PRAIRIE-HILLS ELEMENTARY SCHOOL DISTRICT 144

CURRICULUM MAP 7TH GRADE - SCIENCE

QUARTER 1

GRADE 7 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. **MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.** **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.** **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.**	**Science and Engineering Practices** **Developing and Using Models** ▪ Develop and use a model to describe phenomena. (MS-ESS2-1),(MS-ESS2-6) ▪ Develop a model to describe unobservable mechanisms. (MS-ESS2-4) **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) **Analyzing and Interpreting Data** ▪ Analyze and interpret data to provide evidence for phenomena. (MS-ESS2-3) **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 nature operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2) **Connections to Nature of Science** **Scientific Knowledge is Open to Revision in Light of New Evidence** · Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3) **Disciplinary Core Ideas** **ESS1.C: The History of Planet Earth** ▪ Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3) **ESS2.A: Earth's Materials and Systems** ▪ All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1) ▪ The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2) **ESS2.B: Plate Tectonics and Large-Scale System Interactions**	**Glencoe Science** ***Level Red*** Chapter 10 *Forces Shaping Earth* Pg. 286-313 ***Level Green*** Chapter 1 *The Nature of Science* ***Level Blue*** Chapter 5 *Nonliving Environment* Pg. 120-147 Chapter 7 *Plate Tectonics* Pg. 180-207 • 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 **Teachers may utilize one week this quarter for science fair preparation and research.

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.	▪ Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3) **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) ▪ 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) ▪ Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) ▪ Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) ▪ Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2) **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) **Crosscutting Concepts** **Patterns** ▪ Patterns in rates of change and other numerical relationships can provide information about natural systems. (MS-ESS2-3) **Cause and Effect** ▪ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5) **Scale Proportion and Quantity** ▪ Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2) **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) **Energy and Matter** ▪ Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4) **Stability and Change** ▪ Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1) Application of scientific method and science process skills		

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CURRICULUM MAP 7TH GRADE - SCIENCE

QUARTER 2

GRADE 7 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
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. **MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.** **MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.** **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.** **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** **Asking Questions and Defining Problems** ▪ Ask questions to identify and clarify evidence of an argument. (MS-ESS3-5) **Analyzing and Interpreting Data** ▪ Analyze and interpret data to determine similarities and differences in findings. (MS-ESS3-2) **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-ESS3-1) ▪ Apply scientific principles to design an object, tool, process or system. (MS-ESS3-3) **Engaging in Argument from Evidence** ▪ Construct 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-ESS3-4) **Disciplinary Core Ideas** **ESS3.A: Natural Resources** ▪ Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1) **ESS3.B: Natural Hazards** ▪ Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2) **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),(MS-ESS3-4)	**Glencoe Science** ***Level Green*** Chapter 4 *Atmosphere* Pg. 88-115 Chapter 5 *Weather* Pg. 116-145 Chapter 6 *Climate* Pg. 146-175 ***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 **Teachers may utilize one week this quarter for science fair preparation and research.

	ESS3.D: Global Climate Change ▪ 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** **Patterns** ▪ Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2) **Cause and Effect** ▪ Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3) ▪ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-1),(MS-ESS3-4) **Stability and Change** ▪ Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3-5) **Connections to Engineering, Technology, and Applications of Science** **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-ESS3-1),(MS-ESS3-4) ▪ The uses of technologies and any 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. Thus technology use varies from region to region and over time. (MS-ESS3-2), (MS-ESS3-3) **Connections to Nature of Science** **Science Addresses Questions About the Natural and Material World** ▪ Science knowledge can describe consequences of actions but does not make the decisions that society takes. (MS-ESS3-4) Application of scientific method and science process skills		

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CURRICULUM MAP 7TH GRADE - SCIENCE

