



LAB-AIDS Correlations for

2010 Mississippi Science Framework

MIDDLE SCHOOL, Grades 6-8

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This document is intended to show our alignment with the Mississippi Science Framework for Middle School, Grades 6-8.¹ The Mississippi Science Framework provides an outline of what students should learn through competencies and objectives.

ABOUT OUR PROGRAMS

LAB-AIDS Core Science Programs are developed to support current knowledge on the teaching and learning of science. All materials support an inquiry-driven pedagogy, with support for literacy skill development and with assessment programs that clearly show what students know and are able to do from using the programs. All programs have extensive support for technology in the school science classrooms, and feature comprehensive teacher support. For more information please visit www.lab-aids.com and navigate to the program of interest.

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 Mississippi Science Framework. It is not an exhaustive list; other locations may exist that are not listed here.

¹ <http://www.mde.k12.ms.us/ESE/science/2010-mississippi-science-framework>

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.

Issues and Earth Science, Second Edition (IAES)

Unit Title	Activity Number
Studying Soils 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.

ABOUT THE LAB-AIDS CITATIONS

The following tables are presented in a grade-level arrangement following the Mississippi Science Framework.

The citation: Earth in Space 72, 73, 75, 76, means the *Issues and Earth Science* Student Book, Earth in Space unit activities 72, 73, 75, and 76 combine to address the standard.

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
INQUIRY	Inquiry is embedded throughout the units.
1. Conduct a scientific investigation utilizing appropriate process skills.	Identified activities are intended as representative samples.
a. Design and conduct an investigation that includes predicting outcomes, using experimental controls, and making inferences. (Depth of Knowledge - DOK 3) ²	IAPS 3, 38, 54, 56A, 65, 66, 68, 74, 77, 98; IALS 5, 8, 14, 48, 64, 81, 83, 104, 105, 109; IAES 16, 55, 67, 72
b. Distinguish between qualitative and quantitative observations and make inferences based on observations. (DOK 3)	IAPS 3, 8, 9, 10, 35, 40, 41, 45, 48, 94; IALS 2, 7, 8, 9, 10, 11, 14, 17, 22, 27, 48, 54, 74, 78, 83, 86, 91, 93, 105, 107, 109; IAES 24, 43, 50
c. Use simple tools and resources to gather and compare information (using standard, metric, and non-standard units of measurement). (DOK 1) <ul style="list-style-type: none"> Tools (e.g., English rulers [to the nearest one-sixteenth of an inch], metric rulers [to the nearest millimeter], thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, hygrometers, telescopes, compasses, spring scales) Types of data (e.g., linear measures, mass, volume, temperature, time, area, perimeter) Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.) 	<p>IAPS 3, 8, 9, 10, 35, 54, 56, 56A, 61, 62, 63, 65A, 67, 69, 70, 77, 81, 83, 90; IALS 14, 16, 17, 19, 22, 27, 35, 36, 38, 39, 42, 43, 46, 47, 74, 80, 81, 86, 90, 91, 92, 93, 99, 102, 104, 105, 106, 107; IAES 1, 4, 12, 13, 15, 21, 27, 38, 44, 51, 54, 55, 56, 60, 64, 70, 72, 90, 91, 93, 95</p> <p>IAPS 6, 7, 8, 9, 10, 19, 25, 35, 41, 54, 59, 60, 61, 62, 63, 65, 67, 69, 74, 76, 77, 82, 95, 97; IALS 14, 17, 22, 27, 40, 41, 54, 104, 105; IAES 4, 10, 12, 13, 21, 27, 28, 31, 32, 38, 55, 72, 75, 90, 91, 93</p> <p>IAPS 4, 13, 15, 16, 24, 31, 32, 34, 43, 44, 51, 55, 64, 71, 72, 74, 82, 85; IALS 2, 3, 5, 6, 10, 11, 12, 13, 15, 16, 17, 21, 23, 25, 26, 27, 28, 33, 34, 36, 37, 42, 45, 46, 52, 56, 57, 59, 62, 64, 67, 69, 71, 72, 73, 76, 78, 79, 80, 83, 87, 89, 99, 101, 103, 108; IAES 7, 15, 20, 29,</p>

² Four levels of Depth of Knowledge (DOK) are used in the *2010 Mississippi Science Framework*. For a full explanation, reference <http://www.mde.k12.ms.us/docs/curriculum-and-instructions-library/2010-science-framework.pdf?sfvrsn=4>

