Indiana Science/Computer Science Content Connectors

Grade 8

Matter and its Interactions	**1** Use a model to compare the atomic composition of various molecules and extended structures. (E) MS-PS1-1A
	2 Use data to identify evidence that proves a chemical reaction has occurred. (E) MS-PS1-2A
	3 Use information to describe that synthetic materials are developed from natural materials. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] MS-PS1-3A
	4 Use a model to describe changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawing and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.] MS-PS1-4A
	5 Use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. MS-PS1-5A
	6 Plan how to test and/or modify a device that either releases or absorbs thermal energy by chemical processes. [Clarification Statement: Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] MS-PS1-6A
From Molecules to Organisms: Structures and Processes	**1** Use evidence to identify behaviors animals engage in (e.g., vocalization) or specialized plant structures (e.g., bright flower parts) that increase the likelihood of reproduction. MS-LS1-4A
	2 Identify evidence (e.g., a scientific explanation) in support of how genetic or environmental factors affect the growth of plants or animals. (E) MS-LS1-5A
Heredity: Inheritance and Variation of Traits	**1** Use a model to describe why changes to genes (mutations) result in harmful, beneficial, or neutral effects to the structure and function of the organism. MS-'S3-1A

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	2	**Describe that a variety of inherited traits passed from parents to offspring lead to differences among offspring (e.g., eye color), using models such as Punnett squares, diagrams, and simulations. (E)** MS-LS3-2A
	3	**Describe the transfer of genetic information to offspring shown in a model of asexual reproduction.** MS-LS3-2B
Biological Evolution: Unity and Diversity	1	**Use data to identify patterns of changes of different plants or animals that lived at different times as located in different sedimentary layers.** MS-LS4-1A
	2	**Use data to identify changes in populations of living organisms (e.g., the presence or absence of large numbers of organisms or specific types of organisms) that lived in a specific location at different times as observed in the fossil record.** MS-LS4-1B
	3	**Use similarities in anatomical structures to explain evolutionary relationships between living and fossilized organisms.** MS-LS4-2A
	4	**Use pictorial data to compare similarities in early development stages of multiple species as evidence that the species are related.** MS-LS4-3A
	5	**Use evidence to describe how genetic variations increase some individuals' probability of surviving and reproducing. (E)** MS-LS4-4A
	6	**Identify technologies that have changed the way humans influence the inheritance of desired traits in plants or animals.** MS-LS4-5A
	7	**Explain how natural selection may lead to increasing and decreasing probability of specific traits in populations over time.** MS-LS4-6A
Earth's Systems	1	**Use a model to describe components of the water cycle, including those driven by energy from the sun and/or the force of gravity. (E)** MS-ESS2-4A
	2	**Use a model to describe relationships between components in a model of energy flows and matter cycles within and among Earth's systems. (E)** MS-ESS2-4B
	3	**Use data to show how patterns in the changes and the movement of air masses in the atmosphere (e.g., temperature, pressure, humidity, precipitation, wind) influence local weather patterns. [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).] (E)** MS-ESS2-5A
		Use a model to describe how the sun's energy warms the air over the land (expands and rises), the air over the ocean (cooler air) rushes in to take its place

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	and is called wind. MS-ESS2-6A
Earth and Human Activity	1 Apply scientific principles to determine how well a solution functions to minimize the impact of a human activity on the environment using data. MS-ESS3-3A
	2 Identify evidence of the effects of increases in human population and per-capita consumption of natural resources over time from a variety of resources. [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 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.] MS-ESS3-4A
	3 Ask questions to identify evidence of the factors that have caused the rise in global temperatures over time. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.] (E) MS-ESS3-5A
Engineering Design	1 Define criteria and constraints (e.g., scientific principles, potential impacts on people, the natural environment) of a problem to ensure a successful solution. (E) MS-ETS1-1A
	2 Select the best solution to a problem using evidence of alignment to criteria and constraints. MS-ETS1-2A
	3 Combine the best characteristics from multiple solutions into a new solution to better meet the criteria for success. MS-ETS1-3A
	4 Use a model to generate data on how a design proposal can be modified for improvements through iterative testing. MS-ETS1-4A