

Grade Level Expectations for the Sunshine State Standards

Science Seventh Grade



F L O R I D A

Department
of Education

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**Sunshine State Standards
Grade Level Expectations
Science
Seventh Grade**

The seventh grade student:

The Nature of Matter

- uses a variety of measurements to describe the physical properties of matter (for example, volume and mass).
- understands that weight is the result of gravitational pull on an object.
- knows the difference between heat and temperature.
- knows that relative changes of position and motion of atoms in a solid, liquid, and gas are the result of an increase or decrease in temperature.
- knows the direction of energy flow when a change in the phase of matter occurs.
- knows that physical changes do not result in new substances.
- knows that chemical changes result in new substances with different characteristics.
- knows chemical and physical changes that occur in nature.
- determines the volumes of different substances that have equal masses.
- knows that charged particles and objects will attract or repel each other.
- knows the relationship between frequency and wavelength (the greater the frequency of the wave, the smaller the wavelength of the wave).
- understands that protons and neutrons are located in the nucleus of the atom while electrons exist in areas of probability outside of the nucleus.
- understands that the mass of an atom is concentrated in the nucleus where the protons and neutrons are located.
- determines the mass number and atomic number of an atom from the number of protons and neutrons.
- understands that most of the atom is empty space.
- knows uses of radiation, light, and thermal energy to improve the quality of life for human beings (for example, cooking food, treating disease).

Energy

- knows examples of uses of energy in the home and ways to measure its use.
- knows the difference between potential and kinetic energy.
- knows ways to change energy from potential to kinetic.

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- knows the characteristics, effects, and common uses of ultraviolet, visible and infrared light.
- knows that useful energy is lost as heat energy in every energy conversion.
- knows that as the amount of useful energy of a system decreases, the total disorder in the system increases.
- knows that fossil fuels are found in the Earth, they are nonrenewable, and the advantages and disadvantages of their use.

Force and Motion

- knows that the motion of an object can be described by its position, direction of motion, and speed.
- knows factors that influence the amount of damage vibrations can cause.
- knows intensity of some common waves.
- knows some causes and effects of waves.
- knows the properties of forces.
- knows that like poles of the magnet (two north poles or two south poles) will repel and opposite poles (north and south) will attract.
- knows that a simple electromagnet uses both electrical force and a magnetic force.
- knows the difference between parallel and series circuits.
- knows that objects in a vacuum accelerate at a constant rate.
- understands that as objects fall to Earth, speed increases until they reach terminal velocity.
- understands uses and combinations of simple machines in complicated machines.
- understands that gravity is a force exerted on a mass that causes an object to have weight.
- knows that gravity is a force that holds the Solar System together.

Processes that Shape the Earth

- knows the relationship between run-off and the development of a river system.
- understands the action of ground water to form aquifers, caverns, and sinkholes.
- knows the ways in which the Earth's surface is eroded and reshaped (for example, weathering, erosion, deposition).
- understands that fossils are used to predict and explain the similarities and differences of organisms that lived in the past and compare them with those living today.

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- understands that changes on the surface of the Earth affect living systems.
- knows the ways in which living things reshape the landscape (for example, bacteria, fungi, worms, rodents, and other organisms add organic matter to the soil, increasing soil fertility, encouraging plant growth, and strengthening resistance to erosion).
- uses a geologic timeline to illustrate the occurrence of processes on Earth.
- knows ways to conserve and recycle resources (for example, develops and uses a personal action plan to use recyclable materials whenever possible).
- knows roles of various public and private environmental agencies (for example, Florida Water Management Districts, Environmental Protection Agency).

