



LAB-AIDS CORRELATIONS FOR THE GEORGIA SCIENCE STANDARDS OF EXCELLENCE 2016

GRADES 6-8

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Key to SEPUP Core Science Programs:

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

MIDDLE SCHOOL

IAES = Issues and Earth Science, Second Edition

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

IALS = Issues and Life Science, Second Edition

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

IAPS = Issues and Physical Science, Second Edition

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

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

Recommended Scope and Sequence Georgia Science Standards of Excellence

Grade 6

SEPUP Course/Activity Numbers	Main Unit Issue
<i>IAES Issues and Earth Science:</i>	
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	Which areas of Boomtown are safest for construction?
Plate Tectonics 36-49	Which site would you recommend for storing nuclear waste?
Weather and Atmosphere	Is the growth of Sunbeam City affecting its weather, atmosphere, and water availability?
Earth in Space 71-84	Why are there many different calendars?
Exploring Space 85-98	What kinds of future space missions should we conduct?

Grade 7

SEPUP Course/Activity Numbers	Main Unit Issue
<i>IALS Issues and Life Science:</i>	
Experimental Design: 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?

Grade 8

SEPUP Course/Activity Numbers	Main Unit Issue
<i>IAPS Issues and Physical Science:</i>	
Studying Materials Scientifically 1-11	How should unidentified materials be handled?
Chemistry of Materials 12-29	When you buy a new product, do you think about what materials it is made of? What will happen to it when you no longer have a use for it?
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 a research-based assessment system developed by SEPUP and the Berkeley Evaluation and Assessment Research Group (BEAR) in the University of California Graduate School of Education. Forming the core of the SEPUP Assessment System are the **assessment variables** (content and process skills to be assessed), **assessment questions or tasks** used to gather evidence and **scoring guides** for interpreting students' responses (correspond to assessment variables).

The nine assessment variables are:

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

Types of assessment:

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

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

Citations included in the correlation document are as follows:

Plate Tectonics 40, 41, 42	40 Q1, 3, 4 41 Q3 UC; [IB] D2 42 [IB] D4, 6, 8-10, 16
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Plate Tectonics 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 Plate Tectonics Activity 40 Analysis Question 1, 3 and 4, Plate Tectonics Activity 41 Analysis Question 3 using Understanding Concepts scoring guide and Item Bank Questions 2, 4, 6, 8-10, and 16 from Unit D Plate Tectonics. For more information on program assessment and using SEPUP rubrics, consult the Teacher's Guide, Teacher Resource part III Assessment section.

SEPUP Support for Engineering Design

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

Engineering and Design Practices in SEPUP

Course activity with description	Students suggest or evaluate a solution	Students engage in the engineering process		
		Design	Test	Re-design
IAES11: Recommend a soil improvement plan	X			
IAES 32: Design a coastal breakwater		X	X	X
IAES 35: Recommend a site plan for housing development		X		
IAES 49: Evaluate sites for nuclear waste disposal	X			
IAES 67: Design/build wind vane/ anemometer		X	X	X
IAES 98: Recommend a space mission	X			
IALS 48: Design an improved hand-washing procedure		X	X	X
IALS 88: Suggest a plan for preventing zebra mussel spread	X			
IALS 104: Design artificial heart valve		X		
IALS 105: Design an artificial bone		X	X	X
IALS 107: Design an energy bar		X	X	X
IALS 108: Design a prosthetic limb		X	X	X

IAPS 12: Recommend a material for a drink container	X			
IAPS 13: Construct a product life cycle for a drink container	X			
IAPS 29: Evaluate options to recommend a "green" computer	X			
IAPS 60: Design an ice preservation chamber		X	X	X
IAPS 63: Improve a calorimeter design			X	X
IAPS 69: Design a better solar collector		X	X	X
IAPS 70: Design a warm & cool home		X		
IAPS 72: Recommend an energy-improvement plan for a home	X	X	X	X
IAPS 73: Evaluate vehicle safety features		X		
IAPS 85: Design a crash test dummy		X		

Grade 6: Issues and Earth Science, 2nd Edition

AQ = Analysis Question; IB = Item Bank (unit test questions)

