LAB-AIDS CORRELATIONS FOR THE DELAWARE SCIENCE STANDARDS

GRADES 6-8

With Assessment Guidelines information

Materials from the Science Education for Public Understanding Program (SEPUP) are developed at the Lawrence Hall of Science, at the University of California, Berkeley, and distributed nationally by LAB-AIDS, Inc. SEPUP materials are supported by grants from the National Science Foundation. All other materials developed by LAB-AIDS. This correlation is intended to show selected locations in SEPUP 2nd Edition programs that support the Delaware Science Standards. It is not an exhaustive list; other locations may exist that are not listed here.

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Note: *Standards in italics* may be assessed by the state-testing program.

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 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?
Erosion and Deposition, 24-35	Where should Boomtown construct the new buildings?
Plate Tectonics, 36-49	Which site would you recommend for storing nuclear waste?
Weather and Atmosphere, 50-70	Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?
The Earth in Space, 71-84	Why are there many different calendars?
Earth and the Solar System, 85-98	What kinds of future space missions should we conduct?
IALS *Issues and Life Science*	
Studying People Scientifically, 1-10	Which proposals have an experimental design worth funding?
Body Works, 11-29	How can you convince people to make choices that reduce their level of heart disease risk?
Cell Biology and Disease, 30-53	How is an emerging disease spread? What can you do to stop it?
Genetics, 54-71	What are the ethical issues involved in using genetic information?
Ecology, 72-88	What are the trade-offs of introducing a species into a new environment?
Evolution, 89-101	What are the trade-offs in deciding whether to save an endangered species or to re-create an extinct one?
Bioengineering, 102-108	How are new solutions to problems in life science developed?
IAPS *Issues and Physical Science*	
Studying Materials Scientifically, 1-11	How should unidentified materials be handled?
The Chemistry of Materials, 12-29	When you buy a new product, do you think about what materials it is made of? What will happen to it when you no longer have a use for it?
Water, 30 - 52	What does your community do to make its water safe to drink? Whose responsibility is it?
Energy, 53-72	Can you help a family decide what energy improvements they should invest in?
Force and Motion, 73-88	Should noncommercial vehicles be more alike?
Waves, 89-99	Are there situations in which some waves are harmful to your health?

Key to SEPUP Assessment System:

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

The seven assessment variables are:

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

Types of assessment:

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

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

Citations included in the correlation document are as follows:

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

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

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

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

SEPUP Support for Engineering Design

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

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

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
STANDARD 1: NATURE AND APPLICATION OF SCIENCE AND TECHNOLOGY		
Enduring Understanding: Scientific inquiry involves asking scientifically-oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying the explanation.		
Grades 6-8		
Frame and refine questions that can be investigated scientifically, and generate testable hypotheses.	IAES 16, 55 IALS 8, 14 IAPS 3, 10	**16** AQ3 RE; [IB] B7-10 **55** Proc DI **8** [IB] A11-16 **14** AQ5 RE **3** Proc DI; [IB] A16 **10** AQ1 AD, Proc DI; [IB] A10-12
Design and conduct investigations with controlled variables to test hypotheses.	IAES 16, 55 IALS 8, 14 IAPS 3, 10	**16** AQ3 RE; [IB] B7-10 **55** Proc DI **8** [IB] A11-16 **14** AQ5 RE **3** Proc DI; [IB] A16 **10** AQ1 AD, Proc DI; [IB] A10-12
Accurately collect data through the selection and use of tools and techniques appropriate to the investigation. Construct tables, diagrams and graphs, showing relationships between two variables, to display and facilitate analysis of data. Compare and question results	IAES 72, 95 IALS 19, 83 IAPS 18, 51	**72** [IB] F17 **95** AQ4 AD; [IB] G10, 12 **18** [IB] B9, B17-18,

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
with and from other students.		B29 **83** AQ3 DCI **18** AQ3 AD, [IB] B19-21 **51** AQ4 DI, DI; AQ5 ET, [IB] C24
Form explanations based on accurate and logical analysis of evidence. Revise the explanation using alternative descriptions, predictions, models and knowledge from other sources as well as results of further investigation.	IAES 35, 49 IALS 21, 32 IAPS 10, 52	**35** AQ1 ET; [IB] C13 **49** AQ2 ET **21** [IB] B19 **32** AQ4 ET, [IB] C9 **10** AQ1 AD, Proc DI; [IB] A10-12 **52** AQ1 ET
Communicate scientific procedures, data, and explanations to enable the replication of results. Use computer technology to assist in communicating these results. Critical review is important in the analysis of these results.	IAES 16, 35 IALS 8, 83 IAPS 27, 51	**16** AQ3 RE; [IB] B7-10 **8** [IB] A11-16 **83** AQ3 DCI **27** AQ2 CS, AQ3 ET **51** AQ4 DI, DI; AQ5 ET, [IB] C24
Use mathematics, reading, writing, and technology in conducting scientific inquiries.	IAES 48, 70 IALS 73, 42-43 IAPS 52, 72	**48** AQ4 UC; [IB] D14, D16 **70** AQ3 ET, [IB] E16 **73** [IB] E1, E12, E24 **52** AQ1 ET **72** AQ1 ET, [IB] D17

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
STANDARD 2: MATERIALS AND THEIR PROPERTIES		
Enduring Understanding: The structures of materials determine their properties.		
Grade 6		
No grade level expectations		
Grade 7		
Recognize that all matter consists of particles and how the particles are arranged determines the physical state. Use the particle model to describe solids, liquids, and gases in terms of the packing and motion of particles.	IAPS **35**, 39	**35** AQ1 AD **39** AQ7 SI; [IB] C3-4
Measure and record the temperature of ice water as it is heated. Plot the graph of measurements taken and interpret the change of phase graph using the particle model, identifying the states of matter.	IAPS 59	
Analyze a standard change of phase graph of water.	N/C	
Using the particle model, identify where water is a solid, liquid or gas, is freezing/melting or evaporating/condensing. Relate the states of matter to the changes (increase, decrease) of energy in the system.	IAPS 35, 39, 59 IAES 60	**35** AQ1 AD **39** AQ7 SI; [IB] C3-4 **60** [IB] E3, E8-9
Make a model or drawing of particles of the same material in solid, liquid, and gas state. Describe the arrangement, spacing and energy in each state.	IAPS 35	**35** AQ1 AD
Distinguish between physical properties that are dependent upon mass (size, shape) and those physical properties such as boiling point, melting point, solubility, density, conduction of heat and pH of a substance or material that are not altered when the mass of the material is changed.	IAPS **35**, 37, 48	**35** AQ1 AD **37** AQ2 AD; [IB] C1 **48** [IB] C13, C21

