

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Inquiry Strand Grade 8**

2010 MS Framework G8 - Inquiry	2018 MS CCRS for Science - all grades and courses
<p>Competency 1. Draw conclusions from scientific investigations including controlled experiments.</p>	<p>All Inquiry skills will be taught in the appropriate performance objectives in the new standards. Students will use various Science and Engineering Practices (SEPs) to learn the content. All science skills should be included as needed.</p>
<p>1a. Design, conduct, and analyze conclusions from an investigation that includes using experimental controls.</p>	
<p>1b. Distinguish between qualitative and quantitative observations and make inferences based on observations.</p>	
<p>1c. Summarize data to show the cause and effect relationship between qualitative and quantitative observations (using standard, metric, and non-standard units of measurement).</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>1d. Analyze evidence that is used to form explanations and draw conclusions.</p>	
<p>1e. Develop a logical argument defending conclusions of an experimental method.</p>	
<p>1f. Develop a logical argument to explain why perfectly designed solutions do not exist.</p>	
<p>1g. Justify a scientist’s need to revise conclusions after encountering new experimental evidence that does not match existing explanations.</p>	
<p>1h. Analyze different ideas and recognize the skepticism of others as part of the scientific process in considering alternative conclusions.</p>	

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Life Science Grade 8**

2010 MS Framework G8 – Life Science	2018 MS CCRS for Science G8 - Life Science
<p>Competency 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 align="center">Standard statements are in bold font below.</p>
<p>3a. 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.</p>	<p>L.8.4A Students will demonstrate an understanding of the process of natural selection, in which variations in a population increase some individuals’ likelihood of surviving and reproducing in a changing environment.</p> <p>L.8.4A.1 Use various scientific resources to analyze the historical findings of Charles Darwin to explain basic principles of natural selection.</p> <p>L.8.4A.2 Investigate to construct explanations about natural selection that connect growth, survival, and reproduction to genetic factors, environmental factors, food intake, and interactions with other organisms.</p> <p>L.8.4B Students will demonstrate an understanding of how similarities and differences among living and extinct species provide evidence that changes have occurred in organisms over time and that similarity of characteristics provides evidence of common ancestry.</p> <p>L.8.4B.1 Analyze and interpret data (e.g. pictures, graphs) to explain how natural selection may lead to increases and decreases of specific traits in populations over time.</p> <p>L.8.4B.2 Construct written and verbal explanations to describe how genetic variations of traits in a population increase some organisms’ probability of surviving and reproducing in a specific environment.</p> <p>L.8.4B.3 Obtain and evaluate scientific information to explain that separated populations, that remain separated, can evolve through mutations to become a new species (speciation).</p> <p>L.8.4B.4 Analyze displays of pictorial data to compare and contrast embryological and homologous/analogous structures across multiple species to identify evolutionary relationships.</p>
<p>3b. Compare and contrast the major components and functions of different types of cells.</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><i>Moved to Grade 6 (L.6.1)</i></p>

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3c. Describe how viruses, bacteria, fungi, and parasites may infect the human body and interfere with normal body functions.	<i>Similar topics found in Grade 6 (L.6.4)</i>
<p>3d. 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.</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>L.8.2B Students will demonstrate an understanding of the differences in inherited and acquired characteristics and how environmental factors (natural selection) and the use of technologies (selective breeding, genetic engineering) influence the transfer of genetic information.</p> <p>L.8.2B.1 Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.</p> <p>L.8.2B.2 Use various scientific resources to research and support the historical findings of Gregor Mendel to explain the basic principles of heredity.</p> <p>L.8.2B.3 Use mathematical and computational thinking to analyze data and make predictions about the outcome of specific genetic crosses (monohybrid Punnett Squares) involving simple dominant/recessive traits.</p> <p>L.8.2B.4 Debate the ethics of artificial selection (selective breeding, genetic engineering) and the societal impacts of humans changing the inheritance of desired traits in organisms.</p> <p>L.8.2C Students will demonstrate an understanding that chromosomes contain many distinct genes and that each gene holds the instructions for the production of a specific protein, which in turn affects the traits of an individual.</p> <p>L.8.2C.1 Communicate through diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of the individual (not to include transcription or translation).</p> <p>L.8.2C.2 Construct scientific arguments from evidence to support claims about the potentially harmful, beneficial, or neutral effects of genetic mutations on organisms.</p>
<p>3e. Explain energy flow in a specified ecosystem</p> <ul style="list-style-type: none"> • Populations, communities, and habitats • Niches, ecosystems and biomes • Producers, consumers and decomposers in an ecosystem 	<i>Moved to Grade 6 (L.6.3)</i>
3f. Develop a logical argument for or against research conducted in selective breeding and genetic engineering, including (but not limited to) research conducted in Mississippi.	<i>See L.8.2B.4 above</i>

