EIGHTH GRADE SCIENCE CURRICULUM MAP

UNIT NAME/LENGTH	ESSENTIAL QUESTION	BIG IDEA	STUDENTS WILL BE ABLE TO…	ENGINEERING DESIGN SKILLS
Basic Concepts in Science (1-2 weeks)	**How do scientists solve problems?**	Students will focus on scientific practices: planning and carrying out investigations; data gathering, organization, and analysis; developing and using models; and constructing explanations and engaging in argument from evidence.	**SCI8-WH01.** Analyze and interpret data, using mathematics and computational thinking	**MS-ETS1-2.** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
			SCI8-WH02. Demonstrate grade-appropriate proficiency in developing and using models; planning and carrying out investigations	**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.
			SCI8-WH03. Engage in argument from evidence	**MS-ETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

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		Students will explore plate tectonics by investigating how the Earth has changed in the past and continues to change today.	**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-ETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific	In every public school there shall be instruction, study, and discussion of current problems and needs in the conservation of natural resources, including, but not limited to:

Earth Science **(8 Weeks)**	**How is the Earth changing?**			principles and potential impacts on people and the natural environment that may limit possible solutions.	3. Waste reduction and recycling. 105 ILCS 5/27-13.1
			MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	**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-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**MS-ETS1-4.** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	
			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.		
			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-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. (both 8th and 7th)		
			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-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.		

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Chemistry **(8 Weeks)**	**How does food provide my body with energy?**	Students will address chemical reactions and the energy transformations associated with them, and address their relevance in their own lives and to their own bodies.	**MS-PS1-1.** Develop models to describe the atomic composition of simple molecules and extended structures. **MS-PS1-5.** Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. **MS-LS1-6.** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. **MS-LS1-7.** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	**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.	

UNIT NAME/LENGTH	ESSENTIAL QUESTION	BIG IDEA	STUDENTS WILL BE ABLE TO…	ENGINEERING DESIGN SKILLS	ILLINOIS INSTRUCTIONAL MANDATE
		Students will investigate forces and motion in a variety of contexts in order to construct principles commonly known as the core ideas	**MS-PS2-1.** Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding	**MS-ETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful	

Physical Science (8 Weeks)	**How will it move?**	of Newton's laws of motion.	objects.	solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	
			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.	**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-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	**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-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.		

			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.		
			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.		
			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.		
			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.		
			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.		

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Genetics **(8 weeks)**	How is information in genes inherited and expressed? How do genetic variations of traits enable an organism to survive and reproduce?	Students understand the impact Darwin and Mendel had on the development of the study of genetics today.	**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.	
			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.	
			MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	

			MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	
			MS-LS4-5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	
			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.	