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Calculate the density of various solid materials. Use density to predict whether an object will sink or float in water. Given the density of various solids and liquids, create a density column and explain the arrangement in terms of density.	IAPS **9**, 10, 18, 35,	**9** AQ3 UC, [IB] A10-12 **10** AQ1 AD, Proc DI; [IB] A10-12 **18** AQ3 AD, [IB] B19-21 **35** AQ1 AD
Use physical properties to distinguish and separate one substance or material from another.	IAPS 10, 18, 35,	**10** AQ1 AD, Proc DI; [IB] A10-12 **18** AQ3 AD, [IB] B19-21
Grade 8		
Conduct simple investigations in which a variety of materials (sand, water, light colored materials, dark colored materials) are exposed to light and heat energy. Measure the change in temperature of the material and describe any changes that occur in terms of the physical properties of the material.	IAPS 60 IAES 55	**55** Proc DI
Conduct investigations, using a variety of materials, to show that some materials conduct heat more readily than others. Identify these materials as conductors or insulators.	IAPS 60, 70,	**70** Proc GI; [IB] D12, D-15
Explain why insulators may be used to slow the change of temperature of hot or cold materials.	IAPS 70, 71, 72	**70** Proc GI; [IB] D12, D-15 **71** AQ1 UC **72** AQ1 ET, [IB] D17
Enduring Understanding: The properties of the mixture are based on the properties of its components.		
Grade 6		
No grade level expectations		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Grade 7		
Distinguish between homogeneous and heterogeneous mixtures. Using their physical properties, design and conduct an investigation to separate the components of a homogeneous or heterogeneous mixture. Recognize that a homogeneous mixture is a solution.	IAPS 3, 5, 51	**3** Proc DI; [IB] A16 **5** Proc GI **51** AQ4 DI, DI; AQ5 ET, [IB] C24
Prepare solutions of different concentrations recognizing that the properties of the solution (color, density, boiling point) depend on the nature and concentration of the solute and solvent.	IAPS 24, **40**	**24** [IB] B14-16 **40** AQ1 ET; [IB] C5-7, C19
Conduct investigations to determine the effect of temperature and surface area of the solute on the rate of solubility. Describe the rate of solubility using the particle model.	IAPS 35, 37, **59**	**35** AQ1 AD **37** AQ2 AD; [IB] C1
Conduct investigations to determine the effect of temperature on saturation point.	N/C	
Construct a solubility curve based on data collected. Describe solubility and saturation point using the particle model.	N/C	
Conduct investigations to demonstrate the process of diffusion. Use the particle model to describe the movement of materials from an area of higher concentration to an area of lower concentration.	IAES 46	**46** [IB] D16
Grade 8		
No grade level expectations		
Enduring Understanding: When materials interact within a closed system, the total mass of the system remains the same.		
Grade 6		
No grade level expectations		
Grade 7		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Show that mass is conserved when adding a solute to a solvent (mass of solvent + mass of solute = total mass of solution).	IAPS **25**	
Grade 8		
No grade level expectations		
Enduring Understanding: People develop new materials as a response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment.		
Grade 6		
No grade level expectations		
Grade 7		
Select a manufactured item and identify its component materials. Explain how the physical properties of the materials contribute to the function of the item.	IAPS 12, 18, 22,	**12** AQ5 ET; [IB] B1 **18** AQ3 AD, [IB] B19-21 **22** Proc OD
Grade 8		
No grade level expectations		
Enduring Understanding: People develop new materials as a response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment.		
Grade 6		
No grade level expectations		
Grade 7		
Select a manufactured item and identify its component materials. Explain how the physical properties of the materials contribute to the function of the item.	IAPS 12, 18, 22,	**12** AQ5 ET; [IB] B1 **18** AQ3 AD, [IB] B19-21

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
		22 Proc OD
Discuss the social, economic, and/or environmental consequences of the production of new materials to meet human wants and needs.	IAPS 13, 22, 29	**13** Proc RE, GI; [IB] B2-3 **22** Proc OD **29** AQ1 ET; [IB] B22-23
Grade 8		
No grade level expectations		
STANDARD 3: ENERGY AND ITS EFFECTS		
Enduring Understandings: Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy) and types of energy associated with the position of mass and energy fields (potential energy).		
Grade 6		
List, as basic forms of energy, light, heat, sound, electrical, and energy of motion.	IAPS 53, 54, **58**,	**54** Proc DI; [IB] D1 **58** AQ2 UC, [IB] D4-5, D8
Explain that electrical energy is a form of energy that is transferred through circuits to devices that are designed to make use of this form of energy (e.g., lamps, fans, computers, etc.).	IAPS 58, 65, **66**	**58** AQ2 UC, [IB] D4-5, D8 **65** Proc DI; D13 **66** Proc DI; [IB] D16
Grade 7		
Describe how heat energy when added to a substance, will increase its temperature or change its state. Explain that as more heat energy is added to a substance, the particles' vibrations increase and the spacing between the particles increases, but the size of the particles	IAPS 61, 62, 67	**61** [IB] D10 **62** [IB] D6, D19, D20 **67** AQ5 AD, [IB] D-

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
stays the same.		14
Grade 8		
Explain that kinetic energy is the energy an object has because of its motion and identify that kinetic energy depends upon the object's speed and mass.	IAPS **54**, 55, 56	**54** Proc DI; [IB] D1 **55** AQ1 UC [IB] D1
Design and carry out investigations to determine how changing the mass of an object or changing its speed changes its kinetic energy.	IAPS **54**, 74, 86	**54** Proc DI; [IB] D1 **74** Proc DI; [IB] E1-2, 5-6 **86** [IB] E17-18
Explain that gravitational potential energy (GPE) is the energy of position (above the Earth's surface) and that it depends on the object's mass and height above the ground. Relate that lifted objects have GPE and that the size of an object's GPE depends on its mass and the vertical distance it was lifted. Make a graph to demonstrate and describe how the GPE changes as the height of an object is increased or decreased.	IAPS 54, 55	**54** Proc DI; [IB] D1 **55** AQ1 UC [IB] D1
Explain that the mechanical energy of an object is the sum of its kinetic energy and its potential energy at any point in time. Identify the mechanical energy of objects in different circumstances and identify whether the mechanical energy consists of KE, PE or both (i.e., a ball at rest at the top of an incline and in its motion part of the way down the incline, or a model plane driven by a "rubber band" motor, etc.).	IAPS 55, 58, 74	**55** AQ1 UC [IB] D1 **58** AQ2 UC, [IB] D4-5, D8 **74** Proc DI; [IB] E1-2, 5-6
Interpret graphical representations of energy to describe how changes in the potential energy of an object can influence changes in its kinetic energy.	IAPS 75, 78	

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Explain that the mechanical energy of an object is a measure of how much the object can change the motion of other objects or materials (e.g.,, a ball (or air) having a large kinetic energy can do more damage than a ball (or air) with less kinetic energy).	IAPS 55, 76, 77	**55** AQ1 UC [IB] D1 **76** [IB] E2 **77** Proc DI
Use the particle model to explain heat energy as the combined random kinetic energy of particles that make up an object and while the heat energy and temperature of an object are related, they are different quantities.	IAPS **56**	
Describe how the motion of water particles in a glass of cold water is different from the motion of water particles in a glass of hot water.	IAPS 61, 62	**61** [IB] D10 **62** [IB] D6, D19, D20
Explain that sound energy is mechanical energy that travels in the form of waves. Use the particle model to explain why sound waves must travel through matter, and that sound travels more effectively through solids and liquids than through gases. Model and describe how sound energy travels through solids, liquids, and gases.	N/C	
Use the properties of sound waves and the particle model to describe how the pitch of two waves can be different and how the loudness of two waves can be different.	N/C	
Explain that heat energy and sound energy both make the particles of a substance move. Use models to explain how the particles respond differently to these types of energy. Use models to explain why sound travels much faster through substances than heat energy does.	IAPS 58	**58** AQ2 UC, [IB] D4-5, D8
Relate that the sun is the source of almost all of the Earth's energy and that this energy travels to the Earth in the form of electromagnetic waves.	IAPS 58, 68, 69, 70	**58** AQ2 UC, [IB] D4-5, D8 **68** PROC DI, [IB] D18