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
	30, 33, 36, 40, 44, 48, 57, 60, 61, 66, 70, 74, 75, 78, 81, 82, 83, 87, 97
d. Analyze data collected from a scientific investigation to construct explanations and draw conclusions. (DOK 3)	IAPS 6, 7, 10, 18, 35, 37, 38, 41, 63, 64, 67, 83, 87, 90, 94, 97; IALS 14, 19, 22, 30, 39, 40, 47, 51, 64, 66, 84, 85, 88, 92, 96, 98; IAES 49, 76, 82, 94
e. Communicate scientific procedures and conclusions using diagrams, charts, tables, graphs, maps, written explanations, and/or scientific models. (DOK 2)	IAPS 3, 6, 7, 10, 12, 18, 19, 22, 27, 35, 37, 38, 41, 46, 54, 56A, 63, 64, 65, 66, 67, 68, 74, 77, 83, 87, 90, 92, 94, 95, 97, 98; IALS 5, 8, 14, 17, 19, 22, 30, 39, 40, 46, 47, 48, 51, 54, 59, 62, 64, 66, 77, 81, 83, 84, 85, 88, 91, 96, 98, 104, 105, 109; IAES 16, 27, 49, 51, 55, 67, 72, 76, 82, 94
f. Evaluate the results or solutions to problems by considering how well a product or design met the challenge to solve a problem. (DOK 3)	IAPS 11, 12, 24, 26, 27, 28, 29, 45, 46, 51, 59, 60, 63, 66, 68, 69, 70, 85, 88; IALS 1, 14, 47, 48, 102, 104, 105, 107, 109; IAES 11, 32, 67, 72
g. Infer explanations for why scientists might draw different conclusions from a given set of data. (DOK 2)	IALS 37, 91, 93, 94, 97
h. Recognize and analyze alternative explanations and predictions. (DOK 2)	IALS 37, 91, 93, 94, 97
PHYSICAL SCIENCE	
2. Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.	
a. Recognize that atoms of a given element are all alike but atoms of other elements have different atomic structures. (DOK 1)	Chemistry of Materials 17; Water 36
b. Distinguish physical properties of matter (e.g., melting points, boiling points, solubility) as it relates to changes in states. (DOK 2) <ul style="list-style-type: none"> • Between solids, liquids, and gases through models that relate matter to particles in motion • Solubility in water of various solids to activities (e.g., heating, stirring, shaking, crushing) on the rate of solution • Use of solubility differences to identify components of a mixture (e.g., chromatography) 	Water 35 Water 37, 38 Water 37, 38
c. Investigate and describe the effects of forces acting on objects. (DOK 2) <ul style="list-style-type: none"> • Gravity, friction, magnetism, drag, lift, and thrust 	Energy 54, 55, 57; Force and

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
<ul style="list-style-type: none"> Forces affecting the motion of objects 	<p>Motion 78, 79, 80, 81, 82, 83, 84</p> <p>Force and Motion 74, 76, 77, 78, 79, 80, 81, 82, 84, 85</p>
<p>d. Investigate the mechanical and chemical forms of energy and demonstrate the transformations from one form to another. (DOK 2)</p> <ul style="list-style-type: none"> Energy transformations represented in the use of common household objects Mechanical energy transformed to another form of energy (e.g., vibrations, heat through friction) Chemical energy transformed to another form of energy (e.g., light wands, lightning bugs, batteries, bulbs) 	<p>Energy 54, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 71, 72</p> <p>Energy 54, 56, 57, 58, 62, 64, 66</p> <p>Energy 57, 58, 62, 63, 64, 65, 66</p>
<p>e. Apply the laws of reflection and refraction to explain everyday phenomena. (DOK 2)</p> <ul style="list-style-type: none"> Properties of reflection, refraction, transmission, and absorption of light Images formed by plane, convex, and concave lenses and mirrors, and reflecting and refracting telescopes Objects that are opaque, transparent, or translucent 	<p>Waves 94, 95, 97, 98; Energy 69, 70</p> <p>Not covered in current edition</p> <p>Chemistry of Materials 14; Waves 95</p>
<p>f. Develop a logical argument to explain how the forces which affect the motion of objects has real-world applications including (but not limited to) examples of Mississippi’s contributions as follows: (DOK 3)</p> <ul style="list-style-type: none"> Automotive industry (Nissan’s new production plant is located in Canton, MS. Toyota’s new facility is in Tupelo, MS.) Aerospace industry (The Raspet Flight Research Laboratory, housed at Mississippi State University, is one of the premier university flight research facilities in the country.) Shipbuilding industry (Ingall’s Shipbuilding, of Pascagoula, MS, is a leading supplier of marine 	<p>The SEPUP Force and Motion unit supports the study of Newton’s Laws in the context of motor vehicle safety. Businesses in MS apply this STEM content in many ways, including Nissan’s production plant located in Canton, MS and Toyota’s facility in Tupelo, MS.</p> <p>Local standard</p> <p>Local standard</p> <p>Local standard</p>