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
S6E1. Obtain, evaluate, and communicate information about current scientific views of the universe and how those views evolved.		
a. Ask questions to determine changes in models of Earth’s position in the solar system, and origins of the universe as evidence that scientific theories change with the addition of new information. <i>(Clarification statement: Students should consider Earth’s position in geocentric and heliocentric models and the Big Bang as it describes the formation of the universe.)</i>	Exploring Space 87, 90	87 AQ 1-3
b. Develop a model to represent the position of the solar system in the Milky Way galaxy and in the known universe.	NC	
c. Analyze and interpret data to compare and contrast the planets in our solar system in terms of: <ul style="list-style-type: none"> • size relative to Earth, • surface and atmospheric features, • relative distance from the sun, and • ability to support life. 	Exploring Space 89-94	89 AQ 1; Proc RE; IB G 6, G14 90 AQ 1-2; IB G9, G16, G18 91 AQ 1, 3-4; Proc part B
d. Develop and use a model to explain the interaction of gravity and inertia that governs the motion of objects in the solar system.	Earth in Space 82, 84 Exploring Space 95-96	82 AQ 1-3; Q4 AD 95 AQ 1-4; IB G4, G10, G12, G19
e. Ask questions to compare and contrast the characteristics, composition, and location of comets, asteroids, and meteoroids.	Exploring Space 86, 88	86 AQ 1-3 88 AQ 1-2; Q2 UC; IB G 3, G13, G17
S6E2. Obtain, evaluate, and communicate information about the effects of the relative positions of the sun, Earth, and moon.		
a. Develop and use a model to demonstrate the phases of the moon by showing the relative	Earth in Space 73-74, 79-82	73 AQ 1-5; AQ1 UC

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
positions of the sun, Earth, and moon.		79 AQ 1-5; IB F4-6
b. Construct an explanation of the cause of solar and lunar eclipses.	Ecology 81 (as extension)	81 AQ 1-6; Q5 UC; IB F5, F8
c. Analyze and interpret data to relate the tilt of the Earth to the distribution of sunlight throughout the year and its effect on seasons.	Earth in Space 75-78	75 AQ 1-7 78 1-3; AQ Q2 UC; IB F10-16
S6E3. Obtain, evaluate, and communicate information to recognize the significant role of water in Earth processes.		
a. Ask questions to determine where water is located on Earth’s surface (oceans, rivers, lakes, swamps, groundwater, aquifers, and ice) and communicate the relative proportion of water at each location.	Weather and Atmosphere 54, 60-62	54 AQ 1-2; 60 AQ 1-2; IB E3, 38-9
b. Plan and carry out an investigation to illustrate the role of the sun’s energy in atmospheric conditions that lead to the cycling of water. <i>(Clarification statement: The water cycle should include evaporation, condensation, precipitation, transpiration, infiltration, groundwater, and runoff.)</i>	Weather and Atmosphere 58, 60, 62, 66	58 AQ 1-4, IB E6 60 AQ 1-2; IB E3, 38-9 62 AQ 1-4; Q4 SI; IB E3, 9, 11, 15 66 AQ 3
c. Ask questions to identify and communicate, using graphs and maps, the composition, location, and subsurface topography of the world’s oceans.	Weather and Atmosphere 56-57	56 AQ 1-4; Proc GI 57 AQ 1-4, IB E10
d. Analyze and interpret data to create graphic representations of the causes and effects of waves, currents, and tides in Earth’s systems.	Weather and Atmosphere 55-58 Earth in Space 82	55 AQ 1-3; Proc DI 82 AQ 1-3; Q5 ET
S6E4. Obtain, evaluate, and communicate information about how the sun, land, and water affect climate and weather.		
a. Analyze and interpret data to compare and contrast the composition of Earth’s atmospheric layers (including the ozone layer) and greenhouse gases.	Weather and Atmosphere 64-66	64 AQ1-3; Proc 9 66 AQ 2 UC, 3; IB E4-5