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
		69 [IB] D11, D15, D18 **70** Proc GI; [IB] D12, D-15
Explain that the electromagnetic waves from the sun consist of a range of wavelengths and associated energies. Explain that the majority of the energy from the sun reaches Earth in the form of infrared, visible, and ultraviolet waves. Use diagrams to demonstrate the differences in different types of electromagnetic waves.	N/C	
Plan and conduct an experiment to identify the presence of UV and IR waves in sunlight or other sources of electromagnetic waves. Use evidence to explain the presence of each.	N/C	
Enduring Understandings: Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the different forms of energy.		
Grade 6		
Describe the role of electrical charge in circuits by using a model of electrical circuits.	IAPS 65, **66**	**65** Proc DI; D13 **66** Proc DI; [IB] D16
Relate that electrical energy carried by charges in a circuit is transferred to devices in the circuit and is usually changed into (transformed) different kinds of energy by these devices (e.g., light bulbs change electrical energy into light and heat energy, motors turn the electrical energy into energy of motion). Trace the flow of energy from electrical energy to other forms of energy, such as light. Express whether energy was transferred, transformed or both.	IAPS **58**, 66, 67,	**58** AQ2 UC, [IB] D4-5, D8 **66** Proc DI; [IB] D16 **67** AQ5 AD, [IB] D-14

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Construct both series and parallel circuits to investigate and describe how multiple devices in series or parallel (bulbs, motors) perform (dim versus bright, fast versus slow). Describe how the way the devices are connected affects the functioning (i.e., dim versus bright) of the device, and relate this to how much electrical energy is received.	IAPS 65, **66,** 68	**65** Proc DI; D13 **66** Proc DI; [IB] D16 **68** PROC DI, [IB] D18
Conduct investigations on a moving object and make measurements of time and distance traveled and determine the average speed of moving objects.	IAPS **74,** 78, 82	**74** Proc DI; [IB] E1-2, 5-6 **78** [IB] E2, 3, 8 **82** AQ3 RE; [IB] E3, 9, 12
Graph and interpret distance versus time graphs for constant speed. Use the graphs to describe how the position of an object changes in a time interval.	IAPS **75**	**75** AQ2 UC, [IB] E2, 4-6, 7, 14
Describe how the speed of an object depends on the distance traveled and the travel time. Explain how the motion of an object can be described by its position, speed, and direction of motion.	IAPS 74, 75, 78	**74** Proc DI; [IB] E1-2, 5-6 **75** AQ2 UC, [IB] E2, **78** [IB] E2, 3, 8 4-6, 7, 14
Explain that the earth will pull on all objects with a force called gravity that is directed inward toward the center of the Earth.	IAES **95, 96**	**95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
Give examples of objects at rest, and identify the forces that act on an object while it remains at rest (gravity, supportive forces, friction, other pushing or pulling forces). Explain that if the object is not moving, it must have at least two forces acting on it that are balanced.	IAPS 80, **81,** 82	**80** AQ2; [IB] E2, 3, 11, 20 **81** [IB] E3, 13, 15 **82** AQ3 RE; [IB] E3, 9, 12

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Give examples of moving objects and identify the forces that act on these objects. Select examples where only one force acts on the object and examples where two or more forces act on the object. Explain that unbalanced forces acting on an object will change its speed, direction of motion, or both.	IAPS 80, 81, 84, 85,	**80** AQ2; [IB] E2, 3, 11, 20 **81** [IB] E3, 13, 15 **84** [IB] E16 **85** Proc CS; [IB] E16
Conduct investigations to describe how the relative directions of forces simultaneously acting on an object (reinforce or cancel each other) will determine howstrongly the combination of these forces influences the motion of the object.	IAPS 81, 84, 85,	**81** AQ5 UC, [IB] E2, 3, E5, E13-14 **84** [IB] E16 **85** Proc CS; [IB] E16
Conduct investigations and describe how a force can be directed to increase the speed of an object, decrease the speed of the object or change the direction in which the object moves.	IAPS 74, 81, 82	**74** Proc DI; [IB] E1-2, 5-6 **81** [IB] E3, 13, 15 **82** AQ3 RE; [IB] E3, 9, 12
Explain that an object that feels the effects of balanced forces may be at rest or may be moving in a straight line with a speed that does not change.	IAPS 75, 78, 81	**75** AQ2 UC, [IB] E2, 4-6, 7, 14 **78** [IB] E2, 3, 8 **81** [IB] E3, 13, 15
Conduct investigations using to demonstrate how forces transfer energy. Explain that simple machine may change the direction of an applied force (directional advantage) or the size of the force that is applied (mechanical advantage) but that the amount of energy transferred by the simple machine is equal to the amount of energy transferred to the simple machine.	IAPS 74, 78	**74** Proc DI; [IB] E1-2, 5-6 **78** [IB] E2, 3, 8
Explain that the transfer of energy from one object to another is caused by the exertion of a force.	IAPS 74, 78, 81	**74** Proc DI; [IB] E1-2, 5-6 **78** [IB] E2, 3, 8

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
		81 AQ5 UC, [IB] E2, 3, E5, E13-14
Use the size of the force and the distance over which the force acts to compare how much energy is transferred into a simple machine to how much energy is transferred out of a simple machine.	N/C	
Design a device that relies on the directional and/or mechanical advantage of a simple machine to perform a task (e.g., lift a weight, move a heavy object). Identify the forces and motions involved, the source of the energy used to complete the task, and how the energy is used by the simple machine.	IALS 109	
Grade 7		
No grade level expectations		
Grade 8		
The force of gravity can act across very large distances of space. Through the force of gravity planets pull on their moons, and pull on each other. The sun pulls on all planets, moons and other celestial bodies in the solar system. Use an understanding of how forces change the motion of objects to explain how gravity is responsible for creating the orbital motion of planets and moons.	IAES **95, 96**	**95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
Explain that the transfer of energy from one object to another is caused by the exertion of a force. Create an energy chain to show how forces can change the mechanical energy of an object. Describe how the distance over which the forces act will influence the amount of energy transferred (and when appropriate, the amount of energy transformed).	IAPS 55, 58, 74	**55** AQ1 UC [IB] D1 **58** AQ2 UC, [IB] D4-5, D8 **74** Proc DI; [IB] E1-2, 5-6

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Give examples of how mechanical energy can be transferred to (or away from) an object, and describe the changes that can take place in the motion of the object because of this energy transfer, (e.g., pulling on a trailer to start it moving or using friction to slow an object and bring it to rest).	IAPS 55, 58, 74	**55** AQ1 UC [IB] D1 **58** AQ2 UC, [IB] D4-5, D8 **74** Proc DI; [IB] E1-2, 5-6
Use diagrams to trace and describe the transfer of energy through a physical system (for example, the erosion effects of water flowing down an unprotected slope).	IAPS 58, 84	**58** AQ2 UC, [IB] D4-5, D8 **84** [IB] E16
Use the particle model to explain how mechanical waves can transport energy without transporting mass. Give examples that support the transfer of energy without any net transfer of matter.	N/C	
Explain that the frequency and amplitude are two characteristics of waves that determine the mechanical energy carried and delivered by a sound wave per unit of time. Use diagrams to explain how each of these properties will influence the KE of the particles in the substance when a sound wave passes through the substance.	N/C	
The energy delivered by a wave depends on more than just the frequency. Give an example of a high frequency sound wave that delivers small quantities of energy every second and explain how this is possible. Give an example of a low frequency sound wave that delivers large quantities of energy every second and explain how this is possible.	N/C	
Use the particle model to explain how heat energy is transferred through solid materials (conduction). Give examples of materials that are good “conductors” of heat energy and examples of materials that are poor conductors of heat energy, and how both types of materials are used in typical homes.	IAPS 70, 71, 72	**70** Proc GI; [IB] D12, D-15 **71** AQ1 UC **72** AQ1 ET, [IB] D17