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
vessels to the United States Navy.)	
<p>g. Predict and explain factors that affect the flow of heat in solids, liquids, and gases. (DOK 3)</p> <ul style="list-style-type: none"> • Insulating factors in real life applications (e.g., building, construction, clothing, animal covering) • Conduction, convection, or radiation factors used to enhance the flow of heat • Temperature differences on the movement of water 	<p>Energy 53, 60, 61, 62, 66, 70, 72 Energy 59, 61, 66, 69, 70</p> <p>Energy 61, 62</p>
LIFE SCIENCE	
3. Explain the organization of living things, the flow of matter and energy through ecosystems, the diversity and interactions among populations, and the natural and human-made pressures that impact the environment.	
<p>a. Describe and predict interactions (among and within populations) and the effects of these interactions on population growth to include the effects on available resources. (DOK 2)</p> <ul style="list-style-type: none"> • How cooperation, competition and predation affect population growth • Effects of overpopulation within an ecosystem on the amount of resources available • How natural selection acts on a population of organisms in a particular environment via enhanced reproductive success 	<p>Ecology 77, 84, 85, 87; Evolution 96</p> <p>Ecology 72, 73, 77, 85, 87, 88</p> <p>Evolution 94, 95, 96, 97, 98, 99, 101</p>
<p>b. Compare and contrast structure and function in living things to include cells and whole organisms. (DOK 2)</p> <ul style="list-style-type: none"> • Hierarchy of cells, tissues, organs, and organ systems to their functions in an organism • Function of plant and animal cell parts (vacuoles, nucleus, cytoplasm, cell membrane, cell wall, chloroplast) • Vascular and nonvascular plants, flowering and non-flowering plants, deciduous and coniferous trees 	<p>Body Works 12, 16</p> <p>Cell Biology and Disease 38, 40, 42, 43; Ecology 83</p> <p>Not covered</p>
<p>c. Distinguish between the organization and development of humans to include the effects of disease. (DOK 2)</p> <ul style="list-style-type: none"> • How systems work together (e.g., respiratory, circulatory) • Fertilization, early cell division, implantation, embryonic and fetal development, infancy, childhood, adolescence, adulthood, and old age 	<p>Studying People Scientifically 6; Body Works 12, 13, 14, 15, 16, 17, 18, 23, 24</p> <p>See also: http://www.sepuplhs.org/pdfs/ials_humanreproduction.pdf</p>

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
<ul style="list-style-type: none"> Common diseases caused by microorganisms (e.g., bacteria, viruses, malarial parasites) 	Cell Biology and Disease 30, 31, 33, 34, 37, 42, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53
<p>d. Describe and summarize how an egg and sperm unite in the reproduction of angiosperms and gymnosperms. (DOK 1)</p> <ul style="list-style-type: none"> The path of the sperm cells to the egg cell in the ovary of a flower The structures and functions of parts of a seed in the formation of a plant and of fruits How the combination of sex cells results in a new combination of genetic information different from either parent 	<p>See also: http://www.sepuphs.org/pdfs/ials_humanreproduction.pdf</p> <p>See also: http://www.sepuphs.org/pdfs/ials_lifecycles.pdf Genetics 57</p>
<p>e. Construct a diagram of the path of solar energy through food webs that include humans and explain how the organisms relate to each other. (DOK 2)</p> <ul style="list-style-type: none"> Autotrophs and heterotrophs, producers, consumers and decomposers Predator/prey relationships, competition, symbiosis, parasitism, commensalisms, mutualism 	<p>Ecology 78, 79, 80</p> <p>Ecology 78, 79, 80, 83 Extension</p>
EARTH AND SPACE SCIENCE	
4. Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.	
<p>a. Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust). (DOK 1)</p>	Rocks and Minerals 21, Plate Tectonics 38, 42
<p>b. Draw conclusions about historical processes that contribute to the shaping of planet Earth. (DOK 3)</p> <ul style="list-style-type: none"> Movements of the continents through time Continental plates, subduction zones, trenches, etc. 	<p>Plate Tectonics 40, 41, 42, 44, 46, 47, 48</p> <p>Plate Tectonics 40, 41, 42, 44, 45, 46, 47, 48</p>
<p>c. Analyze climate data to draw conclusions and make predictions. (DOK 2)</p>	Weather and Atmosphere 52, 53, 56, 57, 58, 66, 70
<p>d. Summarize the causes and effects of pollution on people and the environment (e.g., air pollution, ground pollution, chemical pollution) and justify how and why pollution should be minimized. (DOK 1)</p>	Ecology 83, 87; Weather and Atmosphere 70
<p>e. Explain the daily and annual changes in the Earth's rotation and revolution. (DOK 2)</p> <ul style="list-style-type: none"> How the positions of the moon and the sun affect tides The phases of the moon (e.g., new, crescent, half, 	<p>Earth in Space 82, 83, 84</p> <p>Earth in Space 79, 80, 81, 82</p>

Sixth Grade Mississippi Science Framework Standards	SEPUP Location
gibbous, full, waxing, waning)	
f. Differentiate between objects in the universe (e.g., stars, moons, solar systems, asteroids, galaxies). (DOK 1)	Exploring Space 86, 87, 88, 90, 91, 92
<p>g. Research and cite evidence of current resources in Earth's systems. (DOK 3)</p> <ul style="list-style-type: none"> • Resources such as fuels, metals, fresh water, wetlands, and farmlands • Methods being used to extend the use of Earth's resources through recycling, reuse, and renewal • Factors that contribute to and result from runoff (e.g., water cycle, groundwater, drainage basin (watershed)) 	<p>Studying Soils Scientifically 7 extension, Rocks and Minerals 15 extension; Energy 64 extension Chemistry of Materials 22, 23, 27; Water 43; Energy 64 Weather and Atmosphere 62, Erosion and Deposition 29, 31</p>