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<i>(Clarification statement: Earth’s atmospheric layers include the troposphere, stratosphere, mesosphere, and thermosphere.)</i>		
<p>b. Plan and carry out an investigation to demonstrate how energy from the sun transfers heat to air, land and water at different rates.</p> <p><i>(Clarification statement: Heat transfer should include the processes of conduction, convection, and radiation.)</i></p>	Weather and Atmosphere 55-58	55 AQ 1-3; Proc DI 56 AQ 1-4; Proc GI 57 AQ 1-4, IB E10 58 AQ 1-3; IB E6
c. Develop a model demonstrating the interaction between unequal heating and the rotation of the Earth that causes local and global wind systems.	Weather and Atmosphere 55-58, 67-68	55 AQ 1-3; Proc DI 56 AQ 1-4; Proc GI 57 AQ 1-4, IB E10 58 AQ 1-3; IB E6
d. Construct an explanation of the relationship between air pressure, weather fronts, and air masses and meteorological events such as tornados and thunderstorms.	Weather and Atmosphere 69	69 AQ 2; Proc CS; IB E16
e. Analyze and interpret weather data to explain the effects of moisture evaporating from the ocean on weather patterns and weather events such as hurricanes.	Weather and Atmosphere 64, 66	64 AQ 1-4; IB E5 66 AQ 1-3; AQ2 UC; IB E12-13
S6E5. Obtain, evaluate, and communicate information to show how Earth’s surface is formed.		
a. Ask questions to compare and contrast the Earth’s crust, mantle, inner and outer core, including temperature, density, thickness, and composition.	Plate Tectonics 38, 42, 45	38 AQ 1-5; Q5 UC; IB D1, D15 42 AQ 1-3; IB D4, 6, 8-10, 16
b. Plan and carry out an investigation of the characteristics of minerals and how minerals contribute to rock composition.	Rocks and Minerals 15-19	15 AQ 1-5; IB B1-3 19 AQ 1-6
c. Construct an explanation of how to classify rocks by their formation and how rocks change through geologic processes in the rock cycle.	Rocks and Minerals 19-22	19 AQ 1-6 22 AQ 1-7
d. Ask questions to identify types of weathering, agents of erosion and transportation, and	Erosion and Deposition	28 AQ 2-5

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
environments of deposition. <i>(Clarification statement: Environments of deposition include deltas, barrier islands, beaches, marshes, and rivers.)</i>	28-33	29 AQ 2 UC, 3-5 30 AQ 2-3 31 AQ 3, 5 32 AQ 1-7 33 AQ 1-2
e. Develop a model to demonstrate how natural processes (weathering, erosion, and deposition) and human activity change rocks and the surface of the Earth.	Erosion and Deposition 28-35	28 AQ 1-5; Proc GI; IB C2, C7 33 AQ 1-4 35 AQ 1-2
f. Construct an explanation of how the movement of lithospheric plates, called plate tectonics, can cause major geologic events such as earthquakes and volcanic eruptions. <i>(Clarification statement: Include convergent, divergent, and transform boundaries.)</i>	Plate Tectonics 37-38, 41-48	37 AQ 1-4 41 AQ 2 43 AQ 2 44 AQ 3-4 45 AQ 1 48: AQ 1-5; Q4 UC; IB D14, D15
g. Construct an argument using maps and data collected to support a claim of how fossils show evidence of the changing surface and climate of the Earth.	Rocks and Minerals 19 Plate Tectonics 39-40	19 AQ 1-6 39 AQ 1-5; IB D5, D13 40 AQ1-4
h. Plan and carry out an investigation to provide evidence that soil is composed of layers of weathered rocks and decomposed organic material.	Studying Soils Scientifically 3-6, 10	3: AQ 1-3; Q3 RE 10: AQ 1-3; Q2 RE; IB A 11-14
S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth.		
a. Ask questions to determine the differences between renewable/sustainable energy resources (examples: hydro, solar, wind, geothermal, tidal, biomass) and nonrenewable energy resources (examples: nuclear: uranium, fossil fuels: oil, coal, and natural gas), and how they are used in our everyday lives.	NC	
b. Design and evaluate solutions for sustaining the quality and supply of natural resources such	NC	

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
as water, soil, and air.		
<p>c. Construct an argument evaluating contributions to the rise in global temperatures over the past century.</p> <p><i>(Clarification statement: Tables, graphs, and maps of global and regional temperatures, and atmospheric levels of greenhouse gases such as carbon dioxide and methane, should be used as sources of evidence.)</i></p>	Weather and Atmosphere 66, 70	<p>66 AQ 3</p> <p>70 AQ 2, 3 ET, 4</p>