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Use the particle model to describe the difference between heat energy transfer in solids and heat energy transfer in liquids and gases (i.e., the differences between conduction and convection).	IAPS 59 IAES 46	**46** [IB] D16
Use the particle model to explain why heat energy is always transferred from materials at higher temperatures to materials at lower temperatures. Explain why heat energy transfer ceases when the equilibrium temperature is reached. Explain that when this temperature is reached, the materials are in thermal equilibrium.	IAPS **61**, 62	**61** [IB] D10 **62** [IB] D6, D19, D20
Conduct simple investigations to demonstrate that heat energy is transferred from one material to another in predictable ways (from materials at higher temperatures to materials at lower temperatures), until both materials reach the same temperature.	IAPS 61, 62	**61** [IB] D10 **62** [IB] D6, D19, D20
Explain how the addition or removal of heat energy can change an object's temperature or its physical state. Conduct simple investigations involving changes of physical state and temperature. Relate that there is no change in temperature when a substance is changing state.	IAPS 61, 62	**61** [IB] D10 **62** [IB] D6, D19, D20
Enduring Understandings: Energy readily transforms from one form to another, but these transformations are not always reversible. The details of these transformations depend upon the initial form of the energy and the properties of the materials involved. Energy may transfer into or out of a system and it may change forms, but the total energy cannot change.		
Grade 6		
Show how electrical energy carried by currents in wires can be used to create magnetic fields. Demonstrate how these fields exert magnetic forces on permanent magnets.	N/C	

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Explain how these magnetic forces in electric motors are used to change the electrical energy into the energy of motion.	IAPS 65, 66	**65** Proc DI; D13 **66** Proc DI; [IB] D16
Grade 7		
No grade level expectations		
Grade 8		
Identify that energy can exist in several forms, and when it changes from one form into another the process is called energy transformation.	IAPS 55, 58, 66	**58** AQ2 UC, [IB] D4-5, D8 **65** Proc DI; D13 **66** Proc DI; [IB] D16
Explain that energy transformation and energy transfer are different processes, and that energy transformations can take place during an energy transfer. Give examples of energy transformations that take place during an energy transfer.	IAPS 58, 65, 66,	**58** AQ2 UC, [IB] D4-5, D8 **65** Proc DI; D13 **66** Proc DI; [IB] D16
Give examples of energy transfers that do not include energy transformations. Give examples of energy transformations that take place without any energy transfer.	IAPS 58, 69, 70,	**58** AQ2 UC, [IB] D4-5, D8 **69** [IB] D11, D15, D18 **70** Proc GI; [IB] D12, D-15
Use energy chains to trace the flow of energy through physical systems. Indicate the energy transfers and the energy transformations that are involved in the processes (e.g., the lighting of an electric lamp in a region serviced by a hydroelectric (or coal fueled) electric power plant, or the sediment that clouds a stream after a heavy rainfall).	IAPS 58, 64	**58** AQ2 UC, [IB] D4-5, D8 **64** AQ3 ET, AQ4 AD, [IB] D7
Recognize that when light enters an eye, the energy carried by the light waves carries information and allows living things to see.	N/C	

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Trace the flow of the energy carried by the light when the light strikes a material and is reflected from, transmitted through, and/or absorbed by the material. Describe the energy transfers and transformations that take place when light energy is absorbed by a material.	IAPS 58, 69, 70	**58** AQ2 UC, [IB] D4-5, D8 **69** [IB] D11, D15, D18 **70** Proc GI; [IB] D12, D-15
Conduct investigations to show that materials can absorb some frequencies of electromagnetic waves, but reflect others or allow them to transmit through the material. Use this selective absorption process to explain how objects obtain their color, how materials like sunscreen can serve to protect us from harmful electromagnetic waves, and how selective absorption contributes to the Greenhouse Effect.	N/C	
Trace what happens to the energy from the Sun when it reaches Earth and encounters various materials, such as, atmosphere, oceans, soil, rocks, plants, and animals. Recognize that these materials absorb, reflect and transmit the electromagnetic waves coming from the sun differently.	IAPS 70 IAES 55, 56	**70** Proc GI; [IB] D12, D-15 **55** Proc DI **56** Proc GI
Conduct investigations to determine how the physical properties of materials (e.g., size, shape, color, texture, hardness) can account for the effect the materials have on sunlight and the degree of change observed in the materials (e.g., dark cloth absorbs more heat than light cloth, clear water transmits more light than murky water, and polished materials reflect more light than dull materials).	IAPS 69, 70	**69** [IB] D11, D15, D18 **70** Proc GI; [IB] D12, D-15
Use the properties of water and soil to explain how uneven heating of Earth's surface can occur. Conduct an investigation that shows how water and soil are heated unequally by sunlight. Describe how this can be used to explain unequal heating of the Earth's surface, producing atmospheric movements that influence weather.	IAES **55,** 57, 58	**55** Proc DI **57** [IB] E10 **58** [IB] E6

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Use the particle model to explain why a material expands (takes up more space) as its temperature increases. Recognize that this expansion is due to the increase in the motion of the particles, and that the particles themselves remain the same size.	IAPS 35	**35** AQ1 AD
Enduring Understandings: People utilize a variety of resources to meet the basic and specific needs of life. Some of these resources cannot be replaced. Other resources can be replenished or exist in such vast quantities they are in no danger of becoming depleted. Often the energy stored in resources must be transformed into more useful forms and transported over great distances before it can be helpful to us.		
Grade 6		
Compare the differences in power usage in different electrical devices/appliances. Discuss which devices/appliances (i.e., washer, dryer, refrigerator, electric furnace) are manufactured to require less energy. Select one device/appliance, research different brands and their energy usage, determine which would be the better buy, and report on the findings.	IAPS 71, 72	**71** AQ1 UC **72** AQ1 ET, [IB] D17
Grade 7		
No grade level expectations		
Grade 8		
Identify different forms of alternative energy (i.e., solar, wind, ocean waves, tidal and hydroelectric systems). Research and report on the use of this alternative form of energy. Discuss and compare findings to describe the advantages and disadvantages of different kinds of alternative energy.	IAPS 64	**64** AQ3 ET, AQ4 AD, [IB] D7
STANDARD 4: EARTH IN SPACE		
Enduring Understanding: Observable, predictable patterns of movement in the Sun, Earth, Moon system occur because of gravitational interaction and energy		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
from the Sun.		
Grade 6		
No grade level expectations		
Grade 7		
No grade level expectations		
Grade 8		
Describe how scientists have historically confirmed that the Earth is round, not flat.	N/C	
Analyze data on sunrise and sunset times (in terms of length of daylight) and describe patterns. Explain the reason for the patterns by using models or computer simulations of the Earth and Sun.	IAES 72, **73**, 74	**72** [IB] F17 **73** AQ1 UC **74** [IB] F1-2
Using internet, newspaper, and actual observations of the night sky for at least two months, collect data on the Moon's appearance, and moonrise and moonset times. Analyze the data to describe the observable patterns (phases). Explain why the Moon's appearance changes in a repeating cyclical pattern.	IAES **79,** 80, 81	**79** [IB] F10-12, F14-16 **80** [IB] F4-9 **81** AQ5 UC; [IB] F5, F8
Use models to describe how the relative positions of the Sun, Moon, and Earth account for Moon phases, eclipses, and tides.	IAES 80, **81,** 82	**80** [IB] F4-9 **81** AQ5 UC; [IB] F5, F8 **82** AQ5 UC, [IB] F5, F8
Describe how the relative positions of the Earth, Moon and Sun can cause high and low tides, and unusually high or low tides.	IAES 82	**82** AQ5 UC, [IB] F5, F8