Seventh Grade Mississippi Science Framework Standards	SEPUP Location
INQUIRY	Inquiry is embedded throughout the units.
1. Design and conduct a scientific investigation utilizing appropriate process skills and technology.	Identified activities are intended as representative samples.
a. Design, conduct, and draw conclusions from an investigation that includes using experimental controls. (DOK 3)	IAPS 27, 38, 54, 56A, 65, 66, 68, 98; IALS 5, 8, 14, 17, 48, 64, 81, 83; IAES 55, 67, 72
b. Discriminate among observations, inferences, and predictions. (DOK 1)	IAPS 3, 11, 35, 40, 45, 94; IALS 2, 8, 74, 78, 83, 86, 90, 91, 93; IAES 1, 4, 8, 18, 24, 28, 30, 50, 57, 61, 64, 66, 70, 71, 76, 79, 85, 93, 97,
<p>c. Collect and display data using simple tools and resources to compare information (using standard, metric, and non-standard measurement). (DOK 2)</p> <ul style="list-style-type: none"> • Tools (e.g., English rulers [to the nearest one-sixteenth of an inch], metric rulers [to the nearest millimeter], thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, hygrometers, telescopes, compasses, spring scales, pH indicators, stopwatches) • Types of data (e.g., linear measures, mass, volume, temperature, area, perimeter) • Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.) 	<p>IAPS 3, 6, 8, 9, 10, 35, 46, 54, 56, 56A, 61, 62, 63, 65A, 67, 69, 70, 74, 77, 81, 83, 90; IALS 14, 16, 17, 19, 22, 27, 35, 36, 38, 39, 42, 43, 46, 47, 74, 80, 81, 86, 90, 91, 92, 93, 99, 102, 104, 105, 106, 107; IAES 1, 4, 12, 13, 15, 21, 27, 38, 44, 51, 54, 55, 56, 60, 64, 67, 70, 72, 90, 91, 93, 95</p> <p>IAPS 6, 7, 8, 9, 10, 19, 25, 35, 41, 54, 59, 60, 61, 62, 63, 65, 67, 69, 74, 76, 77, 82, 95, 97; IALS 14, 17, 22, 27, 40, 41, 54, 104, 105; IAES 4, 10, 12, 13, 21, 27, 28, 31, 32, 38, 55, 72, 75, 90, 91, 93</p> <p>IAPS 4, 13, 15, 16, 24, 31, 32, 34, 43, 44, 51, 55, 64, 71, 72, 74, 82, 85; IALS 2, 3, 5, 6, 10, 11, 12, 13, 15, 16, 17, 21, 23, 25, 26, 27, 28, 33, 34, 36, 37, 42, 45, 46, 52, 56, 57, 59, 62, 64, 67, 69, 71, 72, 73, 76, 78, 79, 80, 83, 87, 89, 99, 101, 103, 108; IAES 7, 15, 20, 29, 30, 33, 36, 40, 44, 48, 57, 60, 61, 66, 70, 74, 75, 78, 81, 82, 83, 87, 97</p>
d. Organize data in tables and graphs and analyze data to construct explanations and draw conclusions. (DOK 3)	IAPS 6, 7, 10, 12, 18, 19, 22, 27, 35, 37, 38, 41, 46, 67, 83, 90, 92, 95, 97; IALS 8, 14, 17, 19, 30, 39,

Seventh Grade Mississippi Science Framework Standards	SEPUP Location
	40, 46, 47, 51, 54, 59, 64, 77, 84, 96, 98; IAES 27, 51, 76, 94
e. Communicate results of scientific procedures and explanations through a variety of written and graphic methods. (DOK 2)	IAPS 6, 7, 10, 12, 18, 19, 22, 27, 35, 37, 38, 41, 46, 54, 56A, 63, 65, 66, 67, 68, 74, 77, 83, 87, 90, 92, 94, 95, 97, 98; IALS 5, 8, 14, 17, 19, 22, 30, 39, 40, 46, 47, 48, 51, 54, 59, 62, 64, 66, 81, 83, 84, 88, 91, 96, 98, 104, 105, 109; IAES 16, 287, 28, 49, 51, 55, 67, 72, 76, 82, 94 and throughout
f. Explain how science and technology are reciprocal. (DOK 1)	IALS 35, 36, 103, 108, 109; IAES 85, 87, 93, 94, 98
g. Develop a logical argument to explain why scientists often review and ask questions about the results of other scientists' work. (DOK 3)	IALS 37 94; IAPS 80; IAES 41, 42
h. Make relationships between evidence and explanations. (DOK 2)	IAPS 11, 12, 27, 28, 29, 40, 51, 52, 64, 72, 88, 94, 99; IALS 9, 10, 20, 29, 32, 34, 49, 53, 67, 71, 72, 87, 88, 89, 101, 107, 108; IAES 11, 23, 35, 36, 49, 70, 83, 89, 98
PHYSICAL SCIENCE	
2. Develop an understanding of chemical and physical changes, interactions involving energy, and forces that affect motion of objects.	
a. Identify patterns (e.g., atomic mass, increasing atomic numbers) and common characteristics (metals, nonmetals, gasses) of elements found in the periodic table of elements. (DOK 2)	Chemistry of Materials 15, 16
b. Categorize types of chemical changes, including synthesis and decomposition reactions, and classify acids and bases using the pH scale and indicators. (DOK 2)	Chemistry of Materials 21, 25, 26, 27, 28; Water 46, 47, 48
c. Compare the force (effort) required to do the same amount of work with and without simple machines (e.g., levers, pulleys, wheel and axle, inclined planes). (DOK 2)	TX Motion and Simple Machines 31, 32, 33, 34, 35; 38
d. Describe cause and effect relationships of electrical energy. (DOK 2) <ul style="list-style-type: none"> • Energy transfers through an electric circuit (using common pictures and symbols) • Electric motor energy transfers (e.g., chemical to electrical to mechanical motion) and generators 	Energy 66 Energy 56A, 64, 65, 66
e. Distinguish how various types of longitudinal and transverse waves (e.g., water, light, sound, seismic) transfer energy. (DOK 2) <ul style="list-style-type: none"> • Frequency • Wavelength 	Waves 90, 91, 93, 95

