

# Grades 6, 7, 8

Adopted 2016

## Physical Science

- 1. Develop and critique models that describe the atomic composition of simple molecules and extended structures.** PS.6-8.1

---

- 2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.** PS.6-8.2

---

- 3. Gather information to describe that synthetic materials come from natural resources and impact society.** PS.6-8.3

---

- 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.** PS.6-8.4

---

- 5. Develop, use, and critique a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.** PS.6-8.5

---

- 6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.** PS.6-8.6

---

- 7. Apply Newton's Third Law of Motion to design a solution to a problem involving the motion of two colliding objects.** PS.6-8.7

---

- 8. 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.** PS.6-8.8

---

- 9. Ask questions about data to determine the factors affecting electric and magnetic force strengths.** PS.6-8.9

---

- 10. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the mass of interacting objects.** PS.6-8.10

---

- 11. Design and conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.** PS.6-8.11

---

- 12. Construct and interpret graphic displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.** PS.6-8.12

- 
- 13. Develop and critique models to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.** PS.6-8.13

---

  - 14. Apply scientific principles to design, construct, and test a device that minimizes or maximizes thermal energy transfer.** PS.6-8.14

---

  - 15. 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.** PS.6-8.15

---

  - 16. 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.** PS.6-8.16

---

  - 17. Use mathematical representations to describe a simple model for waves that includes how the amplitude and wavelength of a wave is related to the energy in a wave.** PS.6-8.17

---

  - 18. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.** PS.6-8.18
- 

## Life Science

- 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.** LS.6-8.1

---

- 2. Develop and use a model to describe the structure and function of a cell as a whole and ways parts of cells contribute to the function.** LS.6-8.2

---

- 3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.** LS.6-8.3

---

- 4. 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.** LS.6-8.4

---

- 5. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth, release energy, or both, as this matter moves through an organism.** LS.6-8.5

---

- 6. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem and analyze scientific concepts used by American Indians to maintain healthy relationships with environmental sources.** LS.6-8.6

---

- 7. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** LS.6-8.7

- 
- 8. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.** LS.6-8.8

---

  - 9. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.** LS.6-8.9

---

  - 10. 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.** LS.6-8.10

---

  - 11. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth and development of organisms.** LS.6-8.11

---

  - 12. Develop and use a model to describe why structural changes to genes, such as mutations, may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.** LS.6-8.12

---

  - 13. 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.** LS.6-8.13

---

  - 14. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.** LS.6-8.14

---

  - 15. 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.** LS.6-8.15

---

  - 16. 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.** LS.6-8.16

---

  - 17. 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.** LS.6-8.17

---

  - 18. 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.** LS.6-8.18

---

  - 19. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.** LS.6-8.19

---

## Earth and Space Science

- 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.** ESS.6-8.1

- 
- 2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.** [ESS.6-8.2](#)

---

  - 3. Analyze and interpret data to determine scale properties of objects in the solar system.** [ESS.6-8.3](#)

---

  - 4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history.** [ESS.6-8.4](#)

---

  - 5. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time scales and spatial scales.** [ESS.6-8.5](#)

---

  - 6. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.** [ESS.6-8.6](#)

---

  - 7. Develop a model to describe the cycling of earth's materials and the flow of energy that drives this process.** [ESS.6-8.7](#)

---

  - 8. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.** [ESS.6-8.8](#)

---

  - 9. 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.** [ESS.6-8.9](#)

---

  - 10. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.** [ESS.6-8.10](#)

---

  - 11. 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.** [ESS.6-8.11](#)

---

  - 12. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.** [ESS.6-8.12](#)

---

  - 13. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.** [ESS.6-8.13](#)

---

  - 14. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.** [ESS.6-8.14](#)

---

  - 15. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems including indigenous populations.** [ESS.6-8.15](#)