Grade 7: Issues and Life Science, 2nd Edition

AQ = Analysis Question; IB = Item Bank (unit test questions)

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<p>S7L1. Obtain, evaluate, and communicate information to investigate the diversity of living organisms and how they can be compared scientifically.</p>		
<p>a. Develop and defend a model that categorizes organisms based on common characteristics.</p>	Cell Biology and Disease 44	44: Proc 7
<p>b. Evaluate historical models of how organisms were classified based on physical characteristics and how that led to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals).</p> <p><i>(Clarification statement: This includes common examples and characteristics such as, but not limited to, prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures. Modern classification will be addressed in high school.)</i></p>	Cell Biology and Disease 45 Ecology 73, 75, 76	<p>73: Act UC; IB E1, E12, E24</p> <p>75: AQ 1-4; GI</p> <p>76: AQ 1-2</p>
<p>S7L2. Obtain, evaluate, and communicate information to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms.</p>		
<p>a. Develop a model and construct an explanation of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste.</p> <p><i>(Clarification statement: The intent is for students to demonstrate how the component structures of the cell interact and work together to allow the cell as a whole to carry out various processes. Additional structures, beyond those listed, will be addressed in high school Biology.)</i></p>	Cell Biology and Disease 39-42 Ecology 82	<p>40: AQ 1-5; Q3 DCI; IB C15, C18</p> <p>41: AQ 1-3; IB D2</p> <p>42: AQ 1-6; IB C3, C7, C16-20, C23</p> <p>82: AQ 2-5</p>

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<p>b. Develop and use a conceptual model of how cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms.</p>	<p>Body Works 12, 15, 18</p>	<p>12: AQ 1-4; IB B12, B15 15: AQ 1-5; Q3 UC; IB B2, B5, B25-28 18: AQ 1-5; Act GI; IB B9, B17-18, B29</p>
<p>c. Construct an argument that systems of the body. (Cardiovascular, Excretory, Digestive, Respiratory, Muscular, Nervous, and Immune) interact with one another to carry out life processes.</p> <p><i>(Clarification statement: The emphasis is not on learning individual structures and functions associated with each system, but on how systems interact to support life processes.)</i></p>	<p>Body Works 12, 15, 17, 18</p> <p>Cell Biology and Disease 46</p>	<p>12: AQ 1-4; IB B12, B15 18: AQ 1-5; Act GI; IB B9, B17-18, B29 46: AQ 1-3; Q1 UC; IB C27, C36</p>
<p>S7L3. Obtain, evaluate, and communicate information to explain how organisms reproduce either sexually or asexually and transfer genetic information to determine the traits of their offspring.</p>		
<p>a. Construct an explanation supported with scientific evidence of the role of genes and chromosomes in the process of inheriting a specific trait.</p>	<p>Genetics 58-63, 65, 66</p>	<p>58: STT 1-3 63: AQ 1; IB D1, D3-5, 8-11, D18, D22-24 65: AQ 1-3</p>
<p>b. Develop and use a model to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation.</p> <p><i>(Clarification statement: Models could include, but are not limited to, the use of monohybrid Punnett squares to demonstrate the heritability of genes and the resulting genetic variation, identification of heterozygous and homozygous, and comparison of genotype vs. phenotype.)</i></p>	<p>Genetics 57-63, 65</p>	<p>57: AQ 2 58: AQ 1-2 59: AQ 4-6 61: AQ 1, 3, 4 62: AQ 1-3 63: AQ 1; IB D1, D3-5, 8-11, D18, D22-24 65: AQ 2-4, 6, 8 UC</p>
<p>c. Ask questions to gather and synthesize information about the ways humans influence the inheritance of desired traits in organisms through selective</p>	<p>Genetics 57, 60, 61, 64-66</p>	<p>61: AQ 1-4; IB D6, D12-16 64: AQ1-6,</p>