Seventh Grade Mississippi Science Framework Standards	SEPUP Location
<ul style="list-style-type: none"> Speed Amplitude 	
<p>f. Describe the effects of unbalanced forces on the speed or direction of an object's motion. (DOK 2)</p> <ul style="list-style-type: none"> Variables that describe position, distance, displacement, speed, and change in speed of an object Gravity, friction, drag, lift, electric forces, and magnetic forces 	<p>Force and Motion 74, 76, 77, 78, 80, 81, 82 IAES Exploring Space 95, 96 (gravity); Force and Motion 82 (friction and drag). Lift is not covered in the current edition.</p>
LIFE SCIENCE	
3. Distinguish the characteristics of living things and explain the interdependency between form and function using the systems of the human organism to illustrate this relationship.	
<p>a. Assess how an organism's chances for survival are influenced by adaptations to its environment. (DOK 2)</p> <ul style="list-style-type: none"> The importance of fungi as decomposers Major characteristics of land biomes (e.g., tropical rainforests, temperate rainforests, deserts, tundra, coniferous forests/taiga, and deciduous forests) Adaptations of various plants to survive and reproduce in different biomes 	<p>Ecology 80 Ecology 83 Ecology 83</p>
<p>b. Classify the organization and development of living things to include prokaryotic (e.g., bacteria) and eukaryotic organisms (e.g., protozoa, certain fungi, multicellular animals and plants). (DOK 2)</p>	<p>Cell Biology and Disease 43, 44, 45; Ecology 75, 76, 80</p>
<p>c. Evaluate how health care technology has improved the quality of human life (e.g., computerized tomography [CT], artificial organs, magnetic resonance imaging [MRI], ultrasound). (DOK 3)</p>	<p>Body Works 25; Bioengineering 103, 104, 105, 108</p>
<p>d. Compare and contrast reproduction in terms of the passing of genetic information (DNA) from parent to offspring. (DOK 2)</p> <ul style="list-style-type: none"> Sexual and asexual reproduction Reproduction that accounts for evolutionary adaptability of species Mitosis and meiosis Historical contributions and significance of discoveries of Gregor Mendel and Thomas Hunt Morgan as related to genetics 	<p>Genetics 57, 63 Evolution 94, 96, 97 Genetics 57, 63; See also: http://www.sepuplhs.org/pdfs/ials_humanreproduction.pdf Genetics 60, 62, 63, 65 Thomas Hunt Morgan not covered</p>
<p>e. Compare and contrast how organisms obtain and utilize</p>	

Seventh Grade Mississippi Science Framework Standards	SEPUP Location
<p>matter and energy. (DOK 1)</p> <ul style="list-style-type: none"> • How organisms use resources, grow, reproduce, maintain stable internal conditions (homeostasis) and recycle waste • How plants break down sugar to release stored chemical energy through respiration 	<p>Body Works 13, 15, 17, 18, 19, 22, 26, 27, 28; Ecology 79</p> <p>Cell Biology and Disease 39; Ecology 81</p>
EARTH AND SPACE SCIENCE	
4. Describe the properties and structure of the sun and the moon with respect to the Earth.	
<p>a. Justify the importance of Earth materials (e.g., rocks, minerals, atmospheric gases, water) to humans. (DOK 3)</p>	<p>Erosion and Deposition 24, 26, 28, 29, 30, 31, 32; Weather and Atmosphere 50, 61, 62, 65, 66</p>
<p>b. Explain the causes and effects of historical processes shaping the planet Earth (e.g., movements of the continents, continental plates, subduction zones, trenches, etc.) (DOK 2)</p>	<p>Plate Tectonics 40, 41, 42, 43, 44, 45, 46, 47, 48</p>
<p>c. Describe the causes and effects of heat transfer as it relates to the circulation of ocean currents, atmospheric movement, and global wind patterns (e.g., trade winds, the jet stream). Provide examples of how these global patterns can affect local weather. (DOK 2)</p> <ul style="list-style-type: none"> • Characteristics of the Gulf Stream and other large ocean currents • Effects on climate in Eastern North America and Western Europe • Effects of heat transfer to the movement of air masses, high and low pressure areas, and fronts in the atmosphere 	<p>Weather and Atmosphere 57, 58 Weather and Atmosphere 57 Weather and Atmosphere 66, 68, 69</p>
<p>d. Conclude why factors, such as lack of resources and climate can limit the growth of populations in specific niches in the ecosystem. (DOK 2)</p> <ul style="list-style-type: none"> • Abiotic factors that affect population, growth, and size (quantity of light, water, range of temperatures, soil compositions) • Cycles of water, carbon, oxygen, and nitrogen in the environment • Role of single-celled organisms (e.g., phytoplankton) in the carbon and oxygen cycles 	<p>Ecology 77, 79, 83, 84, 85, 86</p> <p>IAES 62; Nitrogen cycle is not covered Ecology 79, 83</p>
<p>e. Research and develop a logical argument to support the funding of NASA's Space Programs. (DOK 3)</p> <ul style="list-style-type: none"> • Space exploration (e.g., telescopes, radio telescopes, X-ray telescopes, cameras, spectro-meters, etc.) • Spinoffs (e.g., laser, pacemaker, dehydrated food, flame retardant clothing, global positioning system [GPS], satellite imagery, global weather information, 	<p>Exploring Space 87, 97, 98</p> <p>Exploring Space 85</p>

