Idaho Science

Grades 6, 7, 8

Adopted 2022

Physical Science

MS-PS-1. Matter and Its Interactions MS-PS-1

1. Develop models to describe the atomic composition of simple molecules. MS-PS-1.1
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-PS-1.2
3. Construct a scientific explanation, based on evidence, to describe that synthetic materials come from natural resources. MS-PS-1.3
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-PS-1.4
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-PS-1.5
6. Undertake a design project to construct, test, and/or modify a device that either releases or absorbs thermal energy by chemical processes. MS-PS-1.6

MS-PS-2. Motion and Stability: Forces and Interactions MS-PS-2

1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. MS-PS-2.1
2. Plan and conduct 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-PS-2.2
3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. MS-PS-2.3
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-PS-2.4
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-PS-2.5

PS-3. Energy MS-PS-3

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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-PS-3.1
2. Develop a model to describe the relationship between the relative positions of objects interacting at a distance and the relative potential energy in the system. MS-PS-3.2
3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. MS-PS-3.3
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-PS-3.4
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-PS-3.5

MS-PS-4. Waves MS-PS-4

1. Use diagrams of a simple wave to explain that (1) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (2) the amplitude of a wave is related to the energy in the wave. MS-PS-4.1
2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. MS-PS-4.2
3. Present qualitative scientific and technical information to support the claim that digitized signals (0s and 1s) can be used to encode and transmit information. MS-PS-4.3

Life Science

MS-LS-1. From Molecules to Organisms: Structure and Processes MS-LS-1

1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. MS-LS-1.1
2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. MS-LS-1.2
3. Make a claim supported by evidence for how a living organism is a system of interacting subsystems composed of groups of cells. MS-LS-1.3
4. Construct a scientific argument based on evidence to defend a claim of life for a specific object or organism. MS-LS-1.4
5. 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-LS-1.5
6. Develop a conceptual model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism. MS-LS-1.6

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MS-LS-2. Ecosystems: Interactions, Energy, and Dynamics MS-LS-2

1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. MS-LS-2.1
2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. MS-LS-2.2
3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. MS-LS-2.3
4. Develop a model to describe the flow of energy through the trophic levels of an ecosystem. MS-LS-2.4
5. Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS-2.5
6. Design and evaluate solutions for maintaining biodiversity and ecosystem services. MS-LS-2.6

MS-LS-3. Heredity: Inheritance and Variation of Traits MS-LS-3

1. Develop and use a model to describe why mutations may result in harmful, beneficial, or neutral effects to the structure and function of the organism. MS-LS-3.1
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-LS-3.2

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MS-LS-4. Biological Adaptation: Unity and Diversity MS-LS-4

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-LS-4.1
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 relationships. MS-LS-4.2
3. Analyze visual evidence to compare patterns of similarities in the anatomical structures across multiple species of similar classification levels to identify relationships. MS-LS-4.3
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-LS-4.4
5. Obtain, evaluate, and communicate information about how technologies allow humans to influence the inheritance of desired traits in organisms. MS-LS-4.5
6. Use mathematical models to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. MS-LS-4.6

Earth and Space Science

MS-ESS-1. Earth's Place in the Universe MS-ESS-1

1. Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of lunar phases, eclipses of the Sun and Moon, and seasons. MS-ESS-1.1
2. Develop and use a model to describe the role of gravity in the orbital motions within galaxies and the solar system. MS-ESS-1.2
3. Analyze and interpret data to determine scale properties of objects in the solar system. MS-ESS-1.3
4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to analyze Earth's history. MS-ESS-1.4

MS-ESS-2. Earth's Systems MS-ESS-2

1. Develop a model to describe the cycling of Earth's materials and the internal and external flows of energy that drive the rock cycle processes. MS-ESS-2.1
2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. MS-ESS-2.2
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-ESS-2.3

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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. MS-ESS-2.4
5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. MS-ESS-2.5
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-ESS-2.6

MS-ESS-3. Earth and Human Activity MS-ESS-3

1. Construct a scientific explanation based on evidence for how Earth's mineral, energy, and groundwater resources are unevenly distributed as a result of past and current geologic processes. MS-ESS-3.1
2. Analyze and interpret data on natural hazards to forecast future catastrophic events to mitigate their effects. MS-ESS-3.2
3. Apply scientific practices to design a method for monitoring human activity and increasing beneficial human influences on the environment. MS-ESS-3.3
4. Construct an argument based on evidence for how changes in human population and per-capita consumption of natural resources positively and negatively affect Earth's systems. MS-ESS-3.4
5. Ask questions to interpret evidence of the factors that cause climate variability throughout Earth's history. MS-ESS-3.5