**7th Grade Science Essential Standards**

## [MS-LS1-1 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-1-molecules-organisms-structures-and-processes)

**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-LS1-2 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-2-molecules-organisms-structures-and-processes)

**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-LS1-3 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-3-molecules-organisms-structures-and-processes)

**Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.**

## [MS-LS1-4 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-4-molecules-organisms-structures-and-processes)

**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-LS1-5 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-5-molecules-organisms-structures-and-processes)

**Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.**

## [MS-LS1-6 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-6-molecules-organisms-structures-and-processes)

**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 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-7-molecules-organisms-structures-and-processes)

**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-LS1-8 From Molecules to Organisms: Structures and Processes](https://nextgenscience.org/pe/ms-ls1-8-molecules-organisms-structures-and-processes)

**Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.**

## [MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics](https://nextgenscience.org/pe/ms-ls2-1-ecosystems-interactions-energy-and-dynamics)

**Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.**

## [MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics](https://nextgenscience.org/pe/ms-ls2-2-ecosystems-interactions-energy-and-dynamics)

**Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.**

## [MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics](https://nextgenscience.org/pe/ms-ls2-3-ecosystems-interactions-energy-and-dynamics)

**Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.**

## [MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics](https://nextgenscience.org/pe/ms-ls2-4-ecosystems-interactions-energy-and-dynamics)

**Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.**

## [MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics](https://nextgenscience.org/pe/ms-ls2-5-ecosystems-interactions-energy-and-dynamics)

**Evaluate competing design solutions for maintaining biodiversity and ecosystem services.\***

## [MS-LS3-2 Heredity: Inheritance and Variation of Traits](https://nextgenscience.org/pe/ms-ls3-2-heredity-inheritance-and-variation-traits)

**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-LS4-4 Biological Evolution: Unity and Diversity](https://nextgenscience.org/pe/ms-ls4-4-biological-evolution-unity-and-diversity)

**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-LS4-6 Biological Evolution: Unity and Diversity](https://nextgenscience.org/pe/ms-ls4-6-biological-evolution-unity-and-diversity)

**Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.**

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## [MS-ESS3-1 Earth and Human Activity](https://nextgenscience.org/pe/ms-ess3-1-earth-and-human-activity)

**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.**

## [MS-ESS3-3 Earth and Human Activity](https://nextgenscience.org/pe/ms-ess3-3-earth-and-human-activity)

**Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.\***

## [MS-ESS3-4 Earth and Human Activity](https://nextgenscience.org/pe/ms-ess3-4-earth-and-human-activity)

**Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.**

**MS-PS2-3 Forces and Interactions**

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|  | Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. |

**MS-PS2-5 Forces and Interactions**

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|  | 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 Energy**

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|  | 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 Energy**

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| **.** | 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-PS4-1 Waves and Electromagnetic Radiation**

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| **.** | 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. |

**MS-PS4-2 Waves and Electromagnetic Radiation**

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| **.** | Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. |

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| **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.** |

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| **MS-ETS1-2.** | **Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.** |

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| **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.** |

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| **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.** |