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Demonstrate an understanding of the components of our Solar System and their characteristics, including the Moon, the Sun, the planets and their moons, extra-solar planets, and smaller objects such as asteroids and comets. Construct scale models of the Solar System in order to describe the relative sizes of planets and their distances from the Sun.	IAES **88, 90, 91**	**88** AQ2 UC, [IB] G3, G13, G17 **90** [IB] G9, 16, 18 **91** AQ4 UC
Use a variety of resources (e.g., NASA photographs, computer simulations) to compare and contrast the physical properties (i.e., temperature, size, composition, surface features) of planets.	IAES 88, 94,	**88** AQ2 UC, [IB] G3, G13, G17
Demonstrate an understanding of the motion of the bodies in our Solar System. Use models, charts, illustrations, and other suitable representations to predict and describe regular patterns of motion for most objects in the Solar System.	IAES 95, 96	**95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
Explain how the Sun is the central and largest body in our Solar System and the source of the light energy that hits our planet. Use models to explain how variations in the amount of Sun's energy hitting the Earth's surface results in seasons.	IAES 75, **76,** 92	**76** AQ4 AD **92** [IB] G2, G11
Recognize that the force of gravity keeps planets in orbit around the sun and influences objects on Earth and other planets (i.e., tides, ability of humans to move and function). Differentiate between an object's mass and weight.	IAES 82, 95, 96	**82** AQ5 UC, [IB] F5, F8 **95** AQ4 AD; [IB] G10, 12 **96** [IB] G 4, 7, 19
Enduring Understanding: Technology expands our knowledge of the Solar System.		
Grade 6		
No grade level expectations		
Grade 7		
No grade level expectations		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Grade 8		
Describe how scientists have acquired knowledge about components of our Solar System. Recognize the importance of people and technologies that have led to our current understanding of space.	IAES 85, 87, 93	**85** [IB] G1 **87** [IB] G8, G15 **93** [IB] G5
Recognize that spin-offs are products which have undergone a technology transfer process from research to public use. Research and report on spin-offs from the space program that have affected our everyday lives (i.e., Velcro, smoke detectors, cordless tools).	N/C	
STANDARD 5: EARTH'S DYNAMIC SYSTEMS		
Enduring Understandings: Earth's systems can be broken down into individual components which have observable measurable properties.		
Grade 6		
Use appropriate instruments and tools to identify the sedimentary rocks: limestone, shale, and sandstone. Infer the environmental conditions in which these rocks formed.	IAES 19, 20	**20** Proc GI; [IB] B6
Examine sedimentary rock formations. Use relative dating and fossil evidence to correlate sedimentary rock sequences. Infer the succession of environmental events that occurred from one rock sequence to another (transgression or regression of the seas). Use the correlated sedimentary rock sequences to support Earth's geologic time scale.	IALS 19, 20	**19** [IB] B14
Grade 7		
Create models that simulate the amount of salt, frozen, fresh, and potable water available on Earth's surface. Compare total water supply on Earth to the amount of potable water available for human use.	IAES 54, 60, 62	**60** [IB] E3, E8-9 **62** AQ4 SI; [IB] E3, 9, 11, 15

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Calculate the ratio/percent of water generally found in solid, liquid and gaseous form on or within the Earth's surface and use this ratio to compare the amounts of water stored in different states.	IAES 62	**62** AQ4 SI; [IB] E3, 9, 11, 15
Grade 8		
No grade level expecations.		
Enduring Understanding: Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth locally and globally.		
Grade 6		
Investigate and describe how factors such as abrasion, frost/ice wedging, temperature changes, and plant growth cause physical weathering of rocks. Infer the environment in which the sedimentary particles were formed based on the results of weathering.	IAES 19, 22, 29	**22** AQ7 UC; [IB] B4-6, B11 **29** AQ2 UC; [IB] C1, C3
Investigate how weathered materials are transported (i.e., mass movement and wind, water, and ice processes) in the process of erosion. Explain how erosion shapes rock particles.	IAES 5, 19, 22, 29	**5** AQ5 UC; [IB] A3-4 **22** AQ7 UC; [IB] B4-6, B11 **29** AQ2 UC; [IB] C1, C3
Describe the process by which eroded materials can form horizontal layers of sedimentary rock.	IAES **21**	
Explain how sedimentary rocks are formed through the processes of weathering, erosion, and deposition.	IAES 19, 22, 29	**22** AQ7 UC; [IB] B4-6, B11 **29** AQ2 UC; [IB] C1, C3
Cite three lines of evidence such as the fit of coastlines, the similarity of rock type and contiguousness of bedding areas, and similarity of fossilized remains that indicate that the continents were once a large land mass.	IAES 40, 41, **42**	**41** AQ3 UC; [IB] D2 **42** [IB] D4, 6, 8-10, 16

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Grade 7		
Use diagrams of the hydrologic cycle to show and describe the circulation of water through the Earth's crust, oceans, and atmosphere.	IAES 60, 61, **62**	**60** [IB] E3, E8-9 **62** AQ4 SI; [IB] E3, 9, 11, 15
Use the particle model to describe solids, liquids, and gases in terms of the packing, motion of particles, and energy gain or loss. Apply this to the processes of evaporation, condensation, and precipitation in the water cycle. Explain how heat energy drives the water cycle.	IAES 60, 62	**60** [IB] E3, E8-9 **62** AQ4 SI; [IB] E3, 9, 11, 15
Use models or diagrams to explain how water stored underground (groundwater and aquifers) and water stored above ground (lakes, rivers, air, etc.) interact to form a continuous cycle.	IAES 60, 61, 62	**60** [IB] E3, E8-9 **62** AQ4 SI; [IB] E3, 9, 11, 15
Investigate, through the use of models, how water acts as a solvent and as it passes through the water cycle it dissolves minerals, gases, and pollutants and carries them to surface water and ground water supplies.	IAES 19, 59 IAPS **39**	**39** AQ7 SI; [IB] C3-4
Conduct investigations and use the data to describe the extent to which the permeability and porosity of a soil sample affect the rate of water percolation.	IAES 4, 5, 31,	**3** [IB] A2**5** AQ5 UC; [IB] A3-4
Describe the role of wetlands and streamside forests (riparian) in filtering water as it runs off into local streams, rivers, and bays or seeps into ground water.	N/C	
Grade 8		
Observe, measure, and predict changes in weather using atmospheric properties (wind speed and direction, cloud cover and type, temperature, dew point, air pressure, and relative humidity). Describe how air pressure and temperature change with increasing altitude and/or latitude.	IAES 64, 66, 68, **69**	**64** [IB] E5 **66** AQ2 UC; [IB] E12-13 **69** Proc CS; [IB] E14

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Explain how uneven heating of Earth's components – water, land, air – produce local and global atmospheric and oceanic movement. Describe how these local and global patterns of movement influence weather and climate.	IAES 57, **58,** 66, 68	**57** [IB] E10 **58** [IB] E6 **66** AQ2 UC; [IB] E12-13
Investigate the rate at which different Earth materials absorb heat. Explain how these differences in heat absorption causes air pressure differences that result in convection currents (i.e., local land and sea breezes).	IAES **55**, 66, 68	**55** Proc DI **66** AQ2 UC; [IB] E12-13
Use a variety of models, charts, diagrams, or simple investigations to explain how the Sun's energy drives the cycling of water through the Earth's crust, oceans, and atmosphere.	IAES 57, 58, **62**	**57** [IB] E10 **58** [IB] E6 **62** AQ4 SI; [IB] E3, 9, 11, 15
Examine maps of ocean currents and trace the origin and flow of such currents to explain the transfer of heat energy. Identify which currents have dominant influence on the Delaware coast.	IAES 56, 57	**56** Proc GI **57** [IB] E10
Differentiate between weather, which is the condition of the atmosphere at a given time, and climate, which is the weather averaged over a long period of time.	IAES **53,** 57, 58	**53** [IB] E2, E7 **57** [IB] E10 **58** [IB] E6
Discuss the origin and identify characteristics (i.e., air circulation pattern, wind speed, temperature and dew point, and air pressure) of storm systems including hurricanes, Nor' easters, tornadoes, thunderstorms, and mid-latitude cyclones. Explain how these weather events can transfer heat. Describe the environmental, economic, and human impact of these storms.	IAES 30, 50, 69	**30** [IB] C2, C10 **50** [IB] E1 **69** Proc CS; [IB] E14
Compare and contrast different storm systems in terms of size, formation, and associated weather.	IAES 50	**50** [IB] E1
Describe how origin affects the temperature and moisture content of an air mass. Describe how the interaction of air masses produces different fronts	IAES 68, **69**	**69** Proc CS; [IB] E14