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3g. Research and draw conclusions about the use of single-celled organisms in industry, in the production of food, and impacts on life.	<i>Moved to Grade 6 (L.6.4.5)</i>
3h. Describe how an organism gets energy from oxidizing its food and releasing some of its energy as heat.	<i>Moved to Grade 7 (L.7.3)</i>
<i>Similar topics taught in Grade 7</i>	<p>L.8.2A Students will demonstrate an understanding of how sexual reproduction results in offspring with genetic variation while asexual reproduction results in offspring with identical genetic information.</p> <p>L.8.2A.1 Obtain and communicate information about the relationship of genes, chromosomes, and DNA, and construct explanations comparing their relationship to inherited characteristics.</p> <p>L.8.2A.2 Create a diagram of mitosis and explain its role in asexual reproduction, which results in offspring with identical genetic information.</p> <p>L.8.2A.3 Construct explanations of how genetic information is transferred during meiosis.</p> <p>L.8.2A.4 Engage in discussion using models and evidence to explain that sexual reproduction produces offspring that have a new combination of genetic information different from either parent.</p> <p>L.8.2A.5 Compare and contrast advantages and disadvantages of asexual and sexual reproduction.</p>

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Physical Science Grade 8**

2010 MS Framework G8 – Physical Science	2018 MS CCRS for Science G8– Physical Science
<p>Competency 2. Apply concepts relating to an understanding of chemical and physical changes, interactions involving energy, and forces that affect motion of objects.</p>	<p>Standard statements are in bold font below.</p>
<p>2.a. Identify patterns found in chemical symbols, formulas, reactions, and equations that apply to the law of conservation of mass</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><i>Moved to Grade 7 (P. 7.5C and P.7.5D)</i></p>
<p>2.b. Predict the properties and interactions of given elements using the periodic table of the elements.</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><i>Moved to Grade 7 (P. 7.5C and P.7.5D)</i></p>
<p>2.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.</p>	<p><i>Moved to Grade 6 (P.6.6)</i></p>
<p>2.d. Relate how electrical energy transfers through electric circuits, generators, and power grids, including the importance of contributions from Mississippi companies.</p>	<p><i>Topic not included in 2018 standards.</i></p>

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<p>2.e. Contrast various components of the electromagnetic spectrum (e.g., infrared, visible light, ultraviolet) and predict their impacts on living things.</p>	<p>P.8.6 Students will demonstrate an understanding of the properties, behaviors, and application of waves.</p> <p>P.8.6.1 Collect, organize, and interpret data about the characteristics of sound and light waves to construct explanations about the relationship between matter and energy.</p> <p>P.8.6.2 Investigate research-based mechanisms for capturing and converting wave energy (frequency, amplitude, wavelength, and speed) into electrical energy.</p> <p>P.8.6.3 Conduct simple investigations about the performance of waves to describe their behavior (e.g., refraction, reflection, transmission, and absorption) as they interact with various materials (e.g., lenses, mirrors, and prisms).</p> <p>P.8.6.4 Use scientific processes to plan and conduct controlled investigations to conclude sound is a wave phenomenon that is characterized by amplitude and frequency.</p> <p>P.8.6.5 Conduct scientific investigations that describe the behavior of sound when resonance changes (e.g., waves in a stretched string and design of musical instruments).</p> <p>P.8.6.6 Obtain and evaluate scientific information to explain the relationship between seeing color and the transmission, absorption, or reflection of light waves by various materials.</p> <p>P.8.6.7 Research the historical significance of wave technology to explain how digitized tools have evolved to encode and transmit information (e.g., telegraph, cell phones, and wireless computer networks).</p> <p>P.8.6.8 Compare and contrast the behavior of sound and light waves to determine which types of waves need a medium for transmission.</p>
<p>2.f. Recognize Newton’s Three Laws of Motion and identify situations that illustrate each law (e.g., inertia, acceleration, action, reaction forces).</p>	<p><i>Moved to Grade 6 (P.6.6)</i></p>