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
breeding. <i>(Clarification statement: The element specifically addresses artificial selection and the ways in which it is fundamentally different from natural selection.)</i>		Extension; Act DCI; IB D20 65: AQ 5
S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.		
a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. <i>(Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)</i>	Ecology 72, 73, 79, 84, 87, 88	72: AQ 6 ET 79: STT 1-4, AQ 1-2; UC Q1; IB E2-3, E7-11, E16, E35 87: AQ 1-3; IB F8, F15
b. Develop a model to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. <i>(Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)</i>	Ecology 78-81	79: STT 1-4, AQ 1-2; UC Q1; IB E2-3, E7-11, E16, E35 80: AQ 2-4; IB E2-3, E7-10, E15-16, E25 81: AQ 1-6; Q5 UC; IB E2, E3, E5, E13, E14
c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.	Ecology 77, 79, 83-85	79: STT 1-4, AQ 1-2; UC Q1; IB E2-3, E7-11, E16, E35 83: AQ 1-4; Q3 DCI; IB E6, E18
d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth’s major terrestrial biomes (i.e., tropical rain forest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine).	Ecology 83	83: AQ 4-6

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<i>(Clarification statement: Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)</i>		
S7L5. Obtain, evaluate, and communicate information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics.		
<p>a. Use mathematical representations to evaluate explanations of how natural selection leads to changes in specific traits of populations over successive generations.</p> <p><i>(Clarification statement: Referencing data should be obtained from multiple sources including, but not limited to, existing research and simulations. Students should be able to calculate means, represent this data in a table or graph, and reference it when explaining the principles of natural selection.)</i></p>	Evolution 89, 94-97, 99, 101	<p>89: AQ 1-2; AQ ET; F1-4, F29</p> <p>95: AQ 1-3</p> <p>96: AQ 1-4</p> <p>97: AQ 1-2; Q1 RE</p> <p>99: AQ 1-4; Q2 UC; IB F32-33</p> <p>101: AQ 1-4; Q4 UC; Q5b ET</p>
b. Construct an explanation based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species.	Evolution 94-97, 100-101	<p>94: AQ 3</p> <p>95: AQ 1-6; extension</p> <p>96: AQ 1-7</p> <p>97: 2 CS</p> <p>100: AQ 1-4; extension</p> <p>101: AQ 1-4</p>
<p>c. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms.</p> <p><i>(Clarification statement: Evidence of evolution found in comparisons of current/modern organisms such as homologous structures, DNA, and fetal development will be addressed in high school.)</i></p>	Evolution 89, 90-93, 98-99	<p>90: AQ1-4; Q3 CM; IB F5</p> <p>91: 1-4; Q4 UC; IB F12-14</p> <p>93: AQ 1-5; Q4 UC; IB F8-11</p> <p>98: AQ 1</p> <p>99: 1-3</p>

Grade 8: Issues and Physical Science, 2nd Edition

AQ = Analysis Question; IB = Item Bank (unit test questions)

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.		
<p>a. Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures.</p> <p><i>(Clarification statement: Include heterogeneous and homogeneous mixtures. Types of bonds and compounds will be addressed in high school physical science.)</i></p>	<p>Chemistry of Materials 15-19, 20</p> <p>Water 50</p>	<p>15 AQ5 UC [IB] B7-11 16 [IB] B7-11 17 AQ6 UC 18 AQ3 AD, [IB] B19-21 19 [IB] B12-14 50 AQ5 UC, [IB] C23</p>
b. Develop and use models to describe the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed.	NC (particle model introduced in 48)	
c. Plan and carry out investigations to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling point) properties of matter.	<p>Chemistry of Materials 14, 18</p> <p>Water 35, 37</p>	<p>14 [IB] B4-6 18 AQ3 AD, [IB] B19-21 35 AQ1 AD 37 AQ2 AD; [IB] C1</p>
<p>d. Construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical.</p> <p><i>(Clarification statement: Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)</i></p>	<p>Chemistry of Materials 26</p> <p>Water 45, 46</p>	<p>45 [IB] C8, C20 46 Proc OD, GI; [IB] C9</p>
e. Develop models (e.g., atomic-level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, and electrons) and simple molecules.	Chemistry of Materials 15-17	<p>15 AQ5 UC [IB] B7-11 16 [IB] B7-11 17 AQ 6 UC</p>