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
(warm, cold, and stationary) that influence our weather.		
Describe how the formation of clouds is influenced by the dew point, environmental temperature and amount of particles in the air. Explain how various lifting mechanisms affect cloud formation.	IAES 60, 66	**60** [IB] E3, E8-9 **66** AQ2 UC; [IB] E12-13
Use cloud characteristics (altitude, composition, and form) to predict the weather. Discuss how different cloud types are indicators of weather and weather systems such as frontal systems and hurricanes.	IAES 60, 64, 66	**60** [IB] E3, E8-9 **64** [IB] E5 **66** AQ2 UC; [IB] E12-13
Enduring Understanding: Technology enables us to better understand Earth's systems. It also allows us to analyze the impact of human activities on Earth's systems and the impact of Earth's systems on human activity.		
Grade 6		
There are no grade level expectations.		
Grade 7		
Use topographic maps to locate Delaware watersheds and to identify the bodies of water into which they drain. Analyze and describe the relationship between elevation of land and the flow rate of water in a watershed.	IAES 25, 26	**25** [IB] C4-6 **26** [IB] C4-6
Conduct tests including temperature, pH, salinity, dissolved oxygen, turbidity, nitrate, and phosphate to determine the potability of local water samples.	IAPS 41, 46, 47 (not all tests)	**41** AQ2 AD **46** Proc OD, GI; [IB] C9 **47** [IB] C10-12
Identify macro-invertebrates in a local stream and apply this identification in determining the stream's	N/C	

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
ecological health.		
Explain the impact of human activities (e.g., building roads, fertilizing golf courses, etc.) on the quality of Delaware's waters.	IAPS 31, 34	**34** AQ1 UC
Research and report on the processes used by municipalities to ensure water taken from local reservoirs is safe to return to the environment.	IAPS 42, 43	**43** IB] C24
Investigate and report on legislation such as the Clean Water Act and its impact on the quality of Delaware water.	N/C	
Examine isobars on weather maps to describe how wind (moving air) travels from a region of high pressure to a region of low pressure. Apply this knowledge to explain the cause of wind.	IAES 67, 68	**67** Proc DI
Record and interpret daily weather measurements over an extended period of time using a variety of instruments (i.e., barometer, anemometer, sling psychrometer, rain gauge, and thermometer) in order to predict and to identify weather patterns.	IAES 51	**51** Proc OD
Construct and use surface station models to represent local atmospheric data and interpret weather patterns on meteorological maps.	IAES 67 LOCAL	**67** Proc DI
Examine satellite imagery pictures and use these images to identify cloud patterns and storm systems.	IAES 51 Website (www.sepuplhs.org)	**51** Proc OD
Use weather maps to describe the movement of fronts and storms and to predict their influence on local weather.	IAES 52 LOCAL	
List ways in which human intervention can help maintain an adequate supply of fresh water for human consumption. Apply knowledge and skills learned about water as a resource to study local sources of drinking water and devise a water quality stewardship plan.	IAPS 50, 51, 52	**50** AQ5 UC, [IB] C23 **51** AQ4 DI, DI; AQ5 ET, [IB] C24 **52** AQ1 ET

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
STANDARD 6: LIFE PROCESSES		
Enduring Understanding: Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and function.		
Grade 6		
Explain that human body systems are comprised of organs (e.g., the heart, the stomach, and the lungs) that perform specific functions within one or more systems.	IALS **12**, 13, 15, 16	**12** [IB] B12, B15 **13** [IB] B3, B7 **15** AQ3 UC, [IB] B2, B5, B25-28
Label and describe the functions of the basic parts of the circulatory system including the heart, arteries, veins and capillaries.	IALS 18, **23**, 24	**18** [IB] B9, B17-18, B29 **23** AQ3 UC, [IB] B23 **24** AQ 2 UC, [IB] B22, B24
Label and describe the functions of the basic parts of the male and female reproductive systems.	IALS **12,** 63	**12** [IB] B12, B15 **63** [IB] D1, D2-5, D8-11, D18, D22-24
Label and describe the functions of the basic parts of the respiratory system including the trachea, bronchi and lungs.	IALS 12, **17**	**12** [IB] B12, B15 **17** [IB] B1, B8, B21
Label and describe the functions of the basic parts of the digestive tract including the mouth, esophagus, stomach, small intestine, liver, large intestine (colon), rectum and anus.	IALS 12, 14, **15**	**12** [IB] B12, B15 **14** [IB] B16 **15** AQ3 UC, [IB] B2, B5, B25-28
Express how the human circulatory, respiratory, and digestive systems work together to carry out life processes.	IALS 15, 17, **18,** 24,	**15** AQ3 UC, [IB] B2, B5, B25-28 **17** [IB] B1, B8, B21 **18** [IB] B9, B17-18,

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
		B29 **24** AQ 2 UC, [IB] B22, B24
Grade 7		
Identify and apply criteria for determining whether specimens or samples are living, dead, dormant or nonliving.	N/C	
Classify organisms based on shared characteristics into currently recognized kingdoms and justify their placement. Give examples of organisms from each kingdom.	IALS **75**, 76, 100	**75** [IB] E4, E36 **76 AQ** 1-2
Explain that individual cells are able to carry out basic life functions that are similar in organisms; however, explain that in multi-cellular organisms, cells become specialized, interdependent upon one another, and unable to survive independently.	IALS 39, 42, 45	**39** AQ2 DCI, [IB] C6 **42** [IB] D3, D7, D16-10, C23 **45** AQ5 UC, [IB] C2, C4, C29
Describe the hierarchical organization of multi-cellular organisms. Recognize that multi-celled organisms are organized as specialized cells within tissues that make up organs within organ systems, which work together to carry out life processes for the entire organism.	IALS 12, 15, 16	**12** [IB] B12, B15 **15** AQ3 UC, [IB] B2, B5, B25-28 **16** AQ4 UC, [IB] B6
Observe and sketch cells using microscopes and other appropriate tools. Compare and contrast plant, animal, protist, and bacterial cells by noting the presence or absence of major organelles (i.e., cell membrane, cell wall, nucleus, chloroplasts, mitochondria and vacuoles) using the sketches and other resources.	IALS 38, 42, 43	**42** [IB] D3, D7, D16-10, C23 **43** AQ2 CM, AQ5 UC, [IB] C 12, C21-22
Grade 8		
No grade level expectations.		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Enduring Understanding: All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism.		
Grade 6		
Trace how the circulatory, respiratory, and digestive systems interact to transport the food and oxygen required to provide energy for life processes.	IALS 14, 17, **18,** 23,	**14** [IB] B16 **17** [IB] B1, B8, B21 **18** [IB] B9, B17-18, B29 **23** AQ3 UC, [IB] B23
Grade 7		
Research the sequence of events that led to the formation of the cell theory and correlate these events with technological advancements (e.g., hand lens, microscopes, and staining techniques).	IALS **37**, 38	**37** Act UC, [IB] C14
Enduring Understanding: All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism.		
Recognize that the process of photosynthesis occurs in the chloroplasts of producers. Summarize the basic process in which energy from sunlight is used to make sugars from carbon dioxide and water (photosynthesis). Indicate that this food can be used immediately, stored for later use, or used by other organisms.	IALS 78, **81, 82**,	**78** [IB] E7-10, E16 **81** AQ5 UC, [IB] E2, 3, E5, E13-14 **82** [IB] E5, E13-14, E17
Recognize that the process of cellular respiration in the mitochondria of both plants and animals releases energy from food. Indicate that this food provides the energy and materials for repair and growth of cells. Explain the complementary nature between photosynthesis and cellular respiration.	IALS 39, 42, 82	**39** AQ2 DCI, [IB] C6 **42** [IB] D3, D7, D16-10, C23 **82** [IB] E5, E13-14, E17

