6th Grade Science Curriculum

Next Generation Science Standards	Next Generation Science Sub-standards	"I can" statements	Vocabulary
MS-ESS1: Earth's place in the universe.	MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	• I can duplicate the patterns of lunar phases. • I can duplicate the patterns of eclipses. • I can duplicate the patterns of Earth's seasons.	
	MS-ESS1-2: Develop and use a model to describe the role of gravity in the motions within the galaxies and solar systems	• I can explain the role of gravity as the force that holds together galaxies and solar systems. • I can explain the factors that affect orbital motion.	
	MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.	• I can determine the differences between objects in the solar system (size, gravity, distance, layers).	
	MS-ESS1-4: Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	• I can construct a model of a geologic column. • I can examine the different types of disturbed rock layers (faulting, folding, tilting, and intrusions) and apply this to relative dating. • I can compare and contrast relative dating with absolute dating. • I can assess how the fossil record reveals changes in life and on the environment. • I can examine the different eons (Hadean, Archean, Proterozoic, and Phanerozoic) and distinguish the differences between them. • I can differentiate between the different eras (Paleozoic, Mesozoic, Cenozoic).	

MS-ESS2: Earth's systems	MS-ESS2-1: Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	• I can compare and contrast chemical and mechanical weathering and provide examples of both. • I can recognize different ways minerals form. • I can distinguish between a mineral and a rock. • I can organize the steps of the rock cycle into a workable model. • I can compare and contrast the different traits of Earth's layers. • I can summarize the methods (convection, slab-pull, and ridge push) that cause plate motion and its contribution to changes on Earth. • I can create a diagram of the radiation cycle (radiation, convection, conduction). • I can diagram the water cycle and understand each component of the cycle.	
	MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	• I can differentiate between weathering, erosion, and deposition. • I can recognize variables that lead to weathering. • I can identify landforms created by wave erosion. • I can identify landforms created by wave deposition. • I can examine how wind causes erosion and deposition. • I can evaluate the McHenry County landscape and determine how glacier erosion and deposition have lead to the topography I see today. • I can appraise how an area can be affected by rapid or slow gravity erosion.	

		• I can distinguish between theory of uniformitarianism and the theory catastrophism and recognize how these theories help explain changes on Earth's surface. • I can examine the different types of disturbed rock layers (faulting, folding, tilting, and intrusions) and apply this to relative dating. • I can summarize the methods (convection, slab-pull, and ridge push) that cause plate motion and its contribution to changes on Earth. • I can prove how the three types of plate boundaries impact the formation of landforms on Earth (faults, folds, mountains). • I can correlate earthquakes to plate boundaries. • I can describe the process that leads to earthquake formation. • I can differentiate between explosive and non-explosive volcanic eruptions by describing the variables that impact an eruption • I can distinguish between the three types of volcanoes (shield, cinder cone, composite). • I can compare and contrast volcanoes formed at plate boundaries with those formed from hot spots. • I can identify how rivers contribute to erosion and deposition on Earth • I can describe how river systems help distribute freshwater on Earth • I can compare and contrast the key traits of young, old, and mature rivers. • I can identify landforms created by deposition.	

	MS-ESS2-3: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	• I can assess how the fossil record reveals changes in life and on the environment. • I can identify evidence on Earth's surface supporting the existence of plate tectonics. • I can prove how the three types of plate boundaries impact the formation of landforms on Earth (faults, folds, mountains). • I can illustrate features found along the ocean floor and communicate how this provides evidence of plate motion.	
	MS-ESS2-4: Develop a model to describe the cycling of water through Earth's system driven by energy from the sun and the force of gravity.	• I can create a diagram of the radiation cycle (radiation, convection, conduction). • I can diagram the water cycle and understand each component of the cycle. • I can describe how river systems help distribute freshwater on Earth • I can identify traits that affect the salinity of ocean water. • I can connect forces at the ocean's surface and deep within the ocean to the formation of ocean currents. • I can explain the role of the sun and moon in tide formation.	
	MS-ESS2-5: Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	• I can identify the relationship between altitude, air pressure, and temperature. • I can distinguish the different layers of the atmosphere and list examples of each layers characteristics. • I can distinguish between low and high air pressure and how they create wind. • I can recognize how differences in air masses creates fronts. • I can synthesize how atmospheric	