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<p>f. Construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants.</p> <p><i>(Clarification statement: Evidence could include models such as balanced chemical equations.)</i></p>	Chemistry of Materials 25, 26	<p>25 AQ 1-3 26 AQ 1-5</p>
<p>S8P2. Obtain, evaluate, and communicate information about the law of conservation of energy to develop arguments that energy can transform from one form to another within a system.</p>		
<p>a. Analyze and interpret data to create graphical displays that illustrate the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object.</p>	Energy 54, 55, 58 Force and Motion 74, 76-77	<p>54 Proc DI; [IB] D1 55 AQ1 UC [IB] D1 58 AQ2 UC, [IB] D4-5, D8 74 AQ 2 76 AQ 2, 4</p>
<p>b. Plan and carry out an investigation to explain the transformation between kinetic and potential energy within a system (e.g., roller coasters, pendulums, rubber bands, etc.).</p>	Energy 54, 55, 58	<p>54 Proc DI; [IB] D1 55 AQ1 UC [IB] D1 58 AQ2 UC, [IB] D4-5, D8</p>
<p>c. Construct an argument to support a claim about the type of energy transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light)].</p>	Energy 56, 65, 66, 67	<p>65 Proc DI; D13 66 Proc DI; [IB] D16 67 AQ5 AD, [IB] d-14</p>
<p>d. Plan and carry out investigations on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or a gas (convection).</p>	Energy 56, 59, 61, 70	<p>59 [IB] D9 61 [IB] D10 70 Proc GI; [IB] D12, D-15</p>
<p>S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.</p>		
<p>a. Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration.</p>	Force and Motion 74, 75, 78 speed and distance	<p>74 Proc DI; [IB] E1-2, 5-6 75 AQ 2 UC, [IB] E2, 4-6, 7, 14</p>

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
<i>(Clarification statement: Students should be able to analyze motion graphs, but students should not be expected to calculate velocity or acceleration.)</i>		78 [IB] E2, 3, 8
b. Construct an explanation using Newton’s Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object.	Force and Motion 79, 80-82	79 [IB] E10 80 AQ 2; [IB] E2, 3, 11, 20 81 [IB] E3, 13, 15 82 AQ 3 RE; [IB] E3, 9, 12
c. Construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia).	Force and Motion 79, 80	79 AQ 1-3 80 AQ 2 UC
S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves.		
a. Ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves. <i>(Clarification statement: Include transverse and longitudinal waves and wave parts such as crest, trough, compressions, and rarefactions.)</i>	Waves 91, 93, 96	93 AQ 1; IB F17 96 AQ 3-4; IB F13
b. Construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy.	Waves 94-96	94 AQ 3-5, 6a AD, 6b ET 95 AQ 2; Proc OD 96 AQ 4-5; IB F10-12, F15
c. Design a device to illustrate practical applications of the electromagnetic spectrum (e.g., communication, medical, military).	NC	
d. Develop and use a model to compare and contrast how light and sound waves are reflected, refracted, absorbed, diffracted or transmitted through various materials. <i>(Clarification statement: Include echo and how color is</i>	Waves 93-97	93 AQ 1-4 97 AQ 2; IB F7-9, F21-23

Georgia Science Standard	Unit Title - Activity Number (s)	Assessment
seen but do not cover interference and scattering.)		
e. Analyze and interpret data to predict patterns in the relationship between density of media and wave behavior (i.e., speed).	Waves 93	93 AQ 1, 3 UC; IB F3-4
f. Develop and use a model (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy.	Waves 90-91	90 AQ 3; IB F1, F14, F16, F18 91 AQ 4-5
g. Develop and use models to demonstrate the effects that lenses have on light (i.e., formation an image) and their possible technological applications.	NC	
S8P5. Obtain, evaluate, and communicate information about gravity, electricity, and magnetism as major forces acting in nature.		
a. Construct an argument using evidence to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact.	Energy 65A	65A Proc; AQ 3
b. Plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators. <i>(Clarification statement: Include conduction, induction, and friction.)</i>	NC	
c. Plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces. <i>(Clarification statement: Including, but not limited to, generators or motors.)</i>	Energy 56A	56A Proc 5 DI; AQ 4-5 UC; extension