

New York State Science Learning Standards Meet the Planets

3rd Grade

Performance Expectations:

Forces and Interactions

- **3-PS2-1.** Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- **3-PS2-3.** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

Weather and Climate

- **3-ESS2-2.** Obtain and combine information to describe climates in different regions of the world.
- **3-ESS2-3.** Plan and conduct an investigation to determine connections between weather and water processes in Earth systems.

Disciplinary Core Ideas:

PS2.A: Forces and Motion

- Each force acts on one particular object and has both strength and direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion.
- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it.

PS2.B: Types of Interactions

- Objects in contact exert forces on each other.
- Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
- Earth's processes continuously cycle water, contributing to weather and climate.



Cross-cutting Concepts:

Patterns

- Patterns of change can be used to make predictions.

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Science is a Human Endeavor

- Science affects everyday life.

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods.

Systems and System Models

- A system can be described in terms of its components and their interactions.

4th Grade

Performance Expectations:

Energy

- **4-PS3-1.** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- **4-ESS3-1.** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Structure, Function, and Information Processing

- **4-PS4-2.** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

Earth's Systems: Processes that Shape Earth

- **4-ESS1-1.** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- **4-ESS2-1.** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Disciplinary Core Ideas:

PS3.A: Definitions of Energy

- Energy can be transferred by moving objects or by sound, light, heat, or electric currents.

PS3.B: Conservation of Energy and Energy Transfer

- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated, and sound is produced.
- Energy can also be transferred by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy.

ESS3.A: Natural Resources

- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.

PS4.B: Electromagnetic Radiation

- An object can be seen when light reflected from its surface enters the eyes.



ESS1.C: The History of Planet Earth

- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. [...]

ESS2.A: Earth Materials and Systems

- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.

Cross-cutting Concepts:

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

Energy and Matter

- Energy can be transferred in various ways and between objects.

Science is a Human Endeavor

- Most scientists and engineers work in teams.
- Science affects everyday life.

Systems and System Models

- A system can be described in terms of its components and their interactions.

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

5th Grade

Performance Expectations:

Structure and Properties of Matter

- **5-PS1-1.** Develop a model to describe that matter is made of particles too small to be seen.
- **5-PS1-3.** Make observations and measurements to identify materials based on their properties.

Earth's Systems

- **5-ESS2-1.** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Space Systems: Stars and the Solar System

- **5-PS2-1.** Support an argument that the gravitational force exerted by Earth on objects is directed down.
- **5-ESS1-1.** Support an argument that differences in the apparent brightness of the Sun compared to other stars is due to their relative distances from Earth.
- **5-ESS1-2.** Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

Disciplinary Core Ideas:

PS1.A: Structure and Properties of Matter

- Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.



- The total amount of matter is conserved when it changes form, even in transitions in which it seems to vanish.

PS1.B: Chemical Reactions

- When two or more different substances are mixed, a new substance with different properties may be formed.

ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

ESS1.A: The Universe and its Stars

- The Sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.

ESS1.B: Earth and the Solar System

- The orbits of Earth around the Sun and of the Moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the Sun, Moon, and stars at different times of the day, month, and year.

Cross-cutting Concepts:

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large.
- Standard units are used to measure and describe physical quantities such as weight, temperature, time, and volume.

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

Systems and System Models

- A system can be described in terms of its components and their interactions.

Energy and Matter

- Energy is transported into, out of, and within systems.
- Energy can be transferred in various ways and between objects.