**Department:** Science
**Course Title:** 8th Grade Science
**Creator:** Natalie Chmielewska
**Date:** 6/4/26

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| **Unit 1: History of Earth - "Rock Strata"** | 4-5 weeks | August-Sept | (MS-ESS1-4) Based on evidence from rock strata, how is the geologic time scale used to organize Earth's 4.6-billion-year-old history? | Fossils, Superposition of Soil Layers, Carbon Dating, Radioactive Decay | Construct an explanation. Use a model. Analyze and interpret data. Use mathematics and computational thinking. Engage in argument from evidence. | 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.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]<br>MS-LS4-1, MS-LS4-2, MS-LS4-3, MS-LS4-4 Fossil Record evolution of traits | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |
| **Unit 2: Plate Tectonics - "Underwater Volcanoes"** | 4-5 weeks | October-Nov | How does oceanic crust change over time? | Pangea, Oceanic Crust & Density, Seafloor Spreading, Plate Boundaries | Analyze and interpret data. Construct an explanation. Use a model. Engage in argument from evidence. | 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).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.] DCI-ESS1.C: The History of Planet Earth: Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |
| **Unit 3: Erosion & Water Cycle - "Mountains & Rivers"** | 4-5 weeks | Nov-Dec | How do landforms change due to weathering and erosion? | Weathering, Erosion, Landforms/National Parks, Water Cycle | Develop a model. Construct an explanation based on evidence. | MS-ESS2 Earth's Systems<br>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.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]<br>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.]<br>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.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.] | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |

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| **Unit 4: DNA - "Life Changes"** | 4-5 weeks | Dec-January | How do traits get passed on over time? How do humans affect DNA? How does the environment affect traits in a population over time? | Genetic Trait Inheritance, DNA, Mutations/Diseases, Natural Selection, How Humans Change DNA: Michael Pollen The Botany of Desire: Chapter 4 The Potato (2001) Pollen, Micheal. The Botany of Desire. Chapter 4: The Potato. Random House, 2001. | Construction a scientific explanation. Develop and use a model. Analyze and interpret data. Finding patterns. Use mathematics and computational thinking. | MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]<br>MS-LS4-5.Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]<br>MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.] LS4.C: Adaptation<br>Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.<br>MS-ETS1-1 How humans affect DNA | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |
| **Unit 5: Climate Change "What's Up? The Atmosphere"** | 4 weeks | February | How can weather be predicted? What are the effects of climate change? How is thermal energy transferred to different Earth's surfaces? | Climate, Weather Pressure, Heating Surfaces on Earth (Thermal Energy, GHG, & Heat Transfer), Coriolis Effect | Collect data, develop and use a model. | MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]<br>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. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.] | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |
| **Unit 6: Understanding Sunlight - Waves & the Electromagnetic Spectrum** | 4 weeks | March | How do sound, light and heat travel as a wave? How does sunlight behave as a wave and a particle? What are the applications of radio waves? | Energy<br>Wave Behavior<br>Mechanical Waves<br>Einstein's Photoelectric Effect<br>Radio Waves | Use mathematical representations. Develop and use a model. Engage in argument from evidence. | MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.]<br>MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]<br>MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.] | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |

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| **Unit 7: Thermal, Kinetic, & Potential Energy - "I've got Potential"** | 4 weeks | April-May (NGSS testing this month) | How is energy transfered? | Kinetic Energy<br>Potential Energy<br>Thermal Energy<br>ENGR Project | Apply scientific principles to design, construct, and test a device. Plan an investigation. Graph data, interpret data, develop a model, engage in argument from evidence | MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.<br>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. 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.<br>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.<br>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.<br>Reiterative Design Project MS-ETS1-2, MS-ETS1-3, MS-ETS1-4 | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |
| **Unit 8: Universal Laws of Physics - "Collisions & Forces"** | 4-6 weeks | May-June | How do forces affect motion? | Collisions<br>Electromagnetic Force<br>Gravitational Force<br>Newton's Laws | Design a solution to a problem, plan an investigation, asking questions, engaging in argument from evidence, evaluating information. | MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]<br>MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]<br>MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]<br>MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]<br>MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.] | Do Now, Exit Ticket, Jeopardy | Quiz, Test, Project, CER |

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