PRAIRIE-HILLS ELEMENTARY SCHOOL DISTRICT 144

CURRICULUM MAP 6TH GRADE - SCIENCE

QUARTER 1

GRADE 6 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. **MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.** **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.** **MS-ESS3–5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.**	**Science and Engineering Practices** **Developing and Using Models** ▪ Develop a model to describe unobservable mechanisms. (MS-ESS2-4) ▪ Develop and use a model to describe phenomena. (MS-ESS2-6) **Asking Questions and Defining Problems** ▪ Ask questions to identify and clarify evidence of an argument. (MS-ESS3–5) **Planning and Carrying Out Investigations** ▪ Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5) **Disciplinary Core Ideas** **ESS2.C: The Roles of Water in Earth's Surface Processes** ▪ Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4) ▪ Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) ▪ The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5) ▪ Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) **ESS2.D: Weather and Climate** ▪ Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6) ▪ Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5) ▪ The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6) **ESS3.D: Global Climate Change**	**Glencoe Science** ***Level Red*** Chapter 12 The Atmosphere in Motion Pg. 342-362 Chapter 13 *Oceans* *Section 2* Pg. 380-384 ***Level Green*** Chapter 5 Weather Section 3 Pg. 134-136 Chapter 6 Climate Section1 Pg. 148-151 Section 3 Pg. 156-166 ***Level Blue*** None	Pre/Post Assessments -Agree/Disagree Chart Rubrics Performance Assessments Project Based Learning Assessments Hands on Activities Evaluation of Lab Skills Common Assessments Formative/Summative Assessments Informal/Formal Assessments

	▪ Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3–5) **Crosscutting Concepts** **Cause and Effect** ▪ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5) **Systems and System Models** ▪ Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6) **Stability and Change** ▪ Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3–5)	• Internet • Library • Videos • Group Discussions • Vocab Activities • Lab Explorations • Lab Tools • Periodicals • Manipulatives	

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QUARTER 2

GRADE 6 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. **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.** **MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.** **MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.** **MS-ETS1-4. Develop a model to generate data for iterative testing**	**Science and Engineering Practices** **Constructing Explanations and Designing Solutions** ▪ Apply scientific principles to design an object, tool, process or system. (MS-ESS3-3) **Asking Questions and Defining Problems** ▪ Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) **Analyzing and Interpreting Data** ▪ Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3) **Engaging in Argument from Evidence** ▪ Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2) **Disciplinary Core Ideas** **ESS3.C: Human Impacts on Earth Systems** ▪ Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3) ▪ Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3) **ETS1.A: Defining and Delimiting Engineering Problems** ▪ The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1) **ETS1.B: Developing Possible Solutions** ▪ A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)	**Glencoe Science** ***Level Red*** Chapter 22 *Earth's Resources* Pg. 646-667 ***Level Green*** None ***Level Blue*** None **Invention Convention Packets** • Internet • Library • Videos • Group Discussions • Vocab Activities • Lab Explorations • Lab Tools • Periodicals • Manipulatives	Pre/Post Assessments -Agree/Disagree Chart Rubrics Performance Assessments Project Based Learning Assessments Hands on Activities Evaluation of Lab Skills Common Assessments Formative/Summative Assessments Informal/Formal Assessments

and modification of a proposed object, tool, or process such that an optimal design can be achieved.	▪ There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2), (MS-ETS1-3) ▪ Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3) ▪ Models of all kinds are important for testing solutions. (MS-ETS1-4) **ETS1.C: Optimizing the Design Solution** ▪ Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3) ▪ The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (MS-ETS1-4) **Crosscutting Concepts** **Cause and Effect** ▪ Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3) **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1) ▪ The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)		

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QUARTER 3

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Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
6-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. **6-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.** **6-PS3–5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.**	**Science and Engineering Practices** **Planning and Carrying Out Investigations** ▪ Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (MS-PS3-4) **Constructing Explanations and Designing Solutions** ▪ Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (MS-PS3-3) **Engaging in Argument from Evidence** ▪ Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (MS-PS3–5) **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science knowledge is based upon logical and conceptual connections between evidence and explanations (MS-PS3-4),(MS-PS3–5) **Disciplinary Core Ideas** **PS3.A: Definitions of Energy** ▪ Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (MS-PS3-3),(MS-PS3-4) **PS3.B: Conservation of Energy and Energy Transfer** ▪ When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (MS-PS3–5) ▪ The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. (MS-PS3-4) ▪ Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (MS-PS3-3) **ETS1.A: Defining and Delimiting an Engineering Problem** ▪ The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (secondary to MS-PS3-3)	**Glencoe Science** ***Level Red*** Chapter 6 *ENERGY* Pg. 162-182 ***Level Green*** NONE ***Level Blue*** NONE • Internet • Library • Videos • Group Discussions • Vocab Activities • Lab Explorations • Lab Tools • Periodicals • Manipulatives	Pre/Post Assessments -Agree/Disagree Chart Rubrics Performance Assessments Project Based Learning Assessments Hands on Activities Evaluation of Lab Skills Common Assessments Formative/Summative Assessments Informal/Formal Assessments

	ETS1.B: Developing Possible Solutions ▪ A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (secondary to MS-PS3-3) **Crosscutting Concepts** **Scale, Proportion, and Quantity** ▪ Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. (MS-PS3-4) **Energy and Matter** ▪ Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion). (MS-PS3–5) ▪ The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS3-3)		

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QUARTER 4

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Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. **MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.** **MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.** **MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.** **MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.**	**Science and Engineering Practices** **Developing and Using Models** ▪ Develop and use a model to describe phenomena. (MS-LS1-2) (MS-LS3-2) **Planning and Carrying Out Investigations** ▪ Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1) **Engaging in Argument from Evidence** ▪ Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3) ▪ Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS1-4) **Obtaining, Evaluating, and Communicating Information** ▪ Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8) **Constructing Explanations and Designing Solutions** ▪ Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-5) **Disciplinary Core Ideas** **LS1.A: Structure and Function** ▪ All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) ▪ Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) ▪ In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3) **LS1.D: Information Processing** ▪ Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along	**Glencoe Science** ***Level Red*** Chapter 16 Cells Pg. 476-487 Chapter 19 The Human Body Section 1 Pg. 571-572 Chapter 20 The Role of Genes in Inheritance Pg. 590-605 ***Level Green*** Chapter 15 Support, Movement, Responses Section 4 Pg. 449 ***Level Blue*** None • Internet • Library • Videos • Group Discussions	Pre/Post Assessments -Agree/Disagree Chart Rubrics Performance Assessments Project Based Learning Assessments Hands on Activities Evaluation of Lab Skills Common Assessments Formative/Summative Assessments Informal/Formal Assessments

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. **MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.**	nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8) **LS1.B: Growth and Development of Organisms** ▪ Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2) ▪ Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) ▪ Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4) ▪ Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5) ▪ Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2) **LS3.B: Variation of Traits** ▪ In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2) **Crosscutting Concepts** **Cause and Effect** ▪ Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) **Scale, Proportion, and Quantity** ▪ Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1) **Systems and System Models** ▪ Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) **Structure and Function** ▪ Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2) ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1) **Science is a Human Endeavor** ▪ Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3) **Cause and Effect** ▪ Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS3-2) ▪ Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4),(MS-LS1-5)	• Vocab Activities • Lab Explorations • Lab Tools • Periodicals • Manipulatives	