		conditions (humidity, air pressure, temperature, etc.) lead to different weather conditions. • I can identify the different types of severe storms and the factors that we use to predict them.	
	MS-ESS2-6: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	• I can explain how the geographic land distribution affects weather patterns and climate. • I can explain the connection between the sun's uneven heating of the planet and Earth's climates.	
MS-ESS3: Earth and Human Activity	MS-ESS3-1: Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	• I can determine factors that influence the rate of soil formation in different regions on Earth. • I can debate the benefits and drawbacks of natural erosion versus human-caused erosion. • I can recognize different ways minerals form. • I can appraise the damage to the environment from deep and surface mining, and create a plan to reclaim the environment after mining. • I will recognize the relationship between modern day materials and the natural rocks/minerals from which they come. • I can evaluate the role location plays in the formation of igneous, sedimentary, and metamorphic rock. • I can describe how river systems help distribute freshwater on Earth • I can justify the value of the ocean resources for humans.	
	MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and	• I can appraise how an area can be affected by rapid or slow gravity erosion.	

	inform the development of technologies to mitigate their effects.	• I can distinguish between theory of uniformitarianism and the theory catastrophism and recognize how these theories help explain changes on Earth's surface. • I can outline the traits of the three types of plate boundaries. • I can identify variables that predict future earthquakes. • I can identify variables that predict future volcanic eruptions. • I can identify the different types of severe storms and the factors we use to predict them.	
	MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	• I can recognize the importance of soil on a personal and global scale. • I can describe the methods used by communities and governments to conserve soil. • I can design a model that will incorporate barriers commonly used for erosion control and evaluate its effectiveness. • I can debate the benefits and drawbacks of natural erosion versus human-caused erosion. • I can appraise the damage to the environment from deep and surface mining, and create a plan to reclaim the environment after mining. • I can evaluate human contribution to greenhouse gases and their effect on global warming in order to develop solutions for the reduction of greenhouse gases. • I can asses the human impact on streams on a large and small scale. • I can evaluate the human contribution to	

		fresh water pollution. • I can develop ways to conserve fresh water on Earth. • I can justify the value of the ocean resources for humans. • I can evaluate the human contribution to ocean water pollution. • I can develop ways to conserve ocean water on Earth.	
	MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	• I can recognize the importance of soil on a personal and global scale. • I can describe the methods used by communities and governments to conserve soil. • I can design a model that will incorporate barriers commonly used for erosion control and evaluate its effectiveness. • I can debate the benefits and drawbacks of natural erosion versus human-caused erosion. • I can appraise the damage to the environment from deep and surface mining, and create a plan to reclaim the environment after mining. • I can evaluate human contribution to greenhouse gases and their effect on global warming in order to develop solutions for the reduction of greenhouse gases. • I can asses the human impact on streams on a large and small scale. • I can evaluate the human contribution to fresh water pollution. • I can develop ways to conserve fresh water on Earth. • I can justify the value of the ocean resources for humans. • I can evaluate the human contribution to	

		ocean water pollution. • I can develop ways to conserve ocean water on Earth.	
	MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperature over the past century.	• I can evaluate human contribution to greenhouse gases and their effect on global warming in order to develop solutions for the reduction of greenhouse gases. • I can analyze the effects that eruptions have on Earth's environment and the impact on life.	
MS-ETS1: Engineering Design	MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	• I can effectively design an experiment according to the steps of the scientific method. • I can analyze the conclusion of an experiment and determine its impact on people and the environment. • I can analyze the color, luster, streak, hardness, cleavage/fracture, density, and special properties of various mineral samples in order to identify a mineral sample.	
	MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	• I can analyze the effectiveness of different model designs and isolate strengths and weaknesses. • I can create a model of a building that is earthquake resistant. • I can outline an earthquake preparedness plan and compare it to federal recommendations.	