Earth and Space

- knows the relative sizes of planets.
- understands the distances of the planets and the asteroid belt from the Sun are vast.
- understands the relationship between the phases of the Moon and the positions of the Moon, Earth, and Sun as the Moon revolves around the Earth.
- understands the revolution and rotation of the Moon relative to the Earth, and knows that the same side of the Moon always faces the Earth.
- understands that the tilt of the Earth on its axis as it rotates causes seasonal changes.
- knows characteristics of the inner planets and outer planets.
- knows basic features of the Moon and the moons of other planets.
- knows some of the constellations of stars in the sky.
- knows why stars appear to move across the sky.
- knows the life cycle of a star.
- knows the process used to determine the age of a star.

Processes of Life

- understands that the systems within living things respond to changes in the environment (for example, allergens and carcinogens).
- understands the concept of multicellular organisms.
- understands that there are many similarities among the great diversity of living things.

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- determines the behavioral responses of different organisms to common stimuli (for example, temperature, light, pressure, moisture).
- knows the differences between and advantages of sexual and asexual reproduction.
- knows common types of asexual reproduction.
- knows the life cycles of a variety of organisms, including non-flowering and flowering plants, insects, amphibians, reptiles, birds, and mammals.

How Living Things Interact with Their Environment

- knows the unique characteristics of a virus that cause them to be considered living at some times and nonliving at others.
- knows ways that viruses depend on other living things.
- knows that viruses may cause diseases in other living things.
- knows that biological adaptations include changes in structures, behaviors, or physiology that enhance reproductive success in a particular environment.
- knows how to design and use a dichotomous guide to identify organisms based on structural characteristics.
- understands how the carbon dioxide-oxygen cycle, water cycle, and nitrogen cycle are important for the survival of organisms.
- knows the interrelationships in a local ecosystem.
- understands ways matter is recycled (for example, water cycle, carbon cycle).
- knows that life on earth is dependent upon a continuous supply of energy from the sun.
- understands that individual food chains occur within a food web and that both show the flow of energy.
- understands the importance of informed use of natural resources.
- knows biotic and abiotic components in a small, local area and ways they interact (for example, field, pond).
- understands the consequences that might result when changes occur in populations.
- understands that changes in one part of the ecosystem will affect other parts of the ecosystem.
- knows possible causes for a species to become threatened, endangered, or extinct.

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- knows ways that human activities may deliberately or inadvertently alter the equilibrium in the ecosystem.

The Nature of Science

- understands that new scientific knowledge is often used to reevaluate existing theories.
- uses systematic, scientific processes to solve problems and reach conclusions.
- knows that science disciplines differ from one another in topic, techniques, and outcomes but that they share a common purpose, philosophy, and enterprise.
- extends and refines use of accurate records, openness, and replication of experiments to ensure credibility.
- extends and refines knowledge of how to identify the independent and dependent variables in an experiment.
- extends and refines use of appropriate experimental design, with consideration for rules, time, and materials required to solve a problem.
- uses rules, time, and materials in ways that ensure the identification and separation of variables in an experiment to solve a problem.
- extends and refines knowledge of selected scientists and their accomplishments and recognizes their varied backgrounds, talents, interests, and goals.
- uses criteria necessary to determine the validity of a scientific experiment.
- knows that natural events (for example, seasons, hurricanes) occur in patterns.
- knows that science ethics demand that scientists must not knowingly subject coworkers, students, the neighborhood, or the community to health or property risks.
- uses appropriate procedures for safety in the classroom, home, and community.
- knows the care, safe practices, and ethical treatment that are appropriate when using animals in field and laboratory research.
- knows that in research involving human subjects, the ethics of science require that potential subjects be fully informed about the risks and benefits associated with the research and of their right to refuse to participate.
- knows that the designs used for technological improvements should consider the values of society (economic, political, social, ethical, aesthetic).
- uses knowledge of political, social, and economic ramifications of certain scientific research to evaluate its role in society.

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- knows that scientific and technological contributions are made by individuals of different ethnic, economic, and cultural backgrounds.
- knows that scientific contributions may result in diverse technological products.
- extends and refines use of a computer to collect, analyze, and report scientific findings.



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