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Grade 8		
No grade level expectations.		
Enduring Understanding: Organisms respond to internal and external cues, which allow them to survive.		
Grade 6		
Conduct simple investigations (how the body reacts to exercise, changes in temperature, etc.) to determine how the systems in the human organism respond to various external stimuli to maintain stable internal conditions.	IALS 5, 19, 27	**5** [IB] A11-14 **19** [IB] B14 **27** [IB] B32
Grade 7		
Research and report on how body systems are affected by lifestyle choices such as diet or exercise, for example lack of exercise leads to cardiovascular disease.	IALS 11, 28, **29**	**11** AQ2 ET **28** [IB] B33 **29** AQ 2 ET
Grade 8		
Understand and describe how the maintenance of a relatively stable internal environment is required for the continuation of life and explain how stability is challenged by changing physical, chemical, and environmental conditions.	IALS 18, 24, 26, 27	**18** [IB] B9, B17-18, B29 **24** AQ 2 UC, [IB] B22, B24 **26** AQ 4 UC, [IB] B30-31
Explain that the regulatory and behavioral responses of an organism to external stimuli occur in order to maintain both short and long term equilibrium (e.g., migrating shorebirds behave differently along the migration path in order to support their life cycle).	IALS 74, 76, 83	**74** AQ3 CM, [IB] E6, E18 **76 AQ** 1-2 **83** AQ3 DCI
Enduring Understanding: The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation.		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Grade 6		
Use knowledge of human body systems to synthesize research data and make informed decisions regarding personal and public health.	IALS 20, 29, 31	**29** AQ 2 ET **31** [IB] C8
Research and report on how body systems are affected by lifestyle choices such as diet or exercise, for example lack of exercise leads to cardiovascular disease.	IALS 11, 28, **29**	**11** AQ2 ET **28** [IB] B33 **29** AQ 2 ET
Grade 7		
Use various indicators (pH, turbidity, nitrates, phosphates, salinity, and macro-invertebrate surveys) to establish the health and potential potability of local bodies of water.	IAPS 41, 46, 47 (some tests not covered)	**41** AQ2 AD **46** Proc OD, GI; [IB] C9 **47** [IB] C10-12
Grade 8		
No grade level expectations.		
STANDARD 7: DIVERSITY AND CONTINUITY OF LIVING THINGS, GRADE LEVEL EXPECTATIONS		
Enduring Understanding: Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring.		
Grade 6		
There are no grade level expectations.		
Grade 7		
Recognize that reproduction is a process that occurs in all living systems and is essential to the continuation of the species. Use models or diagrams to identify the structures of a flowering plant that produce eggs and sperm and explain that plants, as well as, animals can reproduce sexually.	IALS 57, 62, 63,	**62** AQ4a UC **63** [IB] D1, D2-5, D8-11, D18, D22-24

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Given varied scenarios (including one or two parent reproduction, and having traits identical to or different than the parents), classify offspring as either sexually or asexually produced and justify your response.	IALS **57**	
Compare and contrast asexual and sexual reproduction in terms of potential variation and adaptation to a static or changing environment. Relate advantages and/or disadvantages of each strategy.	IALS 57, 95, 96	**95** [IB] F18-21 **96** AQ2 DCI
Make a simple labeled drawing of human reproductive cells. Indicate that the sex cells (sperm and egg) each have half of the chromosomal number (23) as a fertilized egg (46). The fertilized egg has the same number of chromosomes as each of the body cells of the new organism. Recognize that different organisms may have different numbers of chromosomes and that the number of chromosomes does not relate to the complexity of the organism.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
Make a simple labeled drawing of asexual reproduction as it occurs in sexually produced organisms at the cellular level. Indicate that resulting cells contain an identical copy of genetic information from the parent cell.	IALS 57	
Describe the relationship between genes, chromosomes, and DNA in terms of location and relative size.	IALS 63	**63** [IB] D1, D2-5, D8-11, D18, D22-24
Explain how the sex chromosomes inherited from each parent determines the gender of the offspring.	IALS 65	**65** AQ8 UC
Model a random process (e.g., coin toss) that illustrates which alleles can be passed from parent to offspring.	IALS 59, **65**	**59** AQ5 UC, [IB] D2 **65** AQ8 UC

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Use single trait Punnett squares to examine the genotypes of individuals and indicate which individuals will express dominant or recessive traits. Justify the indication by relating that dominant alleles appearing heterozygously or homozygously are expressed or that two recessive alleles (homozygous) are required for an offspring to express a recessive trait phenotypically.	IALS **61**, 62, 66	**61** [IB] D5, D12-16 **62** AQ4a UC **66** [IB] D7, D21, D25
Use pedigrees to illustrate the heritability of dominant and recessive alleles over several generations.	IALS **66**, 67	**66** [IB] D7, D21, D25 **67** AQ2 UC, AQ3, ET, [IB] D20
Research and report on the contributions of Gregor Mendel and other genetic researchers and how their contributions altered the body of scientific knowledge.	IALS **60**	**60** AQ1 DCI [IB] D2
Grade 8		
Relate the advantages and disadvantages of different reproductive strategies in terms of energy expenditure per offspring and survival rates of that offspring.	N/C	
Research and report on reproductive strategies of different organisms (i.e., broadcast spawning versus nurturing parenting) that allow them to be successful.	N/C	
Enduring Understanding: The diversity and changing of life forms over many generations is the result of natural selection, in which organisms with adaptive traits survive, reproduce, and pass those traits to offspring.		
Grade 6		
Recognize that fossils indicate that many organisms that lived long ago are extinct. Use index fossils to determine the relative age of rock sequences, and environmental conditions at the time of formation.	IALS 90, 92, 93	**90** AQ3 CM, [IB] F5 **92** [IB] F6-7, F17 **93** AQ4 UC, [IB] F8-11
Recognize, through fossil evidence, that some species	IALS 92, 98, 99	**92** [IB] F6-7, F17

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
can be traced back in geologic time.		**98** [IB] F32-33 **99** AQ2 UC, [IB] 434-36
Grade 7		
Explain through the use of models or diagrams, why sexually-produced offspring are not identical to their parents.	IALS 59, 63, 65	**59** AQ5 UC, [IB] D2 **63** [IB] D1, D2-5, D8-11, D18, D22-24 **65** AQ8 UC
Identify "kingdom" as the first main level of the standard classification system. Observe a variety of living organisms and determine into which kingdom they would be classified.	IALS 44, 45, 75	**44** Act GI, [IB] C2, C35 **45** AQ5 UC, [IB] C2, C4, C29 **75** [IB] E4, E36
Grade 8		
Recognize that species acquire many of their unique characteristics through biological adaptations, which involve the selection of naturally occurring variations in populations.	IALS 94, 95, 96	**94** AQ3 UC, [IB] F16, F26 **95** [IB] F18-21 **96** AQ2 DCI
Observe a variety of organisms and explain how a specific trait could increase an organism's chances of survival.	IALS 95, 96	**95** [IB] F18-21 **96** AQ2 DCI
Explain how the extinction of a species occurs when the environment changes and the adaptation of a species is insufficient to allow for its survival.	IALS 95, 96, 97, 101	**95** [IB] F18-21 **96** AQ2 DCI **97** AQ2 CM, [IB] F15, F22-25, F27-28, F30-31

