



Correlations to Next Generation Science Standards

Physical Science Performance Expectations

PS-1 Matter and Its Interactions

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the **patterns of electrons in the outermost energy level of atoms.**

Fascinating Chemistry Lesson 1, 2, 3, 4, 5, 6, 14

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the **outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.**

Fascinating Chemistry Lesson 2, 3, 4, 5, 6, 14, 15, 16, 17

Fascinating Biology Lesson 2

HS-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to **infer the strength of electrical forces between particles.**

Fascinating Chemistry Lesson 2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 17

Fascinating Physics Lesson 11, 12

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the **changes in total bond energy.**

Fascinating Chemistry Lesson 2, 3, 4, 5, 6, 12, 13, 14, 16, 17

HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the **effects of changing the temperature or concentration of the reacting particles** on the rate at which a reaction occurs.

Fascinating Chemistry Lesson 6, 11, 13

Fascinating Biology Lesson 13

HS-PS1-6 Refine the design of a chemical system by specifying a **change in conditions that would produce increased amounts of products at equilibrium.**

Fascinating Chemistry Lesson 11, 13, 16, 17

Fascinating Biology Lesson 4

HS-PS1-7 Use mathematical representations to support the claim that **atoms**, and therefore mass, are **conserved during a chemical reaction**.

Fascinating Chemistry Lesson 11, 13, 16

Fascinating Physics Lesson 15

Fascinating Biology Lesson 6, 7, 8

HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of **fission, fusion, and radioactive decay**.

Fascinating Chemistry Lesson 18

Fascinating Physics Lesson 15

PS-2 Motion and Stability: Forces and Interactions

HS-PS2-1 Analyze data to support the claim that **Newton's Second Law of Motion** describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

Fascinating Physics Lesson 3, 4, 5

HS-PS2-2 Use mathematical representation to support the claim that the **total momentum of a system of objects is conserved** when there is no net force on the system.

Fascinating Physics Lesson 4, 5

HS-PS2-3 Apply science and engineering ideas to design, evaluate, and refine a **device that minimizes the force** on a macroscopic object **during a collision**.

Fascinating Physics Lesson 4

HS-PS2-4 Use mathematical representation of **Newton's Law of Gravitation and Coulomb's Law** to describe and predict the gravitational and electrostatic forces between objects.

Fascinating Chemistry Lesson 11, 16

Fascinating Physics Lesson 3, 11, 12

HS-PS2-5 Plan and conduct an investigation to provide evidence that an **electrical current can produce a magnetic field** and that a **changing magnetic field can produce an electrical current**.

Fascinating Physics Lesson 11, 13, 14

HS-PS2-6 Communicate scientific and technical information about **why** the **molecular-level structure is important** in the functioning of designed materials.

Fascinating Chemistry Lesson 6, 9, 11, 14, 16, 17, 18

Fascinating Physics Lesson 11, 13, 14, 15

PS-3 Energy

HS-PS3-1 Create a computational model to calculate the **change in the energy** of one component in a system **when** the change in energy of the other component(s) and **energy flows in and out of the system** are known.

Fascinating Chemistry Lesson 11, 13, 16

Fascinating Physics Lesson 6, 9, 11, 12, 14

Fascinating Biology Lesson 6, 7, 8

HS-PS3-2 Develop and use models to illustrate that **energy** at the macroscopic scale can be accounted for as a combination of energy associated with the **motion of particles** (objects) **and** energy associated with the **relative positions of particles** (objects).

Fascinating Chemistry Lesson 7, 11

Fascinating Physics Lesson 4, 5, 6, 7, 11, 13, 14, 15

Fascinating Biology Lesson 4

HS-PS3-3 Design, build, and refine a device that works within given constraints **to convert one form of energy into another**.

Fascinating Chemistry Lesson 11, 13, 16, 18

Fascinating Physics Lesson 6, 9, 12, 13, 14

Fascinating Biology Lesson 6, 7, 8

HS-PS3-4 Plan and conduct an investigation to provide evidence that the **transfer of thermal energy** when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

Fascinating Chemistry Lesson 13

HS-PS3-5 Develop and use a model of **two objects interacting through electrical or magnetic fields** to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

Fascinating Chemistry Lesson 6, 9, 14, 15, 16, 17

Fascinating Physics Lesson 12, 13, 14

PS-4 Waves and Their Applications in Technologies for Information Transfer

HS-PS4-1 Use mathematical representation to support a claim regarding relationships among the **frequency, wavelength, and speed of waves** traveling in various media.

Fascinating Physics Lesson 7, 8, 9, 14

HS-PS4-2 Evaluate questions about the advantages of using **digital transmission and storage of information**.

HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that **electromagnetic radiation** can be described either by a **wave model** or a **particle model**, and that for some situations one model is more useful than the other.

Fascinating Physics Lesson 7, 8, 9, 10, 14, 15

HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of **electromagnetic radiation** have when **absorbed by matter**.

Fascinating Chemistry Lesson 6, 9, 14

HS-PS4-5 Communicate technical information about how some technological devices use the principles of **wave behavior and wave interactions** with matter to transmit and capture information and energy.

Fascinating Chemistry Lesson 6

Fascinating Physics Lesson 9, 13, 14