Mendon Middle School 6th Grade Life Science Curriculum Map

UNIT #1 AND 2 MATTER and ENERGY

Timeline	Standards/Benchmarks	Learning Targets	Vocab	Assessment
September October November December First and second Marking Periods	**MS.PS3.1** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. *Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.* **MS.PS3.2** Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. *Clarification Statement: Emphasis is on relative amounts of potential energy,* *not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of* *a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.* **MS.PS3.3** Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	**I CAN** explain how riding a bicycle at different speeds affects the kinetic and mass separately from kinetic energy and speed. **I CAN** construct a graph that displays data describing the relationships of kinetic energy to the mass of an object and to the speed of an object. **I CAN** interpret a graph that displays data describing the relationship of kinetic energy to the mass of an object and to its speed. **I CAN** infer the amount of potential energy of a roller coaster car depending on the position or height of the car **I CAN** design, construct, and test a device that either minimizes or maximizes	Energy kinetic energy potential energy gravitational potential energy mass speed energy transformation friction conserve transfer thermal energy heat temperature Law of Conservation of Energy conduct insulate solar energy absorb molecules energy transformation thermal energy kinetic energy pure substances heat thermal impact temperature conduction	Labs Lab Reports Projects Quizzes Test

	Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup. **MS.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. *Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.* 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. *Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.* **MS.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. *Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the*	thermal energy transfer **I CAN** define thermal energy transfer. **I CAN** design an experiment that compares the initial and final temperatures of different materials/masses when a specific amount of energy is added. **I CAN** support the claim with evidence that when the motion energy of an object changes, energy is transferred to or from the object.		

	transfer *in the form of temperature changes or motion of object.*			

UNIT #3- Earths Layers and History of Earth

Timeline	Standards/Benchmarks	Learning Targets	Vocab	Assessment
January February March Third Marking Period	**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. *Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils* *of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.* **MS. ESS2.1** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. *Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.* **MS. ESS2.2** Construct an explanation based on evidence for how geoscience processes have changed Earth's	**I CAN** give examples of major events that ocurred in the Earth's history based on evidence from rock strata. **I CAN** develop a model describing the use of the Earth's energy to form rocks and minerals. **I CAN** identify how earthquakes, volcanoes, mountain building and meteor impacts affect changes in the Earth's surface. **I CAN** use evidence to explain how the Earth's surface has changed over long and	paleontologists geologic time sedimentary igneous metamorphic crystal luster streak rock cycle intrusive extrusive gem landform magma lava volcano sheild volcano cinder cone volcano composite volcanoe stratovolcano earthquake crust mantle core lithosphere continental drift	Labs Lab Reports Projects Quizzes Test

	surface at varying time and spatial scales. *Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or* *the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.* **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. *Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.* **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. *Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly*	short periods of time. **I CAN** create a model that explains how the energy from the sun and Earth's gravity drives the water cycle. **I CAN** use evidence to explain how geoscience processes have unevely distributed Earth's resources **I CAN** explain how the continents were formed based on examination of rock and fossil types. **I CAN** identify the locations of ocean ridges, fracture zones, and trenches based on examination of rock and fossil types on different continents		

	changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/ or deposition of rock). **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. *Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).*			

UNIT #4 – Water Cycle and Ecosystems with Human Impact

Timeline	Standards/Benchmarks	Learning Targets	Vocab	Assessment
March April May June Fourth Marking Period	**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. *Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.* **MS.LS2.3** Develop a model to describe the cycling of matter and flow of	**I CAN** use data to interpret populations and to analyze effects of factors such as competition, predators, and various environmental conditions on population size. **I CAN** give examples of how	sediments landslides erosion deposition topographic map topography weathering surface runoff groundwater watershed surface mining deforestation overpopulation construction and urban development	Labs Lab Reports Projects Quizzes Test

	energy among living and nonliving parts of an ecosystem. *Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.* **MS.LS2.4** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. *Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.* **MS.LSS2.2** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. *Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.* **MS.LSS2.5** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. *Clarification Statement: Examples of ecosystem services could include water purification,*	decomposers recycle nutrients back into the soil or water. **I CAN** give examples of how decomposers recycle nutrients back into the soil or water. **I CAN** explain how a food web transfers matter and energy from producers, consumers, and decomposers **I CAN** make a claim with supporting evidence that when changing the physical environment or when a new species is introduced it affects populations. **I CAN** use data and make inferences about change in populations and in multiple ecosystems. **I CAN** evaluate possible solutions to a threatened	farming dams solar energy producers food web consumers decomposers organic inorganic photosynthesis ecosystem Abiotic biotic predator prey mutualism symbiosis competition species extinction habitat population	

	nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations. **MS. ESS2.2** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. *Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.* **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. *Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (earthquakes and volcanic eruptions), surface processes*	existing ecosystem. **I CAN** infer how surface weathering and deposition shape the Earth's surface on a global scale. **I CAN** explain how the weathering and erosion have shaped the Earth's surface in Michigan. **I CAN** analyze and interpret data on natural hazards to forcast catastrophic events and inform the development of technologies to mitigate their effects. **I CAN** apply scientific principles to design a method formonitoring and minimizing a human impact on the environment. **I CAN** construct an argument supported by evidence for		

	(mass wasting and tsunamis), or severe weather events (hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (satellite systems to monitor hurricanes or forest fires) or local (building basements in tornado-prone regions or reservoirs to mitigate droughts). **MS. ESS3.3** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. *Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction* *of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).* **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. *Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they*	how increases in the human population and per-capita consumption ofnatural resources impact Earth's systems.		

	change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.			