Seventh Grade Mississippi Science Framework Standards	SEPUP Location
diagnostic imagery) <ul style="list-style-type: none"> • Mississippi’s contributions to the space industry 	Local standard
f. Distinguish the structure and movements of objects in the solar system. (DOK 2) <ul style="list-style-type: none"> • Sun’s atmosphere (corona, chromosphere, photosphere and core) • How phenomena on the sun’s surface (e.g., sunspots, prominences, solar wind, solar flares) affect Earth (e.g., auroras, interference in radio and television communication) • Eclipses relative to the position of the sun, moon, and Earth • Contributions of Copernicus, Galileo, and Kepler in describing the solar system 	Not covered Not covered Earth in Space 80, 81 extension Exploring Space 87, 92 Kepler is not covered
g. Research and evaluate the use of renewable and nonrenewable resources and critique efforts in the United States including (but not limited) to Mississippi to conserve natural resources and reduce global warming. (DOK 3) <ul style="list-style-type: none"> • How materials are reused in a continuous cycle in ecosystems, (e.g., Mississippi Ethanol Gasification Project to develop and demonstrate technologies for the conversion of biomass to ethanol) • Benefits of solid waste management (reduce, reuse, recycle) • Conserving renewable and nonrenewable resources (e.g., The Recycling and Solid Waste Reduction Program in Jackson, MS) 	Weather and Atmosphere 62 Chemistry of Materials 12, 29 Rocks and Minerals 12, 23
h. Predict weather events by analyzing clouds, weather maps, satellites, and various data. (DOK 3)	Weather and Atmosphere 56, 57, 58, 66, 69

Eighth Grade Mississippi Science Framework Standards	SEPUP Location
INQUIRY	Inquiry is embedded throughout the units. Identified activities are intended as representative samples.
1. Draw conclusions from scientific investigations including controlled experiments.	
a. Design, conduct, and analyze conclusions from an investigation that includes using experimental controls. (DOK 3)	IAPS 27, 38, 54, 56A, 65, 66, 68, 98; IALS 5, 8, 14, 17, 48, 64, 81, 83; IAES 55, 67, 72
b. Distinguish between qualitative and quantitative observations and make inferences based on observations. (DOK 3)	IAPS 3, 8, 9, 10, 35, 40, 41, 45, 48, 94; IALS 2, 7, 8, 9, 10, 11, 14, 17, 22, 27, 48, 54, 74, 78, 83, 86, 91, 93, 105, 107, 109; IAES 24, 43, 50
<p>c. Summarize data to show the cause and effect relationship between qualitative and quantitative observations (using standard, metric, and non-standard units of measurement). (DOK 3)</p> <ul style="list-style-type: none"> • Tools (e.g., English rulers [to the nearest one-sixteenth of an inch], metric rulers [to the nearest millimeter], thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, hygrometers, telescopes, compasses, spring scales, pH indicators, stopwatches, graduated cylinders, medicine droppers) • Types of data (e.g., linear measures, mass, volume, temperature, area, perimeter) • Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.) 	<p>IAPS 3, 5, 6, 8, 9, 10, 24, 25, 26, 27, 28, 35, 37, 38, 40, 41, 42, 45, 46, 50, 51, 54, 56, 56A, 61, 62, 63, 65A, 67, 69, 70, 74, 77, 81, 83, 90; IALS 14, 16, 17, 19, 20, 22, 27, 30, 35, 36, 38, 39, 40, 41, 42, 43, 46, 47, 55, 64, 74, 80, 81, 82, 83, 86, 90, 91, 92, 93, 99, 102, 104, 105, 106, 107; IAES 1, 4, 12, 13, 15, 16, 17, 21, 27, 38, 44, 51, 54, 55, 56, 60, 64, 67, 70, 72, 90, 91, 93, 95</p> <p>IAPS 6, 7, 8, 9, 10, 19, 25, 35, 41, 54, 59, 60, 61, 62, 63, 65, 67, 69, 74, 76, 77, 82, 95, 97; IALS 14, 17, 22, 27, 40, 41, 54, 104, 105; IAES 4, 10, 12, 13, 21, 27, 28, 31, 32, 38, 55, 72, 75, 90, 91, 93</p> <p>IAPS 4, 13, 15, 16, 24, 31, 32, 34, 43, 44, 51, 55, 64, 71, 72, 74, 82, 85; IALS 2, 3, 5, 6, 10, 11, 12, 13, 15, 16, 17, 21, 23, 25, 26, 27,</p>

