SEPUP Units		
1. <i>Identify questions that can be answered through scientific investigations</i>	IAES Erosion and Deposition (ED) 24, 26, 27, 31-32 Plate Tectonics (PT) 36, 41, 44, 46, 49 Earth in Space (ES) 71-72, 74-77, 79, 82-83 Exploring Space (EX) 86, 88, 94, 98 IAPS Force and Motion (FM) 74, 76-77, 79, 81-82, 85-86 IALS Genetics (G) 54-55, 58-60, 64-65, 69 Evolution (Evo) 90-93, 95-96, 99-100 Bioengineering 102, 105-107, 109	
2. <i>Design and conduct a scientific investigation</i>	IAES Erosion and Deposition (ED) 31	

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	Plate Tectonics (PT) 46 IAPS Force and Motion (FM) 74, 77, 86 IALS Genetics (G) 64 Bioengineering 104-105, 109	FM 74 Proc DI 77 Proc DI G 64 Proc DI Bioengineering 104 Proc DI 105 Proc DI 109 Proc DI
3. Use appropriate mathematics, tools and techniques to gather data and information	IAES Erosion and Deposition (ED) 27-28, 31-32 Plate Tectonics (PT) 37, 44 Exploring Space (EX) 86, 93-95 IAPS Force and Motion (FM) 74, 76-77, 79, 81-82, 85-86 IALS Genetics (G) 54-55, 59-62, 64, 66, 69 Evolution (Evo) 90- 91, 93, 95-96, 98 Bioengineering 104-	

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	106, 109	
4. <i>Analyze and interpret data</i>	<p>IAES Earth in Space (ES) 76, 82</p> <p>Exploring Space (EX) 95</p> <p>IAPS Force and Motion (FM) 83, 87</p> <p>IALS Genetics (G) 62, 64, 66</p> <p>Evolution (Evo) 91, 96, 98</p>	<p>ES 76 AQ4 AD 82 AQ4 AD EX 95 AQ4 AD</p> <p>FM 83 AQ6 AD 87 AQ5 AD</p> <p>G 62 Proc AD 64 AQ1 AD 66 AQ3-4 AD</p> <p>Evo 91 Proc AD 96 AQ2a AD 98 Proc AD</p>
5. <i>Develop descriptions, models, explanations and predictions</i>	<p>IAES Erosion and Deposition (ED) 26-28, 31-32, 34-35</p> <p>Plate Tectonics (PT) 37, 41-42, 44, 46</p> <p>Exploring Space (EX) 86, 88-91, 93- 95</p> <p>IAPS Force and Motion (FM) 73-74, 76-77, 79, 81-81, 85-86</p> <p>IALS</p>	

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Ohio Content Statement	Unit Title- Activity Number(s)	Ohio Assessment Blueprint by Analysis Question (AQ) Activity No.-AQ No. Or Item Bank [IB]
	Genetics (G) 54-55, 58-60, 62, 64, 66-68, 70-71 Evolution (Evo) 90- 91, 93, 95-95, 98- 101 Bioengineering 106-108	
<i>6. Think critically and logically to connect evidence and explanations</i>	IAES Plate Tectonics (PT) 36, 39, 40-49 Exploring Space (EX) 85-86, 88-96 IAPS Force and Motion (FM) 74, 76-79, 81- 83, 86-87 IALS Genetics (G) 54, 58- 60, 62, 64, 68, 70 Evolution (Evo) 89, 91, 94, 96, 98, 100- 101 Bioengineering 107-108	
<i>7. Recognize and analyze alternative explanations and predictions</i>	IAES Erosion and Deposition (ED) 24, 26-35 Plate Tectonics (PT) 36-37, 39-42, 49	

Key to Alignment Document		
Ohio Content Statement	Unit Title- Activity Number(s)	Ohio Assessment Blueprint by Analysis Question (AQ) Activity No.-AQ No. Or Item Bank [IB]
	Exploring Space (EX) 86, 88-89, 93 IAPS Force and Motion (FM) 73 IALS Genetics (G) 54-55, 58-59, 62, 64, 67-68, 70-71 Evolution (Evo) 89- 91, 94, 96, 98-99, 101 Bioengineering 102, 104-105, 107, 109	
8. <i>Communicate scientific procedures and explanations</i>	IAES Erosion and Deposition (ED) 25-32, 34, 35 Plate Tectonics (PT) 37, 39-44 Exploring Space (EX) 86, 88-94 IAPS Force and Motion (FM) 74, 76-77, 79, 81-83, 85, 87 IALS Evolution (Evo) 90, 93, 97, 99-100 Bioengineering 104-105, 107, 109	

Key to Alignment Document		
Ohio Content Statement	Unit Title-Activity Number(s)	Ohio Assessment Blueprint by Analysis Question (AQ) Activity No.-AQ No. Or Item Bank [IB]
Above and beyond standards for STEM Applications and 21st Century Skill Development		
Evaluate the overall effectiveness of a product design or solution.	<p>IAES Erosion and Deposition (ED) 32, 35</p> <p>Plate Tectonics (PT) 49</p> <p>Exploring Space (EX) 98</p> <p>IAPS Force and Motion (FM) 85, 87-88</p> <p>IALS Bioengineering (102-109)</p>	<p>ED 32 Proc GI; Ext [IB] C11, C12 (Make a breakwater) 35 AQ1 ET; [IB] C13 (Choose new housing site)</p> <p>PT 49 AQ2 ET (Recommend Nuclear Waste Storage Plan)</p> <p>EX 98 AQ2 ET, CS; [IB] G16, 20 (Recommend space mission)</p> <p>FM 85 Procedure (Design crash test dummy) 87-88 (Evaluate car designs for safety)</p>