Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Inquiry Strand Grade 6

2010 MS Framework G6 - Inquiry	2018 MS CCRS for Science - all grades and courses
Competency 1. Conduct a scientific investigation utilizing appropriate process skills.	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.
1a. Design and conduct an investigation that includes predicting outcomes, using experimental controls, and making inferences.	
1b. Distinguish between qualitative and quantitative observations and make inferences based on observations.	
1c. Use simple tools and resources to gather and compare information (using standard, metric, and non-standard units of measurement). • 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.)	
1d. Analyze data collected from a scientific investigation to construct explanations and draw conclusions.	
1e. Communicate scientific procedures and conclusions using diagrams, charts, tables, graphs, maps, written explanations, and/or scientific models.	
1f. Evaluate the results or solutions to problems by considering how well a product or design met the challenge to solve a problem.	
1g. Infer explanations for why scientists might draw different conclusions from a given set of data.	
1h. Recognize and analyze alternative explanations and predictions.	

2010 MS Framework G6 – Life Science	**2018 MS CCRS for Science G6 - Life Science**
Competency 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.	**Standard statements are in bold font below.**
3a. Describe and predict interactions (among and within populations) and the effects of these interactions on population growth to include the effects on available resources. • 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	*See L.6.3 below*
3b. Compare and contrast structure and function in living things to include cells and whole organisms. • 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	**L.6.1 Students will demonstrate an understanding that living things range from simple to complex organisms, are organized hierarchically, and function as whole living systems.** L.6.1.1 Use argument supported by evidence in order to distinguish between living and non-living things, including viruses and bacteria. L.6.1.2 Obtain and communicate evidence to support the cell theory. L.6.1.3 Develop and use models to explain how specific cellular components (cell wall, cell membrane, nucleus, chloroplast, vacuole, and mitochondria) function together to support the life of prokaryotic and eukaryotic organisms to include plants, animals, fungi, protists, and bacteria (not to include biochemical function of cells or cell part). L.6.1.4 Compare and contrast different cells in order to classify them as a protist, fungus, plant, or animal. L.6.1.5 Provide evidence that organisms are unicellular or multicellular. L.6.1.6 Develop and use models to show relationships among the increasing complexity of multicellular organisms (cells, tissues, organs, organ systems, organisms) and how they serve the needs of the organism.

2010 MS Framework G6 – Life Science	**2018 MS CCRS for Science G6 - Life Science**
3c. Distinguish between the organization and development of humans to include the effects of disease. • How systems work together (e.g., respiratory, circulatory) • Fertilization, early cell division, implantation, embryonic and fetal development, infancy, childhood, adolescence, adulthood, and old age • Common diseases caused by microorganisms (e.g., bacteria, viruses, malarial parasites)	*See above L.6.1.6 above for basic overview of how a system is formed and how systems work together for the organism*
3d. Describe and summarize how an egg and sperm unite in the reproduction of angiosperms and gymnosperms. • 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	*Plant life cycles moved to Grade 4 (L.4.2)*

2010 MS Framework G6 – Life Science	**2018 MS CCRS for Science G6 - Life Science**
3e. Construct a diagram of the path of solar energy through food webs that include humans and explain how the organisms relate to each other. • Autotrophs and heterotrophs, producers, consumers and decomposers • Predator/prey relationships, competition, symbiosis, parasitism, commensalisms, mutualism	**L.6.3 Students will demonstrate an understanding of the relationships among survival, environmental changes, and diversity as they relate to the interactions of organisms, populations, and the environment.** L.6.3.1 Use scientific reasoning to explain differences between biotic and abiotic factors that demonstrate what living organisms need to survive. L.6.3.2 Develop and use models to describe the levels of organization within ecosystems (species, populations, communities, ecosystems, and biomes). L.6.3.3 Analyze cause and effect relationships to explore how changes in the physical environment (limiting factors, natural disasters) can lead to population changes within an ecosystem. L.6.3.4 Investigate organism interactions in a competitive or mutually beneficial relationship (predation, competition, cooperation, or symbiotic relationships). L.6.3.5 Develop and use food chains, webs, and pyramids to analyze how energy is transferred through an ecosystem from producers (autotrophs) to consumers (heterotrophs, including humans) to decomposers.
Previously taught in Biology	**L.6.4 Students will demonstrate an understanding of classification tools and models such as dichotomous keys to classify representative organisms based on the characteristics of the kingdoms: Archaebacteria, Eubacteria, Protists, Fungi, Plants, and Animals.** L.6.4.1 Compare and contrast modern classification techniques (e.g., analyzing genetic material) to the historical practices used by scientists such as Aristotle and Carolus Linnaeus. L.6.4.2 Use classification methods to explore the diversity of organisms in kingdoms (animals, plants, fungi, protists, bacteria). Support claims that organisms have shared structural and behavioral characteristics. L.6.4.3 Analyze and interpret data from observations to describe how fungi obtain energy and respond to stimuli (e.g., bread mold, rotting plant material). L.6.4.4 Conduct investigations using a microscope or multimedia source to compare the characteristics of protists (euglena, paramecium, amoeba) and the methods they use to obtain energy and move through their environment (e.g., pond water). L.6.4.5 Engage in scientific arguments to support claims that bacteria (Archaebacteria and Eubacteria) and viruses can be both helpful and harmful to other organisms and the environment.

Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Physical Science Grade 6

2010 MS Framework G6 – Physical Science	2018 MS CCRS for Science G6 – Physical Science
Competency 2. Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.	**Standard statements are in bold font below.**
2a. Recognize that atoms of a given element are all alike but atoms of other elements have different atomic structures.	*Introduced in Grade 5 (P.5.5A) and expanded and moved to Grade 7 (P.7.5C)*
2b. Distinguish physical properties of matter (e.g., melting points, boiling points, solubility) as it relates to changes in states. • 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)	*Expanded and moved to Grade 5 (P.5.5A and P.5.5B)*

2010 MS Framework G6 – Physical Science	2018 MS CCRS for Science G6 – Physical Science
2c. Investigate and describe the effects of forces acting on objects. • Gravity, friction, magnetism, drag, lift, and thrust • Forces affecting the motion of objects	**P.6.6 Students will demonstrate an understanding of Newton's laws of motion using real world models and examples.** P.6.6.1 Use an engineering design process to create or improve safety devices (e.g., seat belts, car seats, helmets) by applying Newton's Laws of motion. Use an engineering design process to define the problem, design, construct, evaluate, and improve the safety device.* P.6.6.2 Use mathematical computation and diagrams to calculate the sum of forces acting on various objects. P.6.6.3 Investigate and communicate ways to manipulate applied/frictional forces to improve movement of objects on various surfaces (e.g., athletic shoes, wheels on cars). P.6.6.4 Compare and contrast magnetic, electric, frictional, and gravitational forces. P.6.6.5 Conduct investigations to predict and explain the motion of an object according to its position, direction, speed, and acceleration. P.6.6.6 Investigate forces (gravity, friction, drag, lift, thrust) acting on objects (e.g., airplane, bicycle helmets). Use data to explain the differences between the forces in various environments. P.6.6.7 Determine the relationships between the concepts of potential, kinetic, and thermal energy.
2d. Investigate the mechanical and chemical forms of energy and demonstrate the transformations from one form to another. • 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)	*See P.6.6.7 above*

2010 MS Framework G6 – Physical Science	2018 MS CCRS for Science G6 – Physical Science
2e. Apply the laws of reflection and refraction to explain everyday phenomena. • 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	*Expanded and moved to Grade 8 (P.8.6)*
2f. 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: • 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 vessels to the United States Navy.)	*See P.6.6.1 above*
2g. Predict and explain factors that affect the flow of heat in solids, liquids, and gases. (DOK 3) • 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	*Expanded and moved to Grade 7 (P.7.5B)*

Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Earth Science Grade 6

2010 MS Framework G6 – Earth Science	**2018 MS CCRS for Science G6 – Earth Science**
Competency 4. Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.	**Standard statements are in bold font below.**
4a. Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust)	*Moved to Grade 3 (E.3.7B)*
4b. Draw conclusions about historical processes that contribute to the shaping of planet Earth. • Movements of the continents through time • Continental plates, subduction zones, trenches, etc.	*Expanded and moved to Grade 8 (E.8.9A)*
4c. Analyze climate data to draw conclusions and make predictions.	*Moved to Grade 4 (E.4.9B.2)*
4d. 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.	*Moved to Grade 4 (E.4.9C and E.4.10)*

2010 MS Framework G6 – Earth Science	**2018 MS CCRS for Science G6 – Earth Science**
4e. Explain the daily and annual changes in the Earth's rotation and revolution. • How the positions of the moon and the sun affect tides •The phases of the moon (e.g., new, crescent, half, gibbous, full, waxing, waning)	**E.6.8 Students will demonstrate an understanding of Earth's place in the universe and the interactions of the solar system (sun, planets, their moons, comets, and asteroids) using evidence from multiple scientific resources to explain how these objects are held in orbit around the Sun because of its gravitational pull.** E.6.8.1 Obtain, evaluate, and summarize past and present theories and evidence to explain the formation and composition of the universe. E.6.8.2 Use graphical displays or models to explain the hierarchical structure (stars, galaxies, galactic clusters) of the universe. E.6.8.3 Evaluate modern techniques used to explore our solar system's position in the universe. E.6.8.4 Obtain and evaluate information to model and compare the characteristics and movements of objects in the solar system (including planets, moons, asteroids, comets, and meteors). E.6.8.5 Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth. E.6.8.6 Design models representing motions within the Sun-Earth-Moon system to explain phenomena observed from the Earth's surface (positions of celestial bodies, day and year, moon phases, solar and lunar eclipses, and tides). E.6.8.7 Analyze and interpret data from the surface features of the Sun (e.g., photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth.
4f. Differentiate between objects in the universe (e.g., stars, moons, solar systems, asteroids, galaxies)	*See E.6.8.2 and E.6.8.4 above*

2010 MS Framework G6 – Earth Science	**2018 MS CCRS for Science G6 – Earth Science**
4g. Research and cite evidence of current resources in Earth's systems • 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)	*Moved to Grade 5 (E.5.10)*