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Earth Science Grade 8**

2010 MS Framework G8 - Earth Science	2018 MS CCRS for Science G8 – Earth Science
<p>Competency 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>	<p>Standard statements are in bold font below.</p>
<p>4a. Compare and contrast the lithosphere and the asthenosphere.</p> <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>E.8.9A Students will demonstrate an understanding that physical processes and major geological events (e.g., plate movement, volcanic activity, mountain building, weathering, erosion) are powered by the Sun and the Earth’s internal heat and have occurred over millions of years.</p> <p>E.8.9A.1 Investigate and explain how the flow of Earth’s internal energy drives the cycling of matter through convection currents between Earth’s surface and the deep interior causing plate movements.</p> <p>E.8.9A.2 Explore and debate theories of plate tectonics to form conclusions about past and current movements of rocks at Earth’s surface throughout history.</p> <p>E.8.9A.3 Map land and water patterns from various time periods and use rocks and fossils to report evidence of how Earth’s plates have moved great distances, collided, and spread apart.</p> <p>E.8.9A.4 Research and assess the credibility of scientific ideas to debate and discuss how Earth’s constructive and destructive processes have changed Earth’s surface at varying time and spatial scales.</p> <p>E.8.9A.5 Use models that demonstrate convergent and divergent plate movements that are responsible for most landforms and the distribution of most rocks and minerals within Earth’s crust.</p> <p>E.8.9A.6 Design and conduct investigations to evaluate the chemical and physical processes involved in the formation of soils.</p> <p>E.8.9A.7 Explain the interconnected relationship between surface water and groundwater.</p>
<p>4b. Describe the cause and effect relationship between the composition of and movement within the Earth’s lithosphere.</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>E.8.9B Students will demonstrate an understanding of natural hazards (volcanic eruptions, severe weather, earthquakes) and construct explanations for why some hazards are predictable and others are not.</p> <p>E.8.9B.1 Research and map various types of natural hazards to determine their impact on society.</p> <p>E.8.9B.2 Compare and contrast technologies that predict natural hazards to identify which types of technologies are most effective.</p> <p>E.8.9B.3 Using an engineering design process, create mechanisms to improve community resilience, which safeguard against natural hazards (e.g., building restrictions in flood or tidal zones, regional watershed management, Firewise construction).*</p>

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<p>4c. Examine weather forecasting and describe how meteorologists use atmospheric features and technology to predict the weather.</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><i>Moved to Grade 7 (E.7.9A)</i></p>
<p>4d. 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.</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>E.8.10 Students will demonstrate an understanding that a decrease in natural resources is directly related to the increase in human population on Earth and must be conserved.</p> <p>E.8.10.1 Read and evaluate scientific information about advancements in renewable and nonrenewable resources. Propose and defend ways to decrease national and global dependency on nonrenewable resources.</p> <p>E.8.10.2 Create and defend a proposal for reducing the environmental effects humans have on Earth (e.g., population increases, consumer demands, chemical pollution, deforestation, and change in average annual temperature).</p> <p>E.8.10.3 Using scientific data, debate the societal advantages and disadvantages of technological advancements in renewable energy sources.</p> <p>E.8.10.4 Using an engineering design process, develop a system to capture and distribute thermal energy that makes renewable energy more readily available and reduces human impact on the environment (e.g., building solar water heaters, conserving home energy).*</p>
<p>4e. 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.</p>	<p><i>Moved to Grade 7 (E.7.9C)</i></p>

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<p>4f. 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.</p>	<p><i>Similar topics found in Grade 5 (E.5.8B) and Grade 6 (E.6.8)</i></p>
<p>4g. Justify the importance of continued research and use of new technology in the development and commercialization of potentially useful natural products, including, but not limited to research efforts in Mississippi.</p> <ul style="list-style-type: none"> • The Thad Cochran National Center for Natural Products Research, housed at the University of Mississippi • The Jamie Whitten Delta States Research Center in Stoneville, MS, • The Mississippi Polymer Institute, housed at the University of Southern Mississippi 	<p><i>Topic not included in new standards</i></p>
<p>4h. Justify why an imaginary hurricane might or might not hit a particular area, using important technological resources including (but not limited to) the following:</p> <ul style="list-style-type: none"> • John C. Stennis Space Center Applied Research • NOAA • The National Weather Service 	<p><i>Similar topics found in Grade 7 (E.7.9A)</i></p>

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<i>Similar topic taught in Grade 3</i>	<p>E.8.7 Students will demonstrate an understanding of geological evidence to analyze patterns in Earth’s major events, processes, and evolution in history.</p> <p>E.8.7.1 Use scientific evidence to create a timeline of Earth’s history that depicts relative dates from index fossil records and layers of rock (strata).</p> <p>E.8.7.2 Create a model of the processes involved in the rock cycle and relate it to the fossil record.</p> <p>E.8.7.3 Construct and analyze scientific arguments to support claims that most fossil evidence is an indication of the diversity of life that was present on Earth and that relationships exist between past and current life forms.</p> <p>E.8.7.4 Use research and evidence to document how evolution has been shaped both gradually and through mass extinction by Earth’s varying geological conditions (e.g., climate change, meteor impacts, and volcanic eruptions).</p>