

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Inquiry Strand Grade 4**

2010 MS Framework G4 - Inquiry	2018 MS CCRS for Science - all grades and courses
Competency 1. Explain and use skills necessary to conduct scientific inquiry.	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. Form hypotheses and predict outcomes of problems to be investigated.	
1b. Use the senses and simple tools to gather qualitative information about objects or events (size, shape, color, texture, sound, position, change).	
1c. Demonstrate the accurate use of simple tools to gather and compare information <ul style="list-style-type: none"> • Tools (English rulers [to the nearest eighth of an inch], metric rulers [to the nearest centimeter], thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges) • Types of data (height, mass/weight, temperature, length, distance, volume, area, perimeter) 	
1d. Use simple sketches, diagrams, tables, charts, and writing to draw conclusions and communicate data results.	
1e. Interpret and describe patterns of data using drawings, diagrams, charts, tables, graphs, and maps.	
1f. Explain why scientists and engineers often work in teams with different individuals doing different things that contribute to the results.	
1g. Draw conclusions about important steps (e.g., making observations, asking questions, trying to solve a problem, etc.) that led to inventions and discoveries.	

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Life Science Grade 4**

2010 MS Framework G4 – Life Science	2018 MS CCRS for Science G4 – Life Science
Competency 3. Analyze the characteristics, structures, life cycles, and environments of organisms.	Standard statements are in bold font below.
<p>3a. Describe the cause and effect relationships that explain the diversity and evolution of organisms over time.</p> <ul style="list-style-type: none"> • Observable traits due to inherited or environmental adaptations • Variations in environment (over time and from place to place) • Variations in species as exemplified by fossils • Extinction of a species due to insufficient adaptive capability in the face of environmental changes 	<i>Expanded and moved to Grade 3 (L.3.4)</i>

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<p>3b. Classify the organs and functions of the nervous, circulatory, and respiratory systems of the body.</p>	<p>L.4.1 Students will demonstrate an understanding of the organization, functions, and interconnections of the major human body systems.</p> <p>L.4.1.1 Use technology or other resources to research and discover general system function (e.g., machines, water cycle) as they relate to human organ systems and identify organs that work together to create organ systems.</p> <p>L.4.1.2 Obtain and communicate data to describe patterns that indicate the nature of relationships between human organ systems, which interact with one another to control digestion, respiration, circulation, excretion, movement, coordination, and protection from infection.</p> <p>L.4.1.3 Construct models of organ systems (e.g. circulatory, digestive, respiratory, muscular, skeletal, nervous) to demonstrate both the unique function of the system and how multiple organs and organ systems work together to accomplish more complex functions.</p> <p>L.4.1.4 Research and communicate how noninfectious diseases (e.g. diabetes, heart disease) and infectious diseases (e.g. cold, flu) serve to disrupt the function of the body system.</p> <p>L.4.1.5 Using informational text, investigate how scientific fields, medical specialties, and research methods help us find new ways to maintain a healthy body and lifestyle (e.g. diet, exercise, vaccines, and mental health).</p>
<p>3c. Compare characteristics of organisms, including growth and development, reproduction, acquisition and use of energy, and response to the environment.</p> <ul style="list-style-type: none"> • Life cycles of various animals to include complete and incomplete metamorphosis • Plant or animal structures that serve different functions in growth, adaptation, and survival • Photosynthesis 	<p>L.4.2 Students will demonstrate an understanding of life cycles, including familiar plants and animals (e.g., reptiles, amphibians, or birds).</p> <p>L.4.2.1 Compare and contrast life cycles of familiar plants and animals.</p> <p>L.4.2.2 Develop and use models to explain the unique and diverse life cycles of organisms other than humans (e.g., flowering plants, frogs, or butterflies) including commonalities (e.g., birth, growth, reproduction, or death).</p> <p>[<i>Photosynthesis basic concepts moved to Grade 5 (L.5.3A)</i>]</p>

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3d. Distinguish the parts of plants as they relate to sexual reproduction and explain the effects of various actions on the pollination process (e.g., wind, water, insects, adaptations of flowering plants, negative impacts of pesticides).	<i>Moved to Grade 1 (L.1.2, L.1.3A, L.1.3B, L.1.4) and Grade 3 (L.3.1.2)</i>
3e. Analyze food webs to interpret how energy flows from the sun.	<i>Expanded and moved to Grade 5 (L.5.3B)</i>
3f. Describe the structural and functional relationships among the cells of an organism. <ul style="list-style-type: none"> • Benefit from cooperating • Vary greatly in appearance • Perform very different roles 	<i>Expanded and moved to Grade 6 (L.6.1)</i>