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	28, 33, 34, 36, 37, 42, 45, 46, 52, 56, 57, 59, 62, 64, 67, 69, 71, 72, 73, 76, 78, 79, 80, 83, 87, 89, 99, 101, 103, 108; IAES 7, 15, 20, 29, 30, 33, 36, 40, 44, 48, 57, 60, 61, 66, 70, 74, 75, 78, 81, 82, 83, 87, 97
d. Analyze evidence that is used to form explanations and draw conclusions. (DOK 3)	IAPS 6, 7, 10, 18, 35, 37, 38, 41, 63, 64, 67, 83, 87, 90, 92, 94, 97; IALS 14, 19, 22, 30, 39, 40, 47, 51, 62, 64, 66, 84, 85, 88, 91, 96, 98; IAES 49, 76, 82, 94
e. Develop a logical argument defending conclusions of an experimental method. (DOK 3)	IAPS 12, 27, 28, 29, 57, 64, 71, 72, 73, 74, 83, 84, 85, 88, 94, 95, 99; IALS 20, 32, 34, 49, 58, 62, 66, 67, 70, 71, 72, 75, 87, 89, 90, 91, 98, 99, 100, 101; IAES 35, 36, 39, 49, 70, 83, 88, 92, 95
f. Develop a logical argument to explain why perfectly designed solutions do not exist. (DOK 3)	SEPUP has activities and assessment scoring guides that support making decisions that require trade-offs. See, for example: IAPS 11, 12, 27, 28, 29, 40, 51, 52, 64, 72, 88, 94, 99; IALS 9, 10, 20, 29, 32, 34, 49, 53, 67, 71, 72, 87, 88, 89, 101, 107, 108; IAES 11, 23, 35, 36, 49, 70, 83, 89, 98
g. Justify a scientist’s need to revise conclusions after encountering new experimental evidence that does not match existing explanations. (DOK 3)	IAPS 16, 21, 32, 33, 80, 96; IALS 2, 25, 34, 37, 50, 52, 60, 94; IAES 42, 74, 78, 85, 87, 92
h. Analyze different ideas and recognize the skepticism of others as part of the scientific process in considering alternative conclusions. (DOK 3)	IALS 37, 91, 93, 94, 97
PHYSICAL SCIENCE	
2. Apply concepts relating to an understanding of chemical and physical changes, interactions involving energy, and forces that	

Eighth Grade Mississippi Science Framework Standards	SEPUP Location
affect motion of objects.	
<p>a. Identify patterns found in chemical symbols, formulas, reactions, and equations that apply to the law of conservation of mass. (DOK 1)</p> <ul style="list-style-type: none"> • Chemical symbols and chemical formulas of common substances such as NaCl (table salt), H₂O (water), C₆H₁₂O₆ (sugar), O₂ (oxygen gas), CO₂ (carbon dioxide), and N₂ (nitrogen gas) • Mass of reactants before a change and products after a change • Balanced chemical equations such as photosynthesis and respiration 	<p>Chemistry of Materials 16, 17</p> <p>Chemistry of Materials 25</p> <p>Water 50, Ecology 81, 82</p>
<p>b. Predict the properties and interactions of given elements using the periodic table of the elements. (DOK 2)</p> <ul style="list-style-type: none"> • Metals and nonmetals • Acids and bases • Chemical changes in matter (e.g., rusting [slow oxidation], combustion [fast oxidation], food spoilage) 	<p>Chemistry of Materials 15, 16</p> <p>Water 46, 47, 48, 49, 50</p> <p>Chemistry of Materials 19, 21, 26, 27, 28, 45</p>
<p>c. Distinguish the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction. (DOK 2)</p>	<p>Force and Motion 74, 75, 79, 81, 82</p>
<p>d. Relate how electrical energy transfers through electric circuits, generators, and power grids, including the importance of contributions from Mississippi companies. (DOK 2)</p> <ul style="list-style-type: none"> • The Electrical Power Products Division of Howard Industries, a leading manufacturer of electrical distribution equipment in such locations as Laurel and Ellisville, MS • Kuhlman Electric Corporation, located in Crystal Springs, MS 	<p>Local standard</p> <p>Local standard</p>
<p>e. Contrast various components of the electromagnetic spectrum (e.g., infrared, visible light, ultraviolet) and predict their impacts on living things. (DOK 2)</p>	<p>Waves 94, 96</p>
<p>f. Recognize Newton's Three Laws of Motion and identify situations that illustrate each law (e.g., inertia, acceleration, action, reaction forces). (DOK 2)</p>	<p>Force and Motion 76, 78, 79, 80, 81</p>
LIFE SCIENCE	
<p>3. Compare and contrast the structure and functions of the cell, levels of organization of living things, basis of heredity, and adaptations that explain variations in populations.</p>	
<p>a. Analyze how adaptations to a particular environment (e.g., desert, aquatic, high altitude) can increase an organism's survival and reproduction and relate organisms and their ecological niches to evolutionary change and extinction. (DOK 3)</p>	<p>Ecology 83 extension, Evolution 94, 95, 96, 97, 99, 100, 101</p>
<p>b. Compare and contrast the major components and functions of</p>	

