Indiana Science: Grades K-8

Grade 8

Matter and its Interactions	1	Develop models to describe the atomic composition of simple molecules and extended structures. MS-PS1-1
	2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. MS-PS1-2
	3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. MS-PS1-3
	4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. MS-PS1-4
	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-PS1-5
	6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. MS-PS1-6
From Molecules to Organisms: Structures and Processes	1	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. MS-LS1-4
	2	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS1-5
Heredity: Inheritance and Variation of Traits	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-LS3-1
	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-LS3-2
Biological Evolution: Un	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-LS4-1

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	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-LS4-2
	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-LS4-3
	4 **Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.** MS-LS4-4
	5 **Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.** MS-LS4-5
	6 **Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.** MS-LS4-6
Earth's Systems	1 **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-ESS2-4
	2 **Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.** MS-ESS2-5
	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-ESS2-6
Earth and Human Activity	1 **Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.** MS-ESS3-3
	2 **Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.** MS-ESS3-4
	3 **Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over time.** MS-ESS3-5
Engineering Design	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-ETS1-1
	2 **Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.** MS-ETS1-2

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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-ETS1-3

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-ETS1-4