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Physical Science Grade 4**

2010 MS Framework G4 – Physical Science	2018 MS CCRS for Science G4 – Physical Science
<p>Competency 2. Use the properties of objects and materials, position and motion of objects, and transfer of energy to develop an understanding of physical science concepts.</p>	<p>Standard statements are in bold font below.</p>
<p>2a. Recognize that materials may be composed of parts that are too small to be seen without magnification.</p>	<p><i>Expanded and moved to Grade 5 (P.5.5A)</i></p>
<p>2b. Distinguish between physical and chemical changes and between objects composed of a single substance from those composed of more than one substance.</p>	<p><i>Expanded and moved to Grade 5 (P.5.5C)</i></p>
<p>2c. Determine the causes and effects of forces on motion.</p> <ul style="list-style-type: none"> • Force exerted over a distance causes work to be done and that the result (work) is the product of force and distance • Friction on moving objects and actions that increase or decrease friction • Momentum and inertia 	<p><i>Expanded and moved to Grade 5 (P.5.6)</i></p>

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<p>2d. Explain how energy flowing through an electrical circuit can be converted from electrical energy to light, sound, or heat energy.</p> <ul style="list-style-type: none">• Parts of an electric circuit and resulting actions when circuits are opened or closed• Construction and uses of electromagnets• Energy transferred through an electrical circuit to a bulb or bell to its surroundings as light, sound, and heat (thermal) energy	<p>P.4.6A Students will demonstrate an understanding of the common sources and uses of heat and electric energy and the materials used to transfer heat and electricity.</p> <p>P.4.6A.1 Obtain and communicate information to compare how different processes (including burning, friction, and electricity) serve as sources of heat energy.</p> <p>P.4.6A.2 Plan and conduct scientific investigations to classify different materials as either an insulator or conductor of electricity.</p> <p>P.4.6A.3 Develop models demonstrating how heat and electrical energy can be transformed into other forms of energy (e.g., motion, sound, heat, or light).</p> <p>P.4.6A.4 Develop models that demonstrate the path of an electric current in a complete, simple circuit (e.g., lighting a light bulb or making a sound).</p> <p>P.4.6A.5 Use informational text and technology resources to communicate technological breakthroughs made by historical figures in electricity (e.g. Alessandro Volta, Michael Faraday, Nicola Tesla, Thomas Edison, incandescent light bulbs, batteries, Light Emitting Diodes).</p> <p>P.4.6A.6 Design a device that converts any form of energy from one form to another form (e.g., construct a musical instrument that will convert vibrations to sound by controlling varying pitches, a solar oven that will convert energy from the sun to heat energy, or a simple circuit that can be used to complete a task). Use an engineering design process to define the problem, design, construct, evaluate, and improve the device.*</p>

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<p>2e. Describe how light behaves (travels in a straight line, is absorbed, reflected, refracted, or appears transparent or translucent).</p>	<p>P.4.6B Students will demonstrate an understanding of the properties of light as forms of energy.</p> <p>P.4.6B.1 Construct scientific evidence to support the claim that white light is made up of different colors. Include the work of Sir Isaac Newton to communicate results.</p> <p>P.4.6B.2 Obtain and communicate information to explain how the visibility of an object is related to light.</p> <p>P.4.6B.3 Develop and use models to communicate how light travels and behaves when it strikes an object, including reflection, refraction, and absorption.</p> <p>P.4.6B.4 Plan and conduct scientific investigations to explain how light behaves when it strikes transparent, translucent, and opaque materials.</p>
<p>2f. Investigate and draw conclusions about the relationship between the rate of vibrating objects and the pitch of the sound.</p>	<p>P.4.6C Students will demonstrate an understanding of the properties of sound as a form of energy.</p> <p>P.4.6C.1 Plan and conduct scientific investigations to test how different variables affect the properties of sound (i.e., pitch and volume).</p> <p>P.4.6C.2 In relation to how sound is perceived by humans, analyze and interpret data from observations and measurements to report how changes in vibration affect the pitch and volume of sound.</p> <p>P.4.6C.3 Obtain and communicate information about scientists who pioneered in the science of sound, (e.g., Alexander Graham Bell, Robert Boyle, Daniel Bernoulli, and Guglielmo Marconi).</p>
<p>2g. Describe how heat flows from a warm object to a cold one and categorize examples of materials that may or may not be used as insulators.</p>	<p><i>Expanded and moved to Grade 3 (P.3.5)</i> <i>Insulators are addressed above (P.4.6A.2)</i></p>