Eighth Grade Mississippi Science Framework Standards	SEPUP Location
<p>different types of cells. (DOK 2)</p> <ul style="list-style-type: none"> • Differences in plant and animal cells • Structures (nucleus, cytoplasm, cell membrane, cell wall, mitochondrion, and nuclear membrane) • Different types of cells and tissues (e.g., epithelial, nerve, bone, blood, muscle) 	<p>Cell Biology and Disease 38, 42, 45; Ecology 82 Cell Biology and Disease 38, 40, 42, 43, 44, 45, 46 Ecology 82 Body Works 12, 15, 16; Cell Biology and Disease 42, 46</p>
<p>c. Describe how viruses, bacteria, fungi, and parasites may infect the human body and interfere with normal body functions. (DOK 1)</p>	<p>Cell Biology and Disease 31, 32, 33, 34, 37, 44, 45, 46, 47, 48, 49, 51</p>
<p>d. Describe heredity as the passage of instructions from one generation to another and recognize that hereditary information is contained in genes, located in the chromosomes of each cell. (DOK 2)</p> <ul style="list-style-type: none"> • How traits are passed from parents to offspring through pairs of genes • Phenotypes and genotypes • Hierarchy of DNA, genes, and chromosomes and their relationship to phenotype • Punnett square calculations 	<p>Genetics 54, 55, 57, 58, 59, 60, 61, 62, 63, 66 Genetics 61, 62 Genetics 63 Genetics 61, 62, 66, 67</p>
<p>e. Explain energy flow in a specified ecosystem. (DOK 2)</p> <ul style="list-style-type: none"> • Populations, communities, and habitats • Niches, ecosystems and biomes • Producers, consumers and decomposers in an ecosystem 	<p>Ecology 83 Ecology 83 Ecology 79, 80, 81, 82, 86</p>
<p>f. Develop a logical argument for or against research conducted in selective breeding and genetic engineering, including (but not limited to) research conducted in Mississippi. Examples from Mississippi include the following: (DOK 3)</p> <ul style="list-style-type: none"> • The Animal Functional Genomics Laboratory at Mississippi State University • The Stoneville Pedigreed Seed Company in Stoneville, MS • Catfish Genetics Research Unit at the Thad Cochran National Warm Water Aquaculture Center in Stoneville, MS 	<p>Evolution 101 Local standard Local standard Local standard</p>
<p>g. Research and draw conclusions about the use of single-celled organisms in industry, in the production of food, and impacts on life. (DOK 3)</p>	<p>Cell Biology and Disease 31, 37, 39, 45, 50, 52</p>
<p>h. Describe how an organism gets energy from oxidizing its food and releasing some of its energy as heat. (DOK 1)</p>	<p>Body Works 15</p>
EARTH AND SPACE SCIENCE	
4. Describe the Earth's System in terms of its position to objects in the universe, structure and composition, climate, and renewable and nonrenewable resources.	
<p>a. Compare and contrast the lithosphere and the asthenosphere. (DOK 1)</p>	

Eighth Grade Mississippi Science Framework Standards	SEPUP Location
<ul style="list-style-type: none"> • Composition, density, and location of continental crust and oceanic crust • Physical nature of the lithosphere (brittle and rigid) with the asthenosphere (plastic and flowing) • How the lithosphere responds to tectonic forces (faulting and folding) 	<p>Plate Tectonics 44, 45, 47, 48</p> <p>Plate Tectonics 38, 44, 47</p> <p>Plate Tectonics 43, 45, 47, 48</p>
<p>b. Describe the cause and effect relationship between the composition of and movement within the Earth’s lithosphere. (DOK 1)</p> <ul style="list-style-type: none"> • Seismic wave velocities of earthquakes and volcanoes to lithospheric plate boundaries using seismic data • Volcanoes formed at mid-ocean ridges, within intra-plate regions, at island arcs, and along some continental edges • Modern distribution of continents to the movement of lithospheric plates since the formation of Pangaea 	<p>Plate Tectonics 43, 44, 45</p> <p>Plate Tectonics 42, 44, 45, 47, 48</p> <p>Plate Tectonics 40, 41, 42</p>
<p>c. Examine weather forecasting and describe how meteorologists use atmospheric features and technology to predict the weather. (DOK 2)</p> <ul style="list-style-type: none"> • Temperature, precipitation, wind (speed/direction), dew point, relative humidity, and barometric pressure • How the thermal energy transferred to the air results in vertical and horizontal movement of air masses, Coriolis effect • Global wind patterns (e.g., trade winds, westerlies, jet streams) • Satellites and computer modeling 	<p>Weather and Atmosphere 53, 56, 64, 68</p> <p>Weather and Atmosphere 57, 68</p> <p>Weather and Atmosphere 68</p> <p>Weather and Atmosphere 69</p>
<p>d. Research the importance of the conservation of renewable and nonrenewable resources, including (but not limited to) Mississippi, and justify methods that might be useful in decreasing the human impact on global warming. (DOK 3)</p> <ul style="list-style-type: none"> • Greenhouse gases • The effects of the human population • Relationships of the cycles of water, carbon, oxygen, and nitrogen 	<p>Weather and Atmosphere 66</p> <p>Weather and Atmosphere 66, 70</p> <p>Not covered</p>
<p>e. Explain how the tilt of Earth’s axis and the position of the Earth in relation to the sun determine climatic zones, seasons, and length of the days. (DOK 2)</p>	<p>Earth in Space 73, 74, 75, 76, 77, 78</p>
<p>f. Describe the hierarchical structure (stars, clusters, galaxies, galactic clusters) of the universe and examine the expanding universe to include its age and history and the modern techniques (e.g., radio, infrared, ultraviolet and X-ray astronomy) used to measure objects and distances in the universe. (DOK 2)</p>	<p>Exploring Space 87, 93, 94</p>

