

**EIGHTH GRADE
Science
PRIORITY STANDARDS**

Grade 6-8 Engineering, Technology, and the Application of Science

MS.ETS1 Engineering Design

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.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.**

Earth & Space Science

8.ESS1 Earth's Place in the Universe

8.ESS1.1 **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.**
[Clarification Statement: Examples of models can be physical, graphical, or conceptual.]

8.ESS1.2 **Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.**
[Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as their school or state).]
[Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]

Life Science

8.LS3 Heredity: Inheritance and Variation of Traits

8.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.**
[Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.]
[Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]

8.LS4 Biological Evolution: Unity and Diversity

8.LS4.4 **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.**
[Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]

8.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.**
[Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time. [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]

Physical Science

8.PS2 Motion and Stability: Forces and Interactions

8.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.**
[Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.]
[Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]

8.PS3 Energy

8.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.**
[Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.]

8.PS4 Waves and Their Applications in Technologies for Info Transfer

8.PS4.1 **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.**
[Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.]
[Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]