**Crosswalk 2010 MS Science - 2018 MS CCRS for Science
Earth Science Grade 4**

2010 MS Framework G4 - Earth Science	2018 MS CCRS for Science G4 – Earth Science
Competency 4. Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.	Standard statements are in bold font below.
4a. Classify sedimentary, metamorphic, and igneous rocks.	<i>Expanded and moved to Grade 3 (E.3.7A)</i>
4b. Compare and contrast Earth’s geological features and the changes caused by external forces. <ul style="list-style-type: none"> •Bodies of water, beaches, ocean ridges, continental shelves, plateaus, faults, canyons, sand dunes, and ice caps • External forces including heat, wind, and water • Movement of continental plates 	E.4.9C Students will demonstrate an understanding of how natural processes and human activities affect the features of Earth’s landforms and oceans. E.4.9C.1 Analyze and interpret data to describe and predict how natural processes (e.g., weathering, erosion, deposition, earthquakes, tsunamis, hurricanes, or storms) affect Earth’s surface. E.4.9C.2 Develop and use models of natural processes to explain the effect of the movement of water on the ocean shore zone, including beaches, barrier islands, estuaries, and inlets (e.g., marshes, bays, lagoons, fjord, or sound). E.4.9C.3 Construct scientific arguments from evidence to support claims that human activities, such as conservation efforts or pollution, affect the land, oceans, and atmosphere of Earth. E.4.9C.4 Research and explain how systems (i.e., the atmosphere, geosphere, and/or hydrosphere), interact and support life in the biosphere. E.4.9C.5 Obtain and communicate information about severe weather phenomena (e.g., thunderstorms, hurricanes, or tornadoes) to explain steps humans can take to reduce the impact of severe weather events.
4c. Investigate, record, analyze and predict weather by observing, measuring with simple weather instruments (thermometer, anemometer, wind vane, rain gauge, barometer and hygrometer), recording weather data (temperature, precipitation, sky conditions, and weather events), and using past patterns to predict future patterns.	E.4.9B Students will demonstrate an understanding of weather and climate patterns. E.4.9B.1 Analyze and interpret data (e.g., temperature, precipitation, wind speed/direction, relative humidity, or cloud types) to predict changes in weather over time. E.4.9B.2 Construct explanations about regional climate differences using maps and long-term data from various regions. E.4.9B.3 Design weather instruments utilized to measure weather conditions (e.g., barometer, hygrometer, rain gauge, anemometer, or wind vane). Use an engineering design process to define the problem, design, construct, evaluate, and improve the weather instrument.*

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<p>4d. Describe how human activities have decreased the capacity of the environment to support some life forms.</p> <ul style="list-style-type: none"> • Reducing the amount of forest cover • Increasing the amount of chemicals released into the atmosphere • Farming intensively 	<p><i>Expanded and moved to Grade 5 (E.5.10)</i></p>
<p>4e. Compare and contrast the seasons and explain why seasons vary at different locations on Earth.</p>	<p><i>Expanded and moved to Grade 5 (E.5.8B)</i></p>
<p>4f. Describe objects in the universe including their movement.</p> <ul style="list-style-type: none"> • Physical features of the moon (craters, plains, mountains) • Appearance and movement of Earth and its moon (e.g., waxing/waning of the moon and lunar/solar eclipses) • Why a planet can be seen in different constellations (locations) at different times) 	<p><i>Expanded and moved to Grade 5 (E.5.8A)</i></p>
<p>4g. Summarize the process that results in deposits of fossil fuels and conclude why fossil fuels are classified as nonrenewable resources</p>	<p>E.4.10 Students will demonstrate an understanding of the various sources of energy used for human needs along with their effectiveness and possible impacts. E.4.10.1 Organize simple data sets to compare energy and pollution output of various traditional, non-renewable resources (e.g. coal, crude oil, wood). E.4.10.2 Use technology or informational text to investigate, evaluate, and communicate various forms of clean energy generation.</p>
<p><i>Similar concepts previously taught in Grade 3</i></p>	<p>E.4.9A Students will demonstrate an understanding of how the water cycle is propelled by the sun’s energy. E.4.9A.1 Develop and use models to explain how the sun’s energy drives the water cycle. (e.g., evaporation, condensation, precipitation, transpiration, runoff, and groundwater).</p>