QUARTER 3

GRADE 7 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
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. **MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.** **MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.** **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.**	**Science and Engineering Practices** **Developing and Using Models** ▪ Develop and use a model to describe phenomena. (MS-ESS1-1),(MS-ESS1-2) **Analyzing and Interpreting Data** ▪ Analyze and interpret data to determine similarities and differences in findings. (MS-ESS1-3) **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-ESS1-4) **Disciplinary Core Ideas** **ESS1.A: The Universe and Its Stars** ▪ Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1) ▪ Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2) **ESS1.B: Earth and the Solar System** ▪ The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2),(MS-ESS1-3) ▪ This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. (MS-ESS1-1) ▪ The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2) **ESS1.C: The History of Planet Earth** ▪ The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1-4)	**Glencoe Science** ***Level Red*** NONE ***Level Green*** Chapter 7 *Earth in Space* Pg. 176-207 ***Level Blue*** Chapter 11 *The Sun-Earth-Moon System* Pg. 304-333 Chapter 12 *The Solar System* Pg. 334-367 • 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

Crosscutting Concepts

Patterns

- Patterns can be used to identify cause-and-effect relationships. (MS-ESS1-1)

Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS1-3),(MS-ESS1-4)

Systems and System Models

- Models can be used to represent systems and their interactions. (MS-ESS1-2)

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-ESS1-3)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-ESS1-1),(MS-ESS1-2)

Scientific method and science process skills

- Formulate hypotheses generating if-then, cause-effect statements and predictions, or choosing and explaining selection of the controlled variables.
- Design and conduct scientific investigation, incorporating appropriate safety precautions, available technology and equipment, researching historic and current foundations for similar studies, or replicating all processes in multiple trials.
- Collect and organize data accurately, using consistent measuring and recording techniques with necessary precision, using appropriate metric units, documenting data accurately from collecting instruments, or graphing data appropriately.
- Interpret and represent results of analysis to produce findings, differentiating observations that support or refute a hypothesis, identifying the unexpected data within the data set, or proposing explanations for discrepancies in the data set.
- Report the process and results of an investigation, using available technologies for presentations, distinguishing observations that support the original hypothesis, analyzing a logical proof or explanation of findings, or generating additional questions which address procedures, similarities, discrepancies or conclusions for further investigations.

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CURRICULUM MAP 7TH GRADE - SCIENCE

QUARTER 4

GRADE 7 SCIENCE — REVISED 2016

Next Generation Science Standard Performance Expectations	Performance Outcomes	Instructional Resources	Assessments
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.** **MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** **MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.** **MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*** **Science and Engineering Practices** **Developing and Using Models** ▪ Develop a model to describe phenomena. (MS-LS2-3) **Analyzing and Interpreting Data** ▪ Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1) **Constructing Explanations and Designing Solutions** ▪ Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2) **Engaging in Argument from Evidence** ▪ Construct 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-LS2-4) ▪ Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5) **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4) **Disciplinary Core Ideas** **LS2.A: Interdependent Relationships in Ecosystems** ▪ Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1) ▪ In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1) ▪ Growth of organisms and population increases are limited by access to resources. (MS-LS2-1) ▪ Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2) **LS2.B: Cycle of Matter and Energy Transfer in Ecosystems** ▪ Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal	**Glencoe Science** ***Level Red*** Chapter 21 *Ecology* Pg. 616-643 ***Level Green*** Chapter 18 *Interactions of Living Things* Pg. 530-557 Chapter 19 *Conserving Resources* Pg. 558-587 ***Level Blue*** Chapter 6 *Ecosystems* Pg. 148-175 • 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

	matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3) **LS2.C: Ecosystem Dynamics, Functioning, and Resilience** ▪ Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4) ▪ Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5) **LS4.D: Biodiversity and Humans** ▪ Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5) **ETS1.B: Developing Possible Solutions** ▪ There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary to MS-LS2-5) **Crosscutting Concepts** **Patterns** ▪ Patterns can be used to identify cause and effect relationships. (MS-LS2-2) **Cause and Effect** ▪ Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1) **Energy and Matter** ▪ The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3) **Stability and Change** ▪ Small changes in one part of a system might cause large changes in another part. (MS-LS2-4),(MS-LS2-5) **Connections to Engineering, Technology, and Applications of Science** **Influence of Science, Engineering, and Technology on Society and the Natural World** ▪ The use of technologies and any 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. Thus technology use varies from region to region and over time. (MS-LS2-5) **Connections to Nature of Science** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** ▪ Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3) **Science Addresses Questions About the Natural and Material World** ▪ Science knowledge can describe consequences of actions but does not make the decisions that society takes. (MS-LS2-5) Application of scientific method and science process skills		