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Conduct a natural selection simulation to demonstrate how physical adaptations (i.e., protective camouflage, long neck for food gathering, muscular legs for running, heavy beak for nut cracking, etc.) have selective advantages for an organism. Research and report on beneficial physical adaptations of a variety of organisms.	IALS 95, 96	**95** [IB] F18-21 **96** AQ2 DCI
Investigate and discuss how short-term physiological changes of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration of polar bears, seed formation in plants) that occur in populations of organisms over generations.	IALS 94	**94** AQ3 UC, [IB] F16, F26
Recognize that species acquire many of their unique characteristics through biological adaptations, which involve the selection of naturally occurring variations in populations.	IALS 95, 96, 97	**95** [IB] F18-21 **96** AQ2 DCI **97** AQ2 CM, [IB] F15, F22-25, F27-28, F30-31
Observe a variety of organisms and explain how a specific trait could increase an organism's chances of survival.	IALS 95, 96, 97	**95** [IB] F18-21 **96** AQ2 DCI **97** AQ2 CM, [IB] F15, F22-25, F27-28, F30-31
Explain how the extinction of a species occurs when the environment changes and the adaptation of a species is insufficient to allow for its survival.	IALS 95, 96, 97	**95** [IB] F18-21 **96** AQ2 DCI **97** AQ2 CM, [IB] F15, F22-25, F27-28, F30-31

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Conduct a natural selection simulation to demonstrate how physical adaptations (i.e., protective camouflage, long neck for food gathering, muscular legs for running, heavy beak for nut cracking, etc.) have selective advantages for an organism. Research and report on beneficial physical adaptations of a variety of organisms.	IALS 95, 96, 97	**95** [IB] F18-21 **96** AQ2 DCI **97** AQ2 CM, [IB] F15, F22-25, F27-28, F30-31
Investigate and discuss how short-term physiological changes of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration of polar bears, seed formation in plants) that occur in populations of organisms over generations.	94	**94** AQ3 UC, [IB] F16, F26
Conduct simulations to investigate how organisms fulfill basic needs (i.e., food, shelter, air, space light/dark, and water) in a competitive environment. Relate how competition for resources can determine survival.	IALS 96, 100	**96** AQ2 DCI
Examine an assortment of plants and animals and use simple classification keys, based on observable features, to sort and group the organisms.	IALS 44, 78	**44** Act GI, [IB] C2, C35 **78** [IB] E7-10, E16
Identify a variety of reasons for extinction of a species. Use research on a variety of extinct organisms to speculate causes of extinction (i.e., inability to adapt to environmental changes).	IALS 89, 98, 100	**89** AQ4 ET, [IB] F1-4, F29 **98** [IB] F32-33
Enduring Understanding: The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human wants and needs.		
Grade 6		
No grade level expectations.		
Grade 7		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Research and report on selective breeding. Select an organism (e.g., race horses, pedigree dogs, drought resistant plants) and trace its history of development and the traits of the plant or animal that were enhanced by selective breeding.	N/C	
Recognize that the health profession uses pedigree charts to trace genetic disorders in past generations make predictions for future generations. Research and report on a chromosomal disorder. Complete a simulated pedigree for a fictional family based on your research.	IALS 56, 66	**56** AQ3 UC, [IB] D7, D2, D25 **66** [IB] D7, D21, D25
Grade 8		
No grade level expectations.		
STANDARD 8: ECOLOGY		
Enduring Understandings: Organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system.		
Grade 6		
No grade level expectations		
Grade 7		
No grade level expectations		
Grade 8		
Survey the diversity of organisms in a local or model ecosystem. Recognizing that a population consists of all individuals of a species that occur together at a given place and time, describe how to estimate and then calculate the size of a large population of a variety of organisms. Chart the diversity of the organisms in the ecosystem.	IALS 86	**86** AQ1 CM
Categorize populations of organisms according to the roles (producers, consumers, and decomposers) they	IALS 78, 80 83	**78** [IB] E7-10, E16 **80** [IB] E2-3, E7-10,

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
play in an ecosystem.		E15, E16, E25 **83** AQ3 DCI
Describe and explain how factors (i.e., space, food, water, disease) limit the number of organisms an ecosystem can support.	IALS 79, 84, 85	**79** AQ1 UC, [IB] E2-3, E7-11, E16, E35 **84** [IB] E19-20, E26-27, E34 **85** AQ1 UC, [IB] E21-23
Construct a data table or line graph to show population changes of a selected species over time. Describe the population changes portrayed by the graph.	IALS 72, 84, 85	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **84** [IB] E19-20, E26-27, E34 **85** AQ1 UC, [IB] E21-23
Observe graphs or data tables showing both the population growth of a species and the consequences of resource depletion on the population. Analyze the data and explain the effect that may occur from exponential growth of a population (given finite resources).	IALS 72, 84, 85	**72** AQ5 UC, [IB] E2, 3, E5, E13-14 **84** [IB] E19-20, E26-27, E34 **85** AQ1 UC, [IB] E21-23
Enduring Understandings: Matter needed to sustain life is continually recycled among and between organisms and the environment. Energy from the sun flows irreversibly through ecosystems and is conserved as organisms use and transform it.		
Grade 6		
No grade level expectations		
Grade 7		
No grade level expectations		
Grade 8		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Investigate and discuss how short-term physiological changes of an organism (e.g., skin tanning, muscle development, formation of calluses) differ from long-term evolutionary adaptations (e.g., white coloration of polar bears, seed formation in plants) that occur in a group of organisms over generations.	IALS 94	**94** AQ3 UC, [IB] F16, F26
Investigate local areas, disturbed and undisturbed, that are undergoing succession (i.e., abandoned gardens, ditch banks, and the edge of a forest). Predict how plant communities that grow in the area may change over time and how their presence determines what kinds of animals may move into and out of the areas.	IALS 86	**86** AQ1 CM
Enduring Understandings: Matter needed to sustain life is continually recycled among and between organisms and the environment. Energy from the sun flows irreversibly through ecosystems and is conserved as organisms use and transform it.		
Construct food webs and identify the relationships among producers, consumers, and decomposers.	IALS 73, 78, 80	**73** [IB] E1, E12, E24 **78** [IB] E7-10, E16 **80** [IB] E2-3, E7-10, E15, E16, E25
Design food webs and trace the flow of matter and energy (beginning with the Sun) through the food web.	IALS 73, 78, 80	**73** [IB] E1, E12, E24 **78** [IB] E7-10, E16 **80** [IB] E2-3, E7-10, E15, E16, E25
Enduring Understanding: Humans can alter the living and non-living factors within an ecosystem, thereby creating changes to the overall system.		
Grade 6		
No grade level expectations.		
Grade 7		

DELAWARE SCIENCE STANDARD	SEPUP	
	LOCATION	**ASSESSMENT**
Explain how sanitation measures such as sewers, landfills, and water treatment are important in controlling the spread of organisms that contaminate water and cause disease.	IAPS 32, 33, 34	**32** Proc GI **33** AQ3 RE & SI **34** AQ1 UC
Grade 8		
Research and analyze data on human population changes that have occurred in a specific Delaware ecosystem. Discuss reasons for changes in human population and explain how these changes have affected the biodiversity of local organisms and availability of natural resources in the given ecosystem (e.g., habitat loss, water quality, preservation/conservation efforts).	N/C	
Identify ways in which invasive species can disrupt the balance of Delaware as well as other ecosystems (i.e., competition for resources including habitat and/or food). Research and report on an invasive species, indicating how this species has altered the ecosystem.	IALS 73, 88	**73** [IB] E1, E12, E24 **88** AQ3